# 2008 - 2009 GEORGIA INSTITUTE OF TECHNOLOGY CATALOG

The statements set forth in this catalog are for informational purposes only and should not be construed as the basis of a contract between a student and this institution.

While the provisions of this catalog will ordinarily be applied as stated, Georgia Tech reserves the right to change any provision listed in this catalog, including but not limited to academic requirements for graduation, without actual notice to individual students. Every effort will be made to keep students advised of any such changes. Information on changes will be available in the offices of the registrar, the dean of students, and the major schools and colleges. It is especially important that each student note that it is his or her responsibility to be aware of current graduation requirements for a particular degree program.

This catalog becomes effective with summer term 2008.

## ABOUT THIS CATALOG

The statements set forth in this catalog are for informational purposes only and should not be construed as the basis of a contract between a student and this institution.

While the provisions of this catalog will ordinarily be applied as stated, Georgia Tech reserves the right to change any provision listed in this catalog, including but not limited to academic requirements for graduation, without actual notice to individual students. Every effort will be made to keep students advised of any such changes. Information on changes will be available in the offices of the registrar, the dean of students, and the major schools and colleges. It is especially important that each student note that it is his or her responsibility to be aware of current graduation requirements for a particular degree program.

This institution is in compliance with Title VI of the Civil Rights Act of 1964 and does not discriminate on the basis of race, creed, color, or national origin and is also in compliance with the provisions of Title IX of the Educational Amendments of 1972, which prohibit discrimination on the basis of sex.

It is the policy of the Institute that sexual harassment as defined in the EEOC Guidelines will not be tolerated among members of the Tech community. Any complaint of sexual harassment should be reported immediately to the appropriate person or persons designated by the vice president, dean, or director. Statistics on campus crime are available upon request from Georgia Tech's Police Department.

This catalog becomes effective with summer term 2008.

## ACADEMIC OFFERINGS

Undergraduate and graduate degrees are offered in the Colleges of Architecture, Engineering, Sciences, Computing, Management, and the Ivan Allen College of Liberal Arts as well as preparatory programs for law, dental, medical, and veterinary schools.

## ACCREDITATION

The Georgia Institute of Technology is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools to award bachelor's, master's, and doctoral degrees.

Inquiries to the Southern Association of Colleges and Schools (SACS) concerning alleged failures by the Georgia Institute of Technology to comply with or maintain accreditation should be forwarded to:

Southern Association of Colleges and Schools
1866 Southern Lane
Decatur, Georgia 30033-4097
Telephone number: 404.679.4500

In addition, many Institute programs are specifically accredited by appropriate professional certifying agencies.

The following undergraduate engineering programs are accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012 - Telephone number: (410) 347-7700:

- Bachelor of Science in Aerospace Engineering
- Bachelor of Science in Biomedical Engineering
- Bachelor of Science in Chemical and Biomolecular Engineering
- Bachelor of Science in Civil Engineering
- Bachelor of Science in Civil Engineering - Regional Engineering Program (offered through Georgia Tech-Savannah)
- Bachelor of Science in Computer Engineering
- Bachelor of Science in Computer Engineering - Regional Engineering Program (offered through Georgia Tech-Savannah)
- Bachelor of Science in Electrical Engineering
- Bachelor of Science in Industrial Engineering
- Bachelor of Science in Materials Science and Engineering
- Bachelor of Science in Mechanical Engineering
- Bachelor of Science in Nuclear and Radiological Engineering
- Bachelor of Science in Polymer and Fiber Engineering

The following undergraduate engineering programs are not currently accredited by the Engineering Accreditation Commission of ABET:

- Bachelor of Science in Electrical Engineering - Regional Engineering Program (offered through Georgia Tech-Savannah)
- Bachelor of Science in Environmental Engineering
- Bachelor of Science in Mechanical Engineering - Regional Engineering Program (offered through Georgia Tech-Savannah)

The American Chemical Society has certified the curriculum leading to the bachelor's degree in chemistry; the Human Factors and Ergonomics Society has accredited the curriculum leading to the Ph.D. in Engineering Psychology; the Commission on Accreditation of Allied Health Education Programs (CAAHEP) upon the recommendation of the National Commission on Orthotic and Prosthetic Education (NCOPE) has accredited the curriculum leading to the Master of Science in Prosthetics and Orthotics (MSPO).

The Bachelor of Science in Computer Science is accredited by the Computing Accreditation Commission (CAC) of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, Telephone: (410) 347-7700.

The College of Management and all of its degrees are fully accredited by the Association to Advance Collegiate Schools of Business.

The National Architectural Accrediting Board (NAAB) has certified the curriculum leading to the Master of Architecture; the American Council for Construction Education (ACCE) has accredited the curriculum leading to the Bachelor of Science in Building Construction; the Master of Science in Building Construction and Integrated Facility Management is recognized by the International Facility Management Association (IFMA), and the Design Build Institute of America (DBIA); the Planning Accreditation Board has accredited the curriculum leading to the Master of City and Regional Planning; the Bachelor of Science in Industrial Design has been accredited by the National Association of Schools in Art and Design (NASAD) and is recognized by the Industrial Designers Society of America (IDSA).

The Counseling Center is accredited by the International Association of Counseling Services.

## GEORGIA TECH ALUMNI ASSOCIATION

The Georgia Tech Alumni Association was chartered in June 1908 and incorporated in 1947 as a not-for-profit organization governed by a board of alumni volunteers known as the Board of Trustees.

The mission of the Georgia Tech Alumni Association is to serve alumni and promote the Institute. The Association will continually create relevant and meaningful programs for current and future alumni to foster lifelong participation and philanthropic support. The Association will communicate the achievements of the Institute, maintain its traditions, and strengthen relationships with the campus community. Underlying all the Association does is a belief in the value of education, a commitment to integrity and exceptional customer service, and a pledge to perform in a fiscally responsible manner.

The Association is organized around four major disciplines: the acquisition and management of information about Tech's alumni and friends, communication to these constituents, engagement of these supporters and fundraising.

It is currently organized into five departments: Administration/Technical Services, Communications, Marketing Services, Constituent Services and Fundraising/Business Development.

The offices of the Alumni Association are located in the L.W. "Chip" Robert Jr. Alumni House at 190 North Ave., Atlanta, Georgia 30313. Inquiries should be directed to 404.894.2391 or 1.800.GTALUMS (phone) or 404.894.5113 (fax). The Web address is www.gtalumni.org.

## GEORGIA TECH INTERCOLLEGIATE ATHLETICS

Intercollegiate athletics at Georgia Tech have enjoyed a long and storied history marked by tradition and success. The athletics program is administered as a non-profit corporation through a board of trustees chaired by the president of Georgia Tech. The board consists of seven faculty members, three students, and three alumni representatives. The Georgia Tech athletics program is committed to the development, preparation, support, and graduation of its student-athletes through its Total Person Program and Academic Services. The athletic department provides and maintains facilities, offering goods and services for participation of more than 350 student-athletes competing in 17 NCAA Division I sports. Georgia Tech is a member of the Atlantic Coast Conference. Intercollegiate sports at Georgia Tech include football, men's and women's basketball, women's volleyball, softball, baseball, men's golf, men's and women's tennis, men's and women's swimming and diving, and men's and women's cross-country, and men's and women's indoor and outdoor track. The athletic program at Georgia Tech is committed to excellence and competition at the highest national level. Georgia Tech athletics serves as a compliment to the overall mission of the Institute.

## DISTANCE LEARNING

Georgia Institute of Technology’s distance-delivered graduate engineering programs provide you with an advanced graduate education with the proper mix of theory, case studies, and their applications.

Georgia Tech offers eight master’s degrees via distance delivery:

- Aerospace Engineering
- Electrical and Computer Engineering
- Environmental Engineering
- Industrial Engineering
- Mechanical Engineering
- Medical Physics and
- Operations Research

You may apply at any time for admission for the fall, spring, and summer semesters. Students must meet the same academic standards as other campus graduate students. Upon acceptance to the program, working engineers typically enroll in one or two courses per term. Many companies provide tuition reimbursement for these classes.

### How You Will Benefit

- Meet the same academic standards as on campus
- Directly apply class lessons at work
- Advance yourself with a Georgia Tech degree
- Utilize Distance Learning student-support staff
- Access a dedicated Distance Learning librarian
- Study at a top-ranked university with all its graduate engineering programs consistently in the top 10 of *U.S. News & World Report’s* annual rankings

### How Distance Learning Works

Distance Learning courses are offered via the Internet. Lectures and student-faculty interaction are digitally recorded during regular graduate courses each year and then posted for students to view or download on demand.

Distance Learning students are assigned a unique Web account to access and post class assignments, as well as download graded assignments. Students also interact with classmates and faculty members through telephone, e-mail, fax server, electronic bulletin boards, and threaded-discussions with Georgia Tech’s course management systems providing full access to campus resources.

Georgia Tech offers more than 90 courses each semester, except during the summer when there are a smaller number of courses available. Visit www.dl.gatech.edu/dl/servlet/DLHome for class offerings.

For more information, visit http://www.dl.gatech.edu/, call 404-894-3378, or write to:
Distance Learning and Professional Education
Georgia Institute of Technology
84 Fifth St. N.W.
Atlanta, GA 30308-1031

## LANGUAGE INSTITUTE

Since 1958, Georgia Tech's Language Institute has helped thousands of students and professionals from around the world, Atlanta, and Georgia Tech improve their English proficiency through full-time and part-time instruction in English as a second language through

- The **Intensive English Program,** which offers core courses in writing, grammar, reading, and speaking/listening at seven levels of proficiency and electives in TOEFL preparation, GRE/GMAT writing preparation, SAT/GRE vocabulary building, accent reduction, movie making, and drama
- Evening ESL classes in grammar/writing, practical writing, conversation, public speaking, and TOEFL preparation
- Summer courses in conversation, writing, speaking, and GTA training
- Courses for corporate clients
- Online courses

More than 1,000 students attend programs offered by the Language Institute each year, including academic support for international students in degree programs at Georgia Tech, preparing international students for academic work at an American university, and helping professionals improve their English to further their careers.

A member of UCEIP and AAIEP, Georgia Institute of Technology's Language Institute is committed to the standards of excellence in English as a second language teaching. The Language Institute is located on the campus of one of the top 10 public universities in the United States.

For information, visit www.esl.gatech.edu, call 404.894.2425, or write to:

Language Institute
Georgia Institute of Technology
151 6th Street N.W.
Atlanta, Georgia 30332-0374

## PROFESSIONAL EDUCATION

Distance Learning and Professional Education coordinates the delivery of noncredit short courses and professional development programs to the public and to corporate clients. Programs are held on campus and at other selected locations. Some courses are available online, in DVD/CD-ROM format, and through videoconferencing.

Short courses, varying in length from one to five days, are offered throughout the year to help professionals keep pace with the latest developments and innovations in their fields. Courses are offered in

- defense technology
- engineering
- architecture
- science
- management
- economic development,
- logistics
- research and
- information technology

DLPE offers 26 certificate programs comprised of sequences of short courses in these subject areas.

For information, visit www.dlpe.gatech.edu, call 404.385.3500, fax to 404.894.7398, or write to:

Distance Learning and Professional Education
Georgia Institute of Technology
Global Learning Center
84 Fifth Street N.W.
Atlanta, Georgia 30308-1031

## GEORGIA TECH FOUNDATION INC.

The Georgia Tech Foundation Inc. is a not-for-profit, tax-exempt corporation that receives, administers, and invests virtually all private contributions made in support of the academic programs of the Georgia Institute of Technology. The Foundation maintains its support of the Institute through the regular and emeritus members of its board of trustees, who are distinguished by their expertise in financial management and investments and by their devotion to Georgia Tech.

Endowment funds maintained by the Foundation furnish student scholarships and fellowships, faculty assistance, and general support to the academic divisions of the Institute. In addition, gifts and income from undesignated endowments provide unrestricted funds that help meet the most pressing needs of the Institute.

# FAMILY EDUCATIONAL RIGHTS AND PRIVACY ACT (FERPA)

## NOTIFICATION OF STUDENT RIGHTS UNDER FERPA AND DIRECTORY INFORMATION

The Family Educational Rights and Privacy Act (FERPA) affords students certain rights with respect to their education records. They are:

- The right to inspect and review the student's education records within forty-five days of the day that the Institute receives the request for access.

  Students should submit to the registrar written requests that identify the record(s) they wish to inspect. The registrar will make arrangements for access and notify the student of the time and place where the records may be inspected.

- The right to request the amendment of the student's education records that the student believes are inaccurate or misleading.

  Students may ask the Institute to amend a record that they believe is inaccurate or misleading. They should write the registrar, clearly identifying the part of the record they want changed, and specify why it is inaccurate or misleading.

  If the Institute decides not to amend the record as requested by the student, the Institute will notify the student of the decision and advise the student of his or her right to a hearing regarding the request for amendment. Additional information regarding the hearing procedures will be provided to the student when notified of the right to a hearing.

- The right to consent to disclosures of personally identifiable information contained in the student's education records, except to the extent that FERPA authorizes disclosure without consent.

  One exception which permits disclosure without consent is disclosure to school officials with legitimate educational interests. A school official is a person employed by the Institute in an administrative, supervisory, academic or research, or support staff position (including law enforcement unit personnel and health staff); a person or company with whom the Institute has contracted (such as an attorney, auditor, or collection agent); a person serving on the Board of Trustees; or a student serving on an official committee, such as a disciplinary or grievance committee, or assisting another school official in performing his or her tasks.

  A school official has a legitimate educational interest if the official needs to review an education record in order to fulfill his or her professional responsibility.

- The right to file a complaint with the United States Department of Education concerning alleged failures by the Georgia Institute of Technology to comply with the requirements of FERPA. The name and address of the Office that administers FERPA is:

  Family Policy Compliance Office
  U.S. Department of Education
  400 Maryland Avenue, SW
  Washington, DC 20202-4605

## ANNUAL NOTICE OF DIRECTORY INFORMATION CONTENTS

"Directory Information" is information not generally considered harmful or an invasion of privacy if disclosed. Effective November 1, 2007 the Georgia Institute of Technology considers the following information to be directory information:

- Name, address (including GT email address), and telephone listing
- Level (graduate or undergraduate)
- Field of study
- Enrollment status (full-time, part-time, less than part-time)
- Dates of attendance
- Degrees with associated honors and designations, and date(s) awarded

Directory information cannot include student identification numbers or social security numbers.

Students who wish to prohibit the release of Directory Information can view information on the registrar's confidentiality Web page.

## HUMAN RELATIONS STATEMENT

Georgia Tech is a diverse community, composed of individuals and groups with a variety of religious, racial, national, cultural, sexual, and educational identities. The continuing need to deal constructively with this diversity is one of the great challenges facing us over the next two decades. The challenge is both professional and personal. Professionally, we increase the opportunities in our lives if we are able to constructively manage and guide such diversity with tolerance. The challenge is also personal because each of us has a legacy of religious, racial, national, cultural, sexual, and educational prejudices that influences our lives.

Each member of our community must be committed to the creation of a harmonious climate because one cannot be neutral to this challenge. Those who are committed to it strengthen Georgia Tech and themselves. Individuals who choose not to commit to the challenge, via acts of intolerance, jeopardize their continued affiliation with the Institute. Those acts may be defined as attempts to injure, harm, malign, or harass a person because of race, religious belief, color, sexual orientation, national origin, disability, age, or gender.

To belong to a global society, Georgia Tech must be a pluralistic institution. Only by embracing diversity, multiformity, and variety can we gain stature, strength, and influence in that global society.

The Institute is committed to maintaining academic and working environments free of objectionable conduct and communication that would be construed as sexual harassment. The determination of what constitutes sexual harassment will vary with particular circumstances, but it can be described as unwanted sexual behavior, such as physical contact or verbal comments that adversely affect the environment of an individual.

# THE GEORGIA TECH VISION/MISSION STATEMENTS

## THE VISION

Our vision is bold: "Georgia Tech will define the technological research university of the 21st century and educate the leaders of a technologically driven world."

## THE MISSION

Our mission is clear: "to provide the state of Georgia with the scientific and technological base, innovation, and workforce it needs to shape a prosperous and sustainable future and quality of life for its citizens." It is achieved through educational excellence, innovative research, and outreach in selected areas of endeavor.

Georgia Tech's mission in education and research will provide a setting for students to engage in multiple intellectual pursuits in an interdisciplinary fashion. Because of our distinction for providing a broad but rigorous education in the multiple aspects of technology, Georgia Tech seeks students with extraordinary motivation and ability and prepares them for lifelong learning, leadership, and service. As an institution with an exceptional faculty, an outstanding student body, a rigorous curriculum, and facilities that enable achievement, we are an intellectual community for all those seeking to become leaders in society.

Georgia Tech values its position as a leading public research university in the United States and understands full well its responsibility to advance society toward a proper, fair, and sustainable future. By seeking to develop beneficial partnerships within public and private sectors in education, research, and technology, Georgia Tech ensures relevance in all that it does and assures that the benefits of its discoveries are widely disseminated and used in society.

Georgia Tech pursues its mission by giving the highest respect to the personal and intellectual rights of everyone in our diverse community. In return, we expect that all members of our community will conduct themselves with the highest ethical principles.

## LIBRARY AND INFORMATION CENTER

The Georgia Tech Library and Information Center houses one of the nation's largest collections of scientific and technical literature. Resources include more than 4 million volumes, more than 1.4 million government documents, more than 3,000 videotapes, a complete collection of U.S. patents, and approximately 2.75 million technical reports. The Library receives more than 20,000 current periodicals.

The Library, in cooperation with the Office of Information Technology, provides an Information Commons equipped with 100 high-end computer workstations. Georgia Tech faculty, students, and staff have access to more than 250 online databases containing citations, abstracts, newspapers, indexes to journals and conference proceedings, and the full text of 13,000 electronic periodicals. These databases, as well as the Library's catalog, are accessed through the Georgia Tech Electronic Library (GTEL) ® and Galileo, a statewide database service. Gateways to a variety of information resources available on the Internet are provided through GTEL ®. Students, faculty, and staff may use libraries at Emory University, Georgia State University, the University of Georgia, and other local schools via a Georgia Tech ID card.

The Library's digital repository, rapidly gathering and serving access to the intellectual output of the campus currently contains over 6,500 digital items from over 40 components of the campus.

Copiers are available on the main floor of the Library. Students may use facilities for group or individual study. The Library's information consultants provide training classes for all students in the use of GTEL ®, Galileo, and the Internet. Consultants also are available for advice about individual information needs.

## INFORMATION TECHNOLOGY AND COMPUTING FACILITIES

The Office of Information Technology (OIT) provides technology leadership and support to Georgia Tech students, faculty, staff, and researchers. OIT serves as the primary source of information technology, cable television networking, and telecommunications services for the Institute. Key information technology services include operating the campus computer network, providing access to national research networks, providing technical support for centralized computer accounts and computing systems, and protecting the integrity of Institute data and administrative computing systems.

OIT has built the campus network architecture to provide very high performance general-purpose connectivity and peering, including Internet2, with services provided over a multigigabit backbone. OIT is responsible for the Southern Crossroads network aggregation point that connects universities and colleges in the southeast. Georgia Tech also hosts Southern Light Rail, which serves as the anchor in the southeast for National LambdaRail, a high-speed, optical fiber networking infrastructure designed for advanced research and experimentation.

Centrally managed computer user accounts permit on-campus access to the campus network and Internet, the wireless network, computing labs, and core computing services and resources. Remote access to computing resources is supported for the satellite campuses. Examples of core computing services include e-mail, online software distribution, online library resources, Web course development software, campus Web hosting, the campus Web portal, and associated software for collaboration and communication.

Students living on campus can access the Internet and the campus network from student residences, which are equipped with Internet connection ports and cabling. Students also have access to general-purpose computing labs on campus. The computing lab in the library has more than one hundred computer workstations, including systems equipped for multimedia projects, and a presentation rehearsal studio. The newest facility, the Library East Commons, is equipped with 34 workstations designed for group or individual projects, as well as a performance area for small audiences. Another new facility, the Resource Center, is located on the lower level of the Library building and houses walk-in computing support, tutoring, and undergraduate advising.

In addition, academic and research units may operate their own computing labs. The Institute's computational science venue initiative operates a high-performance computing cluster and network emulation facility to support classes and start-up research projects. In conjunction, OIT's Public Access Clustering Environment (PACE) service fosters the acquisition and development of high-performance, parallel, and distributed (grid) computing systems by campus units.

Georgia Tech operates a wireless network for use with laptop computers and other mobile computing devices. The wireless network has wireless access points in and around most campus buildings and walk-up ports in several buildings. Outdoor wireless coverage includes green spaces, pedestrian corridors, and a one-mile corridor along the Tech Trolley route. The wireless network supports guest access through the incorporation of a commercial service.

Technology enhances academic and research activities in more than 300 classrooms, lecture halls, and specialty rooms. These rooms are equipped with desktop computers, video projectors, VCRs, DVD players, document cameras, audio systems, and electric screens. Videoconferencing and streaming media systems are available for teaching and collaboration on the main campus, at satellite campuses, and in distance learning programs.

Georgia Tech administers its own information systems, data repositories, and administrative software systems. The Institute manages information security with campus community education, policy development, technical measures to protect campus resources, and procedures for reacting to events that endanger the Institute's information assets. IT policy development and strategic planning enable Georgia Tech to keep pace with demands for the use and delivery of sustainable services. For more information, visit www.oit.gatech.edu.

## COMMUNITY SERVICES

Georgia Tech applies its resources through community services to the needs of the community and provides an outlet for creative individual responses to social problems. The Office of Community Service promotes civic responsibility and service-learning by encouraging student involvement in meaningful and reciprocal service with the community, both locally and globally.

## FRATERNITIES AND SORORITIES

Georgia Tech's forty-eight social fraternities and sororities are coordinated by the Office of the Dean of Students in the Division of Student Affairs. The groups offer a variety of activities, opportunities, and services to the Georgia Tech community.

## STUDENT PUBLICATIONS AND MEDIA

The Student Publications Board and Radio Communications Board oversee the budgeting and operation of the *Technique*, the official student newspaper; the *Blueprint*, the student yearbook; and other student publications, in addition to the operation of the student radio station, WREK 91.1 FM.

Other student publications include the *North Avenue Review*, an open forum magazine; *Erato*, the student literary magazine; and *T-Book*, an online survival guide of Georgia Tech traditions for new students.

## CAMPUS RECREATION CENTER

The newly renovated and expanded Campus Recreation Center (CRC) opened in fall 2004. One of the nation's premier recreation centers, the facility includes a 15,000 square-foot, state-of-the-art fitness center, thirty-nine-foot climbing wall, indoor track, six basketball courts, five racquetball and squash courts, four studios for aerobics and martial arts, an indoor hockey rink, game room, and outdoor fields for soccer, flag football, lacrosse, and more.

The Aquatic Center, originally built for the 1996 Olympic aquatic events, consists of a fifty-meter competition pool, seventeen-foot-deep diving well, and seating for more than 1,900 spectators. Across the hall, the Helen D. and Vernon D. Crawford pool boasts a 184-foot water slide, current channel, hot tub, six twenty-five-yard lanes, and an outdoor patio.

The CRC also houses Tech's intramural program, which involves nearly half of the Georgia Tech student body in sports ranging from flag football and kickball to volleyball and bowling. Sport clubs offer a more competitive edge, with more than thirty teams competing on the intercollegiate level. Georgia Institute of Technology Fitness (G.I.T. FIT) programs provide more than eighty non-credit classes to CRC members with nominal fees. With group fitness classes, martial arts, personal training, certification and training courses, and instructional classes in swimming, diving, golf, and more, the G.I.T. FIT programs focus on fitness and health education.

Outdoor Recreation Georgia Tech (ORGT), found in the rear of the CRC, exposes the urban campus of Georgia Tech to the outdoor opportunities that Georgia has to offer. Trips are organized throughout the semester in whitewater rafting, kayaking, rock climbing, backpacking, and more. ORGT runs the indoor climbing wall found next to the fitness center and the Wilderness Outpost, which rents equipment for camping, canoeing, and kayaking at reasonable prices.

For more information, please call 404.385.PLAY or visit www.crc.gatech.edu.

## DRAMATECH

DramaTech, Atlanta's oldest theater company, produces at least four plays a year, as well as improvisation and musical theater performances. DramaTech uncovers and nourishes the creative talents of Georgia Tech's future engineers, managers, architects, scientists, and leaders talents that might otherwise go undeveloped in the world of calculators, computers, designs, and formulas. DramaTech is both a student organization and a unit of the Ivan Allen College. Although Georgia Tech has no theater department, the director is part of the faculty of the School of Literature, Communication, and Culture. Participation in the theater is open to all students, faculty, staff, and Tech alumni. Students may earn credit for participation in DramaTech through the School of Literature, Communication, and Culture. For more information, call DramaTech at 404.894.3481, or go to www.dramatech.org.

## FERST CENTER FOR THE ARTS

The Ferst Center for the Arts serves as a showcase for the presentation of concerts, recitals, lectures, dance, and theater.

The Center provides a once-in-a-lifetime opportunity for the students of Georgia Tech to experience the finest entertainers in the world at truly affordable prices. Each year, the Ferst Center hosts memorable performances such as violinist Itzhak Perlman, contemporary dance group Pilobolus, the Capitol Steps, East Village Opera Company and the Pat Metheny Trio. The Center not only houses the theater, but also the Richards and Westbrook galleries, located in the foyer of the Center. The galleries feature displays from local artists and traveling exhibits of fine arts. The James E. Dull Theatre, which is home to DramaTech, is also located within the Center.

The Ferst Center is committed to exploring the links between the arts and technology and serves as a prominent example of Georgia Tech's dedication to excellence and outstanding performance.

## STUDENT CENTER

The Fred B. Wenn Student Center and Penny and Roe Stamps Student Center Commons are located in the heart of the Georgia Tech campus and provide many vital services to Tech students. Governed and operated by students, the Student Center Program Council consists of student-run planning committees that organize and coordinate campus-wide activities and events. The Student Center houses an information desk, the post office, bowling and billiards facilities, video games, a crafts center, a music listening room, a ballroom, a movie theater, several meeting rooms, a computer lab, lounge and study areas, and a wide variety of dining options. Vans and audio/visual equipment are available for use by student organizations through the Student Center Administrative Office. Also located in the Student Center is the Center for the Arts Box Office, Student Government Association offices, the Student Organizations Resource Center, WREK radio station, a travel agency, a full-service optical center, a hair salon, the campus BuzzCard Center, and ATMs from Wachovia, Suntrust, Bank of America, RBC Centura, and State Employees Credit Union.

The hours of operation for many of the Student Center services vary; however, the Student Center building is open twenty-four hours a day, seven days a week, providing students with a place to meet and study.

## STUDENT GOVERNMENT

The Georgia Tech Undergraduate and Graduate Student Government Associations (SGA) enable students to maintain responsible and respected self-government and official institutional involvement in academic and nonacademic affairs. Additionally, Student Government offers free legal advice for all students. For more information, contact the SGA offices in the Student Center Commons at 404.894.2814.

## STUDENT HANDBOOK

Numerous extracurricular activities are available for students. For complete information concerning these services, see the *Student Handbook*, available to all students from the Division of Student Affairs.

## STUDENT ORGANIZATIONS

Georgia Tech has more than 350 chartered student organizations that offer a variety of activities for student involvement. These organizations are classified in the following categories: honor societies, governing boards, professional/departmental, service, educational, political, cultural/diversity, sport clubs, religious/spiritual, student media, performance, recreation, and fraternities and sororities.

The Student Involvement Center (located on the second floor of the Student Center Commons) works to promote extracurricular involvement and create an environment where student organizations and their leaders and advisors, have the resources to be successful, self-sustaining organizations that provide other students with opportunities for leadership, self-exploration and development of new skills.

Students who get involved are more likely to be happier with their college experience, graduate, and have higher grades than those who do not get involved.

## CAREER SERVICES

Career Services offers a variety of services to help students explore, select, and pursue a meaningful career from helping them choose a major to finding internship and full-time positions. The office provides career counseling and testing; career planning; seminars on job search related topics; mock interviews; resume critiques; internship, part-time, and full-time job listings; salary surveys; recruiting company information; resume referral services; and graduate school information. The Career Library contains information on various career fields, career planning, graduate school, and job search related topics.

Career Services sponsors Career Focus in September, the Georgia Tech Majors Fair in November, and other events throughout the year. All seminars and events are listed on Career Services' Web site at www.career.gatech.edu. Campus recruiting for internship and full-time positions takes place during the fall and spring semesters. Approximately 800 employers, representing a substantial number of Fortune 500 corporations, recruit on campus annually.

Visit Career Services in the Bill Moore Student Success Center or online at www.career.gatech.edu.

## COUNSELING CENTER

The Counseling Center is a unit of the Division of Student Affairs. The Center is dedicated to enhancing the academic experience and success of all students by providing a variety of counseling and psychological services to individuals and the campus community. We provide short-term counseling services to address a wide range of personal and career concerns. Our services are available at no charge to currently enrolled students. The Counseling Center is accredited by the International Association of Counseling Services (IACS).

The Center has a staff of licensed psychologists and counselors who provide individual, couples, and group counseling for eligible students to address a wide variety of personal, academic, and career concerns. In addition, the Center provides outreach and consultation programming and services to the Georgia Tech community. The Center also has a number of trainees (pre-doctoral interns, graduate practicum students), who also provide supervised counseling services through the Center. The pre-doctoral internship program is a member of the Association of Psychology Postdoctoral and Internship Centers (APPIC).

The Center's resource library provides a program of computer-assisted study skills instruction (CASSI-GT) and information about careers through reference books; videos; a computer-assisted decision-making program (Kuder Career Planning System); catalogs from other colleges, businesses, and graduate schools; and a number of inventories and tests for determining occupational interests and abilities. The library also has a collection of self-help materials for student use.

More information is available at www.counseling.gatech.edu.

## OFFICE OF THE DEAN OF STUDENTS

The Office of the Dean of Students, a unit of the Division of Student Affairs, strives to create an environment in which student leadership occurs, tradition and diversity are respected, and learning is enhanced. The Dean's Office recognizes the importance of each individual student, nurtures personal growth, and supports academic pursuits through advocacy, services, and programs. Students of nontraditional age (undergraduates over age twenty-five, graduate students over age thirty, and financially independent students whose lifestyles vary significantly from those of younger students) who would like information regarding campus resources, such as housing and other specific services, may call the Dean's Office for assistance.

Information on other areas within the Office of the Dean of Students can be found in various sections of this catalog. The office is located in 210 Student Services Building. Students may drop in or call 404.894.6367 to schedule an appointment.

## DIVERSITY PROGRAMS

The Office of Diversity Programs is responsible for fostering a vision of diversity appreciation reflective of the Institute's strategic plan, which enables students from all backgrounds and cultures to thrive and succeed at Tech. The Office provides an institutionalized approach for meeting the cocurricular needs of students by coordinating and planning educational opportunities that enhance interaction and learning across groups. Through intentional programming and training, the Office assists the campus in understanding, appreciating, and celebrating Tech's rich cultural diversity. For additional information, call 404.894.2561 or visit www.diversity.gatech.edu.

## WOMEN'S RESOURCE CENTER

The Women's Resource Center enhances the performance and personal development of women at Georgia Tech by striving to create a more inclusive and supportive campus environment for women, and by promoting understanding among Georgia Tech's diverse community of women and men. Services and programs provide opportunities to involve female students in all phases of campus life. For additional information, call 404.385.0230 or visit www.womenscenter.gatech.edu.

## ASSISTANCE FOR PEOPLE WITH DISABILITIES

The Access Disabled Assistance Program for Tech Students (ADAPTS) provides accessible programs, services, activities, and reasonable accommodations for students with a disability as defined by section 504 of the Rehabilitation Act of 1973, as amended, and by the Americans with Disabilities Act of 1990. Services are available to ensure that individuals with disabilities have an equal opportunity to pursue education, employment, or other campus programs, activities, or services.

The ADAPTS program offers self-identified students with permanent or temporary disabilities assistance with registration, accessibility, transportation, parking, housing, counseling, note taking, recorded textbooks, advocacy, test proctoring, referral services, and other needs. ADAPTS promotes disability awareness programs for departmental faculty and staff, as well as the Georgia Tech community.

Students and prospective students who wish to learn more about accommodations for students with disabilities should contact ADAPTS, Student Services Building, Georgia Institute of Technology, Atlanta, Georgia 30332-0285, or call 404.894.2563 (voice) or 404.894.1664 (TDD), or visit www.adapts.gatech.edu. Faculty, staff, and visitors should contact Disability Services in the Office of Human Resources at 404.894.3344 (voice) or 404.894.9411 (TDD).

## ACADEMIC ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES

Reasonable accommodations are provided to self-identified students with disabilities who meet the academic and technical standards requisite to admission or participation in the program of study.

Consideration may be given to the substitution or modification of certain course requirements within the limitations imposed by the accreditation criteria for the degree program in which the student is enrolled, and to the extent that such substitutions or modifications of the course or curriculum do not have a net effect of detracting from the quality of the educational experience implied by the course or curriculum designation. Such substitutions or modifications must be approved by the school chair, department head, or college dean, and the Undergraduate Curriculum Committee and/or the Graduate Committee.

# STUDENT HEALTH CENTER

## THE PRIMARY CARE CENTER'S HOURS

(Appointments recommended)
Monday-Friday 8:00 a.m.-6:00 p.m. Full Staff-Fall and Spring Semesters
Sunday 2:00 p.m.-5:00 p.m. Clinic with limited staff for urgent care

## HEALTH PROMOTION HOURS

Monday-Friday 9:00 a.m.-5:00 p.m.

## HEALTH SERVICES CONTACT INFORMATION

Phone: 404.894.1420 for appointments
Web site: www.health.gatech.edu

## GENERAL INFORMATION

Health Services is an ambulatory healthcare clinic that provides medical care and health education for eligible students and spouses. Health Services' staff consists of general practice, family practice, and internal medicine physicians, as well as nurse practitioners, registered nurses, medical and radiological technologists, pharmacists, and health educators. Specialists in gynecology, psychiatry, and radiology, as well as a registered dietician, are available for consultation for a nominal fee. The Women's Clinic provides care for gynecological problems and preventive care, such as Pap smears. Contraceptive counseling and information on sexually transmitted diseases are also available. Health Promotion's services are available to all Tech students and include wellness seminars and events, an information resources center, and personal consultations.

## MEDICAL ENTRANCE FORM

All students, graduate and undergraduate, must complete the Medical Entrance, Tuberculosis Screening and Certificate of Immunization forms, and mail them to Health Services before registration.

Completed forms must be mailed to:

Stamps Health Services
Georgia Institute of Technology
740 Ferst Drive
Atlanta, Georgia 30332-0470
Attention: Medical Records Dept.

Forms may also be hand delivered to Stamps Health Services. It is recommended that students keep a copy of the forms for their records.

## STUDENT HEALTH CENTER

### TUBERCULOSIS (TB) SCREENING

All matriculating students must provide documentation of TB screening prior to registration. Failure to do so will prevent registration. For information on required documentation, go to www.admiss.gatech.edu/images/pdf/Bhealth_forms.pdf.

## IMMUNIZATIONS

All incoming students must comply with the immunization requirements as listed on the Certificate of Immunization. This may be found on Health Services' Web page at www.health.gatech.edu, along with the Medical Entrance form and Tuberculosis Screening form. All forms must be completed and signed by a healthcare provider.

# STUDENT HEALTH CENTER

## ELIGIBILITY FOR TREATMENT

Students enrolled in classes, co-op students, spouses of students enrolled in classes or the co-op program (if both the student and spouse have paid their health fees), cross enrolled students who have paid their health fee for the semester, and students who are sitting out a single semester and have a current student I.D. are eligible for treatment, provided the health fee has been paid.

## STUDENT HEALTH CENTER

### TERMS OF ELIGIBILITY

Once the health fee has been paid, students/spouses are eligible for services from the date paid through the end of break week for each semester; new students are eligible for services during the break week that precedes the semester they are entering if they can present proof that the fee was paid. Students who have graduated are no longer eligible for care.

## COST

A student health fee is automatically assessed to students taking four semester hours or more. Other eligible students, spouses and domestic partners may pay the health fee at the Health Center or present the Health Center with proof that the health fee has been paid. A late penalty will be assessed if the health fee is paid after the second week of each semester.

## SPECIAL HEALTH CONSIDERATIONS

It is the responsibility of all students to notify the Health Center, the School of Applied Physiology, and the Office of Disabled Student Services of any disability that would make participation in swimming, competitive sports, and aerobic training hazardous to their well-being. Any student requesting special consideration because of mental or physical disability should have his or her physician write an explanatory letter, giving full details of the disability and consequent limitations on physical activity, to the medical director of Health Services. This letter must accompany the Medical Entrance form.

## HEALTH AND ACCIDENT INSURANCE

Supplemental insurance to cover major illnesses and surgeries, specialist consultations, and diagnostic procedures not available at Health Services should be purchased by all students who are not included in their parents' or spouse's medical insurance plans. Generally, private hospitals will not admit patients who do not have hospitalization insurance.

Health insurance is mandatory for some students. Please see the information at Health Services' Web page at www.health.gatech.edu regarding mandatory student health insurance and hard waiver.

## DEPARTMENT OF HOUSING

The Department of Housing operates a total of 7,724 beds located in campus residential-style traditional rooms, suites, and apartments. Amenities include local telephone service, cable TV, high-speed Internet connectivity, learning centers, tutoring, laundry facilities, and fitness areas. In January 2005, the Department of Housing opened 394 new family apartments in the Tenth & Home family housing facility, which includes a mix of one- and two-bedroom luxury apartments designed to ensure a family's comfort, convenience, and success.

The residence hall community at Georgia Tech is an integral part of a student's total Tech experience. The Residence Life program within the Department of Housing is responsible for all residence hall matters, including student well-being, staffing, programs, policy formulation, and residence hall government advising. In addition, the Department of Housing team includes Community Offices, ResNet computer networking, and the GTCN cable television network. The Department of Housing is committed to providing a comfortable environment that promotes the growth and development of residents and supports the educational mission of the Institute. For more information, refer to the *Residential Living on the Georgia Tech Campus* brochure available at the Housing Office, or visit www.housing.gatech.edu.

## OFFICE OF INTERNATIONAL EDUCATION

The Office of International Education provides comprehensive support for international education in three broad areas: support to international students and scholars, development of study abroad programs and advice to students about study abroad opportunities, and support to faculty, staff, and students to facilitate the internationalization of Georgia Tech. The office supports the internationalization of the curriculum, advocates for programs of study that prepare students to be globally competent, provides opportunities for faculty to acquire international education experiences, and serves the large population of international students at Georgia Tech.

The Office of International Education currently provides services to more than 2,700 international students from more than 75 countries. These students receive assistance in complying with U.S. immigration law, with cross-cultural adjustment, and in negotiating the academic and social environment of Georgia Tech. International student advisors work closely with student organizations and individual students to help them to realize their personal and academic goals.

Students enrolled at Georgia Tech who wish to study abroad may choose from a wide range of summer programs, as well as semester-length study abroad programs. Such opportunities exist on every continent and in dozens of countries. Students engage in academic programs that allow them to earn credit that can be applied toward their majors. Financial aid and scholarships can be used on approved study abroad programs. More than 900 students elect to participate in study abroad programs each year.

As a leading research institution, Georgia Tech attracts scholars from all over the world. More than 250 visiting scholars are currently involved in cutting-edge research with Georgia Tech faculty. A few of them also teach courses. These collaborative research activities and the contributions made by these visiting scholars help Georgia Tech maintain its national and international prominence as a technological institution.

The Office of International Education provides faculty with information about a variety of international opportunities, including overseas research/teaching fellowships, short-term overseas faculty study seminars, and funding opportunities for international research and for international revisions of the curriculum. The Fulbright Scholar program is housed at the Office of International Education. Faculty are encouraged to take advantage of the hundreds of teaching and research opportunities available worldwide through this distinguished program. Faculty also receive assistance in developing new overseas summer programs, and in designing other initiatives to support the internationalization of academic programs.

## LIBRARY AND INFORMATION CENTER

The Georgia Tech Library and Information Center houses one of the nation's largest collections of scientific and technical literature. Resources include more than 4 million volumes, more than 1.4 million government documents, more than 3,000 videotapes, a complete collection of U.S. patents, and approximately 2.75 million technical reports. The Library receives more than 20,000 current periodicals.

The Library, in cooperation with the Office of Information Technology, provides an Information Commons equipped with 100 high-end computer workstations. Georgia Tech faculty, students, and staff have access to more than 250 online databases containing citations, abstracts, newspapers, indexes to journals and conference proceedings, and the full text of 13,000 electronic periodicals. These databases, as well as the Library's catalog, are accessed through the Georgia Tech Electronic Library (GTEL) ® and Galileo, a statewide database service. Gateways to a variety of information resources available on the Internet are provided through GTEL ®. Students, faculty, and staff may use libraries at Emory University, Georgia State University, the University of Georgia, and other local schools via a Georgia Tech ID card.

The Library's digital repository, rapidly gathering and serving access to the intellectual output of the campus currently contains over 6,500 digital items from over 40 components of the campus.

Copiers are available on the main floor of the Library. Students may use facilities for group or individual study. The Library's information consultants provide training classes for all students in the use of GTEL ®, Galileo, and the Internet. Consultants also are available for advice about individual information needs.

## INFORMATION TECHNOLOGY AND COMPUTING FACILITIES

The Office of Information Technology (OIT) provides technology leadership and support to Georgia Tech students, faculty, staff, and researchers. OIT serves as the primary source of information technology, cable television networking, and telecommunications services for the Institute. Key information technology services include operating the campus computer network, providing access to national research networks, providing technical support for centralized computer accounts and computing systems, and protecting the integrity of Institute data and administrative computing systems.

OIT has built the campus network architecture to provide very high performance general-purpose connectivity and peering, including Internet2, with services provided over a multigigabit backbone. OIT is responsible for the Southern Crossroads network aggregation point that connects universities and colleges in the southeast. Georgia Tech also hosts Southern Light Rail, which serves as the anchor in the southeast for National LambdaRail, a high-speed, optical fiber networking infrastructure designed for advanced research and experimentation.

Centrally managed computer user accounts permit on-campus access to the campus network and Internet, the wireless network, computing labs, and core computing services and resources. Remote access to computing resources is supported for the satellite campuses. Examples of core computing services include e-mail, online software distribution, online library resources, Web course development software, campus Web hosting, the campus Web portal, and associated software for collaboration and communication.

Students living on campus can access the Internet and the campus network from student residences, which are equipped with Internet connection ports and cabling. Students also have access to general-purpose computing labs on campus. The computing lab in the library has more than one hundred computer workstations, including systems equipped for multimedia projects, and a presentation rehearsal studio. The newest facility, the Library East Commons, is equipped with 34 workstations designed for group or individual projects, as well as a performance area for small audiences. Another new facility, the Resource Center, is located on the lower level of the Library building and houses walk-in computing support, tutoring, and undergraduate advising.

In addition, academic and research units may operate their own computing labs. The Institute's computational science venue initiative operates a high-performance computing cluster and network emulation facility to support classes and start-up research projects. In conjunction, OIT's Public Access Clustering Environment (PACE) service fosters the acquisition and development of high-performance, parallel, and distributed (grid) computing systems by campus units.

Georgia Tech operates a wireless network for use with laptop computers and other mobile computing devices. The wireless network has wireless access points in and around most campus buildings and walk-up ports in several buildings. Outdoor wireless coverage includes green spaces, pedestrian corridors, and a one-mile corridor along the Tech Trolley route. The wireless network supports guest access through the incorporation of a commercial service.

Technology enhances academic and research activities in more than 300 classrooms, lecture halls, and specialty rooms. These rooms are equipped with desktop computers, video projectors, VCRs, DVD players, document cameras, audio systems, and electric screens. Videoconferencing and streaming media systems are available for teaching and collaboration on the main campus, at satellite campuses, and in distance learning programs.

Georgia Tech administers its own information systems, data repositories, and administrative software systems. The Institute manages information security with campus community education, policy development, technical measures to protect campus resources, and procedures for reacting to events that endanger the Institute's information assets. IT policy development and strategic planning enable Georgia Tech to keep pace with demands for the use and delivery of sustainable services. For more information, visit www.oit.gatech.edu.

## OMED: EDUCATIONAL SERVICES

OMED (the minority educational development office) is a Georgia Tech Educational Services unit charged with the academic performance, retention, and development of students who are traditionally underrepresented (African American, Hispanic, and Native American). OMED runs bridge, transition, peer-mentor, tutorial, parent, corporate, and intervention programs. OMED programs are nationally recognized and duplicated. OMED has served the Georgia Tech community for more than twenty-five years and has helped Georgia Tech become one of the leading producers of engineering degrees awarded to traditionally underrepresented students. OMED Programs, while targeted to the underrepresented students, are beneficial and open to all Georgia Tech students.

## PARKING AND TRANSPORTATION

Parking registration is conducted online annually from mid-April through mid-June at www.parking.gatech.edu. However, due to limited campus parking availability, parking permit registration is not offered to first semester freshmen. Policies and procedures, fees, Tech Trolley and Stinger services, visitor parking, a campus parking map, and other pertinent parking and transportation information may be found at www.parking.gatech.edu.

Questions may be directed to the Georgia Tech Department of Parking and Transportation via the e-mail link below or by calling 404.385.PARK or 404.385.RIDE.

## SPECIAL ACADEMIC SERVICES

In an effort to assist its students in realizing their full intellectual potential, Georgia Tech sponsors a variety of voluntary programs designed to help the student overcome academic problems.

For assistance within a specific academic discipline, students should contact the appropriate college office. Other academic assistance programs are available via the list below:

## GEORGIA TECH ADMINISTRATION

### PRESIDENT'S OFFICE

**G. Wayne Clough**
Ph.D.
President

**Sue Ann Allen**
Ph.D.
Executive Assistant to the President

**James L. Fetig**
B.S.
Associate Vice President
Communications and Marketing

**Dene H. Sheheane**
M.B.A.
Director of Government Relations

### PROVOST'S OFFICE

**Gary B. Schuster**
Ph.D.
Provost and Vice President for Academic Affairs

**Anderson D. Smith**
Ph.D.
Senior Vice Provost for Academic Affairs

**Mark G. Allen**
Ph.D.
Senior Vice Provost for Research and Innovation

**Steve McLaughlin**
Ph.D.
Vice Provost for International Initiatives

**Ray Vito**
Ph.D.
Vice Provost for Graduate and Undergraduate Studies

**Jack Lohmann**
Ph.D.
Vice Provost for Faculty and Program Development

**Vacant**
Vice Provost for Academic Diversity

**Deborah Smith**
M.S.
Associate Vice Provost for Enrollment Services

### ADMINISTRATION AND FINANCE

**Steven G. Swant**
M.A.
Executive Vice President
Administration and Finance

**B. E. (Chuck) Donbaugh**
B.A.
Associate Vice President
Human Resources

**Joel E. Hercik**
M.B.A.
Associate Vice President
Financial Services

**Rosalind R. Meyers**
C.P.A.
M.B.A.
Associate Vice President
auxiliary Services

**John K. Mullin**
B.S.

Associate Vice President/Associate Vice Provost
Information Technology

**Charles G. Rhode**
M.S.
Associate Vice President
Facilities

**Vacant**
Executive Director
Organizational Development

**John Majeroni**
B.S.
Executive Director
Real Estate Development

**Phil Hurd**
B.S.
Interim Director
Internal Auditing

**Randy A. Nordin**
J.D.
Chief Legal Advisor
Legal Affairs

**Teresa Crocker**
M.A.
Director
Security and Police

**Patrick J. McKenna**
LL.M.
Executive Director
Affiliated Organizations

## ADVANCED TECHNOLOGY DEVELOPMENT CENTER

**H. Wayne Hodges**
B.A.
Director

**Anthony K. Antoniades**
M.B.A.
General Manager

## AUXILIARY SERVICES

**Rosalind R. Meyers**
C.P.A.
M.B.A.
Associate Vice President

**Michael Black**
B.S.
Director
Housing

**James Pete**
Acting Director
Information Technology

**David Santa Ana**
Interim Director
Parking and Transportation

**Barbara A. Hanschke**
M.B.A.
Director of Finance

**Stephen Johnson**
B.S.
Project Director

**Vern Johnson**
B.S.
Director
Dining Services

**Gerard J. Maloney**

B.S.
Director
Bookstore

**Melissa Moore**
B.S.
Communication Officer

**James A. Pete**
M.B.A.
Director
Buzzcard Center

**Jonathan Baker**
RN, MBA
Interim Director
Health Services

**Richard Steele Jr.**
B.ChE.
Director
Student Center

## COLLEGE OF ARCHITECTURE

**Douglas C. Allen**
M.L.A.
R.L.A.
Interim Dean

**Sabir Khan**
M.Arch
Associate Dean

## COLLEGE OF COMPUTING

**Richard A. DeMillo**
Ph.D.
The John P. Imlay, Jr. Dean and Distinguished Professor

**Merrick L. Furst**
Ph.D.
Associate Dean and Distinguished Professor

**Richard J. Lipton**
Ph.D.
Associate Dean and Fredrick G. Storey Chair in Computing and Professor

**Ellen Witte Zegura**
Ph.D. Associate Dean of Special Programs, Chair of the School of Computer Science and Professor

**Aaron Bobick**
Ph.D.
Chair of the School of Interactive Computing and Professor

**Richard Fujimoto**
Ph.D.
Chair of the Computational Science and Engineering Division and Professor

**Thomas D. Pilsch**
M.S.
Assistant Dean for Students

**Mary Alice Isele**
Senior Director of Development

**Carla F. Bennett**
Director of Business Operations

**Pam Ruffin**
Director of Human Resources

**Stefany Wilson**
Director of Communications

## COLLEGE OF ENGINEERING

**Don P. Giddens**
Ph.D.
Dean

**Jane C. Ammons**

Ph.D.
Associate Dean

**John Leonard**
Ph.D.
Associate Dean

**Laurence J. Jacobs**
Ph.D.
Associate Dean

**Jane G. Weyant**
Ph.D.
Assistant Dean

**Felicia Benton-Johnson**
Ed.D
Director
K12/Diversity

**Linda D. Buescher**
B.S.
Director
Human Resources and Administration

**Didier Contis**
MSEE
Director
Technology Services

**Pete Dawkins**
B.B.A.
Director
Finance and Administration

**Gregory B. Goolsby**
Director
Facilities and Capital Planning

**Mahera (Mimi) Philobos**
Ph.D
Director
Women in Engineering

## COLLEGE OF LIBERAL ARTS

(Ivan Allen College)

**Sue V. Rosser**
Ph.D.
Dean

**Susan Cozzens**
Associate Dean for Research and Faculty Development

**John Tone**
Associate Dean for Undergraduate Affairs

**Peter Brecke**
Assistant Dean for Information Technology

## COLLEGE OF MANAGEMENT

**Steve Salbu**
Ph.D.
Dean and Stephen P. Zelnack Jr Chair

**Sridhar Narasimhan**
Ph.D.
Senior Associate Dean and Robert A. Anclien Professor

**Goutam Challagalla**
Ph.D.
Associate Dean,
Executive Education

**Vinod Singhal**
Ph.D.
Associate Dean, MBA Program and Alfred F. and Patricia L. Knoll Professor

**Charles Parsons**
Ph.D.

Associate Dean,
Undergraduate Programs

**Dennis H. Nagao**
Ph.D.
Faculty Director,
MBA-MOT and Associate Professor

**Saby Mitra**
Ph.D.
Faculty Director,
GEMBA and Associate Professor

**James A. Kranzusch**
MA
Executive Director,
Career Development

**Daniel L. Stotz**
MS
Director,
Executive Education

**Nancy Gimbel**
M.A.
Director,
Undergraduate Programs

**Ann J. Scott**
MBA
Director,
Graduate Program

**Paula Wilson**
MS
Director M.B.A. Admissions

**Kurt G. Paquette**
MSM
Chief Administrative and Financial Officer

**Carla Zachery**
BA
Director of Finance

**Hope M. Wilson**
MA
Director, College Relations and Communications

**W. Gail Greene**
MS
Director, Administrative Services

**Phil Spessard**
BA
Director, Development

## COLLEGE OF SCIENCES

**Paul L. Houston**
Ph.D.
Dean

**E. Kent Barefield**
Ph.D.
Associate Dean

**Evans M. Harrell**
Ph.D.
Associate Dean

**Philip Bonfiglio**
M.P.H.
Director
Development

**David L. Moore**
Director
Finance

**Gerald E. O'Brien**

Director
Facilities

## DEVELOPMENT

**Barrett H. Carson**
M.A.
Vice President

**Marta H. Garcia**
B.A.
Assistant Vice President

**Dorcas G. Wilkinson**
Assistant Vice President

## DISTANCE LEARNING AND PROFESSIONAL EDUCATION

**William J. Wepfer**
Ph.D.
Vice Provost

**Nelson C. Baker**
Ph.D.
Associate Vice Provost

**Karen L. Tucker**
Director
Language Institute

**William A. Holm**
Ph.D.
Assistant Vice Provost

**Carolyn Conger**
Senior Director
Business and Operations

**J. Timothy Copeland**
M.B.A. Director
Marketing and Sales

**Jeffrey Fischer**
M.B.A. Director
IT support Services

**Karen L. Tucker**
M.A. Director
Language Institute

**Gretchen Belgum**
B.A.
Registrar

## ENROLLMENT SERVICES

**Deborah D. Smith**
M.Ed.
Associate Vice Provost

**Randolph W. McDow**
M.S.
Director
Special Scholarships

**Reta Pikowsky**
M.Ed
Registrar

**Craig Womack**
M.Ed.
Associate Registrar

**Debbie S. Williamson**
M.A.
Director
Enrollment Services

**Rick Clark**
M.Ed.
Associate Director

Undergraduate Admission

**Valarie R. Mack**
BA
Associate Director
Undergraduate Admission

**Carol Heller**
M.Ed.
Associate Director
Undergraduate Admission

**Gail W. Potts**
B.S.
Director
Graduate Admissions

**Marie R. Mons**
B.B.A.
Director
Student Financial Planning and Services

**Lisa Mitchem**
B.A.
Senior Associate Director
Student Financial Planning and Services

**Jennifer Mullins**
M.A.
Associate Director
Student Financial Planning and Services

**Gina Repak**
B.A.
Associate Director
Student Financial Planning and Services

**Leslie Raborn**
B.S.
Associate Director
Student Financial Planning and Services

## FACILITIES

**Charles G. Rhode**
M.S.
Associate Vice President

**Warren L. Page**
M.E.
Director
Operations and Maintenance

**Michael H. Patterson**
B.A.
Director
Design and Construction

**David L. Goldfarb**
Ph.D.
Director
Finance

**Charles A. LaFleur**
M.S.
Director
Information Technology

## GEORGIA TECH ALUMNI ASSOCIATION

**Joseph P. Irwin**
B.S.
President

**John C. Dunn**
B.A.
Vice President
Communications

**Allison Hickman**

B.S.
C.P.A.
Vice President
Administration and Technical Services

**Leonard Contardo Jr.**
M.A.
Vice President
Constituent Services

**James J. Shea**
B.S.
Vice President
Fundraising and Business Development

## GEORGIA TECH ATHLETIC ASSOCIATION

**Dan Radakovich**
Director of Athletics

**Paul Griffin**
Senior Associate Director

**Larry New**
Senior Associate Director

**Bobby Robinson**
Senior Associate Director

**Jack Thompson**
Senior Associate Director

**Mollie Simmons-Mayfield**
Senior Associate Director

**Jim Hall**
Associate Director
Development

**Phyllis Labaw**
Associate Director
Academic Services

**Eric Ciano**
Director
Player Development

**Wes Durham**
Director
Broadcasting

**Wayne Hogan**
Director
Public Relations

**W. Scott McLaren**
Director
Marketing, Promotions, and Ticketing

**Paul Parker**
Director
Compliance

**Lucius Sanford**
Director
Student-Athlete Development

## GEORGIA TECH RESEARCH CORPORATION

**Jilda Diehl Garton**
M.S.
Associate Vice Provost and General Manager

**Barbara J. Alexander**
M.B.A.
Director
Accounting and Reports

**George G. Harker III**
Ph.D.
Director
Technology Licensing

**Nicolas F. Perez**
M.B.A.
Director
Operations and Services

## GEORGIA TECH RESEARCH INSTITUTE

**Stephen E. Cross**
Ph.D.
Vice President and Director

**David E. Parekh**
Ph.D.
Deputy Director

**Charles E. Brown**
M.S.
Director
Business Operations

**Maj. Gen. George B. Harrison**
U.S.A.F. (ret.)
Director
Strategic Initiatives

**Barbara S. Henry**
M.P.A.
Director
Research Compliance

**Janice P. Rogers**
Director
Administration

## INFORMATION TECHNOLOGY, OFFICE OF

**John K. Mullin**
Associate Vice President/Associate Vice Provost
Chief Information Officer

**Ronald R. Hutchins**
Associate Vice Provost for Research and Technology
Chief Technology Officer

**James M. O'Connor**
Executive Director

**Herbert Baines III**
Director
Information Security

**Hua-Pei Chen**
Director
Architecture and Infrastructure

**Lisa Spence**
Director
Information Technology Services

**Barbara G. Roper**
Director
Resource Management

**Lori P. Sundal**
Director
Enterprise Information Systems

## INTERDISCIPLINARY PROGRAMS/RESEARCH CENTERS

**Mustaque Ahamad**
Director, Georgia Tech Information Security Center (CoC/IAC)

**Christos Alexopoulos**
Director, Modeling and Simulation Research and Education Center (CoC/GTRI)

**Haskell W. Beckham**
Director, National Textile Center (CoE)

**Melvin L. Belcher Jr.**
Co-Director, Center for International Development and Cooperation (GTRI)

**Gisele Bennett**
Director, Logistics and Maintenance Applied Research Center (GTRI)

**Thomas E. Bevan**
Director, Center for Emergency Response Technology, Instruction, and Policy (GTRI)

**Samuel M. Blankenship**
Director, Space Technology Advanced Research Center (GTRI), and
Director, Test and Evaluation Research and Education Center (GTRI)

**Ronald A. Bohlander**
Director, Commercial Product Realization Office (GTRI)

**Jay D. Bolter**
Director, The James and Mary Wesley Center for New Media Education and Research (IAC)

**Jean-Luc E. Brédas**
Co-Director, Center for Computational Molecular Sciences and Technology (CoS)

**B. David Bridges**
Director, Southeastern Regional Technology Transfer Center (EDTV)

**Karl N. Brohammer**
Director, Advanced Wood Products Laboratory (CoA)

**Leonid A. Bunimovich**
Director, Southeast Applied Analysis Center (CoS)

**Carol S. Carmichael**
Director, Institute for Sustainable Technology and Development (CoE/VP Research)

**Mark A. Clements**
Executive Director,
Interactive Media Technology Center/Biomedical Interactive Technology Center (VP Research)

**Carol A. Colatrella**
Co-Director, Center for the Study of Women, Science, and Technology (VP Research/IAC)

**Jonathan S. Colton**
Co-Director, Center for Polymer Processing (CoE)

**Rickey Cotton**
Co-Director, Center for International Development and Cooperation (GTRI)

**Susan E. Cozzens**
Director, Technology Policy and Assessment Center (CoE/IAC), and
Director, Policy Research Initiative (VP Research)

**James I. Craig**
Co-Director, Center for Advanced Systems Analysis (CoE)

**Predrag Cvitanovic**
Director, Center for Nonlinear Sciences (CoS/VP Research)

**Jiangang (Jim) Dai**
Director, Center for Applied Probability (CoE)

**Steven Danyluk**
Director, Manufacturing Research Center (CoE/VP Research), and
Director, Rapid Prototyping and Manufacturing Institute (CoE)

**J. Rick Duke**
Director, Center for Economic Development SerVices (EDTV)

**Charles A. Eckert**
Director, Specialty Separations Center (CoE/VP Research)

**Leroy Emkin**
Co-Director, Computer-Aided Structural Engineering Center (CoE)

**John E. Endicott**
Director, Center for International Strategy, Technology, and Policy (IAC)

**Donna M. Ennis**
Project Director, Georgia Statewide Minority Business Development Center (EDTV)

**Charles M. Estes Jr.**
Director, Traditional Industries Program (EDTV)

**Mark Ferguson**
Coordinator, Pricing & Revenue Management Initiative (CoM)

**Mary Frank Fox**
Co-Director, Center for the Study of Women, Science, and Technology (VP Research/IAC)

**W. J. Frederick Jr.**
Director, Institute of Paper Science and Technology (VP Research)

**Skolnick Jeffrey**
Director, Center for the Study of Systems Biology

**Steven P. French**
Director, Center for Geographic Information Systems (CoA/GTRI)

**Thomas F. Fuller**
Director, Center for Innovative Fuel Cell and Battery Technologies (GTRI)

**Robert Fulton**
Program Manager, Electronic Commerce Resource Center (CoE)

**Aris P. Georgakakos**
Director, Water Resources Institute (CoE/VP Research)

**Leonid Germanovich**
Director, Center for Applied Geomaterials Research (CoE)

**Jean-Pierre Goedgebuer**
Director, Center GTL-CRNS Telecom (CoE)

**Arun M. Gokhale**
Director, USCAR on Structural Case Magnesium Development Project (CoE)

**Barry Goodno**
Director, NSF Mid-America Earthquake Center (CoE)

**Marla J. Gorges**
Director, Southeastern Trade Adjustment Assistance Center (EDTV)

**Robert J. Gregor**
Director, Center for Human Movement Studies (CoS/VP Research)

**Eugene F. Greneker III**
Director, Severe Storms Research Center (GTRI)

**Sathyanaraya Hanagud**
Director, MURI: Multifunctional Energetic Structural Materials (CoE)

**H. Mike Harris**
Director, Phosphor Technology Center of Excellence (CoE/GTRI)

**Rigoberto Hernandez**
Co-Director, Center for Computational Molecular Sciences and Technology (CoS)

**Nolan E. Hertel**
Director, Neely Nuclear Research Center (CoE)

**H. Wayne Hodges**
Vice Provost, Economic Development and Technology Ventures, and Director, Advanced Technology Development Center (EDTV)

**Timothy D. Israel**
Manager, Center for International Standards and Quality (EDTV)

**Nikil S. Jayant**
Director, Georgia Center for Advanced Telecommunications Technology (CoE/VP Research), and
Director, Georgia Tech Broadband Institute (CoE)

**Eric N. Johnson**
Director, MURI: Active-Vision Control Systems for Complex Adversarial 3-D Environment (CoE)

**W. Steven Johnson**
Director, Composites Education and Research Center (CoE)

**Bernd Kahn**
Director, Environmental Resources Center (GTRI)

**Roozbeh Kangari**
Director, Construction Resource Center (CoA)

**Uzi Landman**
Director, Center for Computational Materials Science (CoS), and
Director, Institute for the Study of Matter (VP Research)

**Joy Laskar**
Director, Georgia Electronic Design Center (VP Research)

**Anatoliusz Lesniewski**
Director, IMAGINE Multimedia Lab (CoA)

**Ed Lindsay**
Director, Economic Development Administrations University Center (EDTV)

**Charles L. Liotta**
Vice Provost for Research and Dean of Graduate Studies (VP Research)

**Meilin Liu**
Co-Director, Center for Innovative Fuel Cell and Battery Technologies (GTRI)

**Seth R. Marder**
Director, Center for Organic Photonics and Electronics (CoE)

**Patrick S. McCarthy**
Director, Sloan Center for Paper Business and Industry Studies (IAC/VP Research)

**James H. McClellan**
Director, Center for Signal and Image Processing (CoE)

**David L. McDowell**
Director, Mechanical Properties Research Laboratory (CoE), and
Director, MURI on Multifunctional Energetic Structural Materials (CoE)

**John R. McIntyre**
Executive Director, Center for International Business Education and Research (CoM)

**James A. McNutt**
Executive Director, Center for Paper Business and Industry Studies (IAC/VP Research)

**James D. Meindl**
Director, Microelectronics Research Center (CoE/VP Research)

**Michael D. Meyer**
Co-Director, Georgia Transportation Institute (CoE/VP Research)

**Konstantin Mischaikow**
Director, Center for Dynamical Systems and Nonlinear Studies (CoS)

**M. Helena Mitchell**
Director, Center for Advanced Communications Policy (IAC/VP Research)

**Charles W. Mulford Jr.**
Director, Financial Analysis Lab (CoM)

**Brian Murphy**
Co-Director, European Union Center (IAC)

**John D. Muzzy**
Co-Director, Center for Polymer Processing (CoE)

**Elizabeth D. Mynatt**
Director, Graphics, Visualization, and Usability Center (CoC)

**Robert M. Nerem**
Director, Center for the Engineering of Living Tissues (CoE), and Director, Parker H. Petit Institute for Bioengineering and Bioscience (CoE/VP Research)

**Laura O'Farrell**
Director, Physiological Research Laboratory(VP Research)

**Paul A. Ohme**
Director, Center for Education Integrating Science, Mathematics, and Computing (CoS)

**Zack E. Osborne**
Director, Georgia Tech Procurement Assistance Center (EDTV)

**Krishna V. Palem**
Director, Center for Research in Embedded Systems and Technology (CoE)

**John W. Peifer**
Research Director, Biomedical Interactive Technology Center (VP Research)

**William E. Price**
Research Director, Interactive Media Technology Center (VP Research)

**Hans B. Püttgen**
Director, National Electric Energy Testing, Research, and Application Center (CoE)

**Don Ranly**
Director, Dental Technology Center (GTRI)

**William S. Rees Jr.**
Director, Molecular Design Institute (CoE/CoS)

**Ajeet Rohatgi**
Director, University Center of Excellence for Photovoltaics Research (CoE)

**Catherine L. Ross**
Director, Center for Quality Growth and Regional Development (CoA)

**William B. Rouse**
Director, The Tennenbaum Institute (CoE/VP Research)

**Armistead (Ted) G. Russell**

Director, Air Resources and Engineering Center (VP Research)

**Kenneth H. Sandhage**
Director, MURI on Genetically Engineered Materials and Micro/NanodeVices (CoE)

**Daniel P. Schrage**
Director, Center of Excellence in Rotorcraft Technology (CoE), and
Co-Director, Center for Advanced Systems Analysis (CoE)

**Karsten Schwan**
Director, Center for Experimental Research in Computer Systems (CoC/VP Research)

**Samuel V. Shelton**
Director, Industrial Assessment Center (EDTV), and Director, Strategic Energy Initiative (VP Research)

**C. David Sherrill**
Co-Director, Center for Computational Molecular Sciences and Technology (CoS)

**Stephen H. Sprigle**
Director, Center for Assistive Technology and Environmental Access (CoA)

**Weston M. Stacey Jr.**
Director, Fusion Research Center (CoE)

**Christopher J. Summers**
Director, Phosphor Technology Center of Excellence (CoE/GTRI), and
Director, MURI on Intelligent Luminescence for Communication, Display, and Identification (CoE)

**David G. Taylor**
Director, Center for Board Assembly Research (CoE)

**Marie C. Thursby**
Executive Director, Technological Innovation: Generating Economic Results (CoM)

**Rao R. Tummala**
Director, NSF-ERC Packaging Research Center (CoE)

**Zhong Li Wang, Director**
Center for Nanoscience and Nanotechnology (CoE/VP Research), and
Director, Center for Nanostructure Characterization (CoE)

**Katja Weber**,
Co-Director, European Union Center (IAC)

**Chelsea (Chip) C. White, III**
Executive Director, The Logistics Institute (CoE),
Co-Director, Georgia Transportation Institute (CoE/VP Research), and
head, Sloan Trucking Industry Program (CoE)

**Kenneth Will**
Co-Director, Computer-Aided Structural Engineering Center (CoE)

**Ben T. Zinn**
Director, NASA URETI on Propulsion and Power (CoE), and
Director, University Research Engineering Technology Institute (CoE)

## LIBRARIES

**Richard W. Meyer**
M.A.
M.S.
Dean and Director

## OMED: EDUCATIONAL SERVICES

**S. Gordon Moore Jr.**
Managing Partner/Director

**Willy Barnett**
Partner
Support Programs and Web Development

**Neal L. Christian**
Partner
Academic Support

**Robert M. Hume**
Partner
Data Analysis

**Letitia P. Henderson**
Associate Partner
Financial Control

## PROFESSIONAL PRACTICE DIVISION

**Thomas M. Akins**
M.B.A.
Executive Director

**Robert W. James Jr.**
M.A.
Director Undergraduate Professional Internships & Graduate Co-op

**Harold B. Simmons**
M.B.A.
M.A.
Director Cooperative Education

**Ann Blasick**
M.S.M.E
Assistant Director, Cooperative Education

**Mary K. Fisher**
M.S.
Assistant Director, Undergraduate Professional Internships

**Debbie Gulick**
M.A.
International Practicum Coordinator

**Kenneth A. Little**
M.B.A.
Assistant Director, Cooperative Education

**Tina L. Payne**
B.S.
Assistant Director, Cooperative Education

**Debra T. Pearson**
M.S.
Assistant Director, Cooperative Education

**Robert P. Rogers Jr.**
B.A.
Assistant Director, Cooperative Education

**Tamara Solomon**
M.S.
Assistant Director, Graduate Cooperative Education

**Wayne O. Thompson**
M.A.
Assistant Director, Cooperative Education

## SPONSORED PROGRAMS

**Jilda Diehl Garton**
M.S.
Associate Vice Provost for Research and General Manager
GTRC and GTARC

**G. Duane Hutchison**
M.B.A.
Director
Sponsored Programs

**Robert D. Simpkins**
B.S.
Associate Director
Sponsored Programs

**Christopher E. D'Urbano**
B.A.
Manager
Industry Contracting

## STUDENT AFFAIRS

**William D. Schafer**
Ph.D.
Vice President

**John M. Stein**

M.A., M.S.
Dean of Students
Assistant Vice President

**Stephanie L. Ray**
M.Ed.
Associate Dean of Students; Director, Diversity Programs

**J. Denise Johnson-Marshall**
M.Ed.
Assistant Dean of Students; Director of Disability Services

**Ericka McGarity**
M.A.
Assistant Dean of Students; Director of Student Integrity

**Danielle McDonald**
M.Ed.
Assistant Dean of Students; Director of Student Involvement

**Buck Cooke**
M.S.
Assistant Dean of Students; Director of Greek Affairs

**Yvette Upton**
M.S.
Assistant Dean of Students; Director of Women's Resource Center

**Michael W. Edwards**
M.S.
Director, Campus Recreation

**Ralph Mobley**
M.P.A.
Director, Career Services

**Ruperto Perez**
Ph.D.
Director, Counseling Center

**Patricia K. (Trish) Wichmann**
M.A.
Director, Development for Student Affairs

**Jay C. Constantz**
Director, Ferst Center for the Arts

**Betsey Kidwell**
Director, Finance and Operations

**Jonathan Swaby**
B.A.
Program Manager, Information Technology

**Phillip Thompson**
Ph.D.
J.D., LL.M., Director Leadership Education and Programs

**Brenda Woods**
Ph.D.
Director, Research & Assessment for Student Affairs

**Steven Girardot**
Ph.D.
Director, Success Programs

## MEMBER INSTITUTIONS

### Research Universities

Georgia Institute of Technology
Georgia State University
Medical College of Georgia
Skidaway Institute of Oceanography
University of Georgia

### Regional Universities

Georgia Southern University
Valdosta State University

### State Universities

Albany State University
Armstrong Atlantic State University
Augusta State University
Clayton College and State University
Columbus State University
Fort Valley State University
Georgia College and State University
Georgia Southwestern State University
Kennesaw State University
North Georgia College and State University
Savannah State University
Southern Polytechnic State University
University of West Georgia

### State Colleges

Dalton State College
Gainesville College
Georgia Gwinnett College
Macon State College

### Two-year Colleges

Abraham Baldwin Agricultural College
Atlanta Metropolitan College
Bainbridge College
Coastal Georgia Community College
Darton College
East Georgia College
Georgia Highlands College
Georgia Perimeter College
Gordon College
Middle Georgia College
South Georgia College
Waycross College

As of May 7, 2008

**Said I Abdel-Khalik**
PHD in Mechanical Engineering - University of Wisconsin-Madison
Professor, School of Mechanical Engineering

**Randal T Abler**
PHD in Electrical & Electronic Engineering - Georgia Institute Of Technology
Assistant Professor, Georgia Tech Savannah

**Gregory D Abowd**
PHD in Mathematics - University of Oxford
Professor, College of Computing

**Phillip L Ackerman**
PHD in Psychology - University Of Illinois-Urbana-Champaign
Professor, School of Psychology

**Ali Adibi**
PHD in Electrical Engineering - California Institute Of Technology
Associate Professor, School of Electrical & Computer Engineering

**Pradeep K Agrawal**
PHD in Chemical Engineering - University of Delaware
Associate Chair, School of Chemical and Biomolecular Engineering

**Mustaque Ahamad**
PHD in Computer & Information Science - State University Of New York-Stony Brook
Professor, College of Computing

**Shabbir Ahmed**
PHD in industrial Engineering - University Of Illinois-Urbana-Champaign
Associate Professor, School of Industrial & Systems Engineering

**Krishan K Ahuja**
PHD in Mechanical Engineering - Syracuse University
Regents Professor, School of Aerospace Engineering

**Cyrus K Aidun**
PHD in Mechanical Engineering - Clarkson University
Professor, School of Mechanical Engineering

**Ian F Akyildiz**
PHD in Computer & Information Science - University of Erlangen-Nuremberg
Professor, College of Computing

**Faisal M Alamgir**
PHD in Materials Science - Lehigh University
Assistant Professor, School of Materials Science & Engineering

**Silas D Alben**
PHD in Mathematics - New York University
Assistant Professor, School of Mathematics

**Eleanor C Alexander**
PHD in History - Brown University
Associate Professor, School of History, Technology & Society

**Alexander Alexeev**
PHD in Mechanical Engineering - Technion-Is Inst Tec

Assistant Professor, School of Mechanical Engineering

**Christos Alexopoulos**

PHD in Operations Research - University Of North Carolina-Chapel Hill

Associate Professor, School of Industrial & Systems Engineering

**Faiz A Al-Khayyal**

DSC in Operations Research - George Washington University

Professor, School of Industrial & Systems Engineering

**Janet Katherine Allen**

PHD in Biophysics - University of California-Berkeley

Associate Professor, School of Mechanical Engineering

**Sue Ann Bidstrup Allen**

PHD in Chemical Engineering - University Of Minnesota-Twin Cities

Faculty Executive Assistant to the President, School of Chemical and Biomolecular Engineering

**Mark G Allen**

PHD in Electrical, Electronics & Communication - Massachusetts Institute Of Technology

Senior Vice Provost, Provost & Exec VP Academic Affairs

**Douglas C Allen**

MLS in Landscape Architecture - Harvard University

Dean Academic, College of Architecture

**Ghassan Al-Regib**

PHD in Electrical Engineering - Georgia Institute Of Technology

Assistant Professor, Georgia Tech Savannah

**Yucel Altunbasak**

PHD in Electrical Engineering - University of Rochester

Associate Professor, School of Electrical & Computer Engineering

**Adjo Akpene Amekudzi**

PHD in Civil Engineering - Carnegie Mellon University

Associate Professor, School of Civil & Environmental Engineering

**Mostafa H Ammar**

PHD in Electrical, Electronics & Communication - University of Waterloo

Regents Professor, College of Computing

**Jane C Ammons**

PHD in industrial/Manufacturing Engineering - Georgia Institute Of Technology

Associate Dean, School of Industrial & Systems Engineering

**David V Anderson**

PHD in Electrical Engineering - Georgia Institute Of Technology

Associate Professor, School of Electrical & Computer Engineering

**Sigrun Andradottir**

PHD in Engineering - Stanford University

Professor, School of Industrial & Systems Engineering

**Libero Andreotti**

MARCH in Architecture - Georgia Institute Of Technology

Professor, College of Architecture

**Alfred D Andrew**

PHD in Mathematics - Stanford University

Professor, School of Mathematics

**Alberto Apostolico**

PHD in Electrical, Electronics & Communication - University of Naples

Professor, School of Interactive Computing

**Mustafa M Aral**
PHD in Fluid Mechanics - Georgia Institute Of Technology
Professor, School of Civil & Environmental Engineering

**Ronald C Arkin**
PHD in Computer & Information Science - University of Massachusetts-Amherst
Regents Professor, College of Computing

**Erian A Armanios**
PHD in Aerospace, Aeronautical and Astronomy - Georgia Institute Of Technology
Professor, School of Aerospace Engineering

**Domniki Asimaki**
PHD in Civil Engineering - Northwestern University
Assistant Professor, School of Civil & Environmental Engineering

**Atalay Atasu**
PHD in Management - INSEAD- France
Assistant Professor, College of Management

**Godfried L Augenbroe**
MS in Architecture - Delft University Technology
Associate Professor, College of Architecture

**Philip Auslander**
PHD in Theater Arts - Cornell University Central Office
Professor, School of Literature, Communication & Culture (LCC)

**Farrokh Ayazi**
PHD in Electrical Engineering - University of Michigan-Ann Arbor
Associate Professor, School of Electrical & Computer Engineering

**Hayriye Ayhan**
PHD in industrial/Manufacturing Engineering - Texas A and M University
Associate Professor, School of Industrial & Systems Engineering

**Julia Elizabeth Babensee**
PHD in Chemical Engineering - University of Toronto
Associate Professor, School of Biomedical Engineeringgineering

**David Albert Bader**
PHD in Computer Engineering - University Of Maryland-College Park
Associate Professor, School of Computing Science & Systems

**Sonit Bafna**
PHD in Architecture - Georgia Institute Of Technology
Assistant Professor, College of Architecture

**Matthew Howard Baker**
PHD in Applied Mathematics - University of California-Berkeley
Associate Professor, School of Mathematics

**Nelson C Baker**
PHD in Civil Engineering - Carnegie Mellon University
Associate Vice Provost-Research, School of Civil & Environmental Engineering

**Yury Y Bakhtin**
PHD in Applied Mathematics - Moscow M.V.L. State University
Assistant Professor, School of Mathematics

**Tucker R Balch**
PHD in Computer & Information Science - Georgia Institute Of Technology
Associate Professor, College of Computing

**Daniel F Baldwin**

PHD in Mechanical Engineering - Massachusetts Institute Of Technology
Adjunct Associate Professor, School of Mechanical Engineering

**Edward Michael Balog**
PHD in Physiology - Marquette University
Assistant Professor, School of Applied Physiology

**Sujit Banerjee**
PHD in Chemistry - Concordia University
Professor, School of Chemical and Biomolecular Engineering

**Gang Bao**
PHD in Applied Mathematics - Lehigh University
Professor, School of Biomedical Engineeringgineering

**Gilda Ann Barabino**
PHD in Chemical Engineering - Rice University
Professor, School of Biomedical Engineeringgineering

**E Kent Barefield**
PHD in inorganic Chemistry - Ohio State University
Associate Dean, College of Sciences

**Richard P Barke**
PHD in Political Science & Government - University of Rochester
Associate Professor, Ivan Allen College

**Thomas Harrison Barker**
PHD in Bioengineering & Biomedical Engineering - University of Alabama-Birmingham
Assistant Professor, School of Biomedical Engineeringgineering

**Christopher F Barnes**
PHD in Electrical, Electronics & Communication - Brigham Young University
Associate Professor, Georgia Tech Savannah

**Bridgette Anne Barry**
PHD in Chemistry - University of California-Berkeley
Professor, School of Chemistry & Biochemistry

**John R Barry**
PHD in Electrical, Electronics & Communication - University of California-Berkeley
Professor, School of Electrical & Computer Engineering

**John J Bartholdi**
PHD in industrial/Manufacturing Engineering - University of Florida
Professor, School of Industrial & Systems Engineering

**Nazanin Bassiri-Gharb**
PHD in Materials Science - Pennsylvania State University
Assistant Professor, School of Mechanical Engineering

**Saugata Basu**
PHD in Mathematical Sciences - New York University
Associate Professor, School of Mathematics

**Olivier A Bauchau**
PHD in Structural Engineering - Massachusetts Institute Of Technology
Professor, School of Aerospace Engineering

**Ronald H Bayor**
PHD in History - University of Pennsylvania
School Chair, School of History, Technology & Society

**Haskell W Beckham**
PHD in Engineering-Related Technologies - Massachusetts Institute Of Technology

Professor, School of Polymer, Textile & Fiber Engineering

**Miroslav M Begovic**

PHD in Electrical, Electronics & Communication - Virginia Polytechnic Institute and State University

Professor, School of Electrical & Computer Engineering

**Sven Holger Behrens**

PHD in Civil Engineering - Swiss Federal ETH

Associate Professor, School of Chemical and Biomolecular Engineering

**Igor Belegradek**

PHD in Mathematics - University Of Maryland-College Park

Assistant Professor, School of Mathematics

**Johan G F Belinfante**

PHD in Physics - Princeton University

Professor, School of Mathematics

**Ravi Venkat Bellamkonda**

PHD in Biomedical Engineering - Brown University

Professor, School of Biomedical Engineeringgineering

**Jean V Bellissard**

PHD in Applied Mathematics - University Of Provence (Aix-Marseilles I)

Professor, School of Mathematics

**Willie J Belton**

PHD in Business/Managerial Economics - Pennsylvania State University

Associate Chair, School of Economics

**Paul J Benkeser**

PHD in Electrical, Electronics & Communication - University Of Illinois-Urbana-Champaign

Associate Chair, School of Electrical & Computer Engineering

**Nathan Bennett**

PHD in Organizational Behavior Studies - Georgia Institute Of Technology

Professor, College of Management

**Michael H Bergin**

PHD in Civil Engineering - Carnegie Mellon University

Associate Professor, School of Civil & Environmental Engineering

**Nicholas Henry Bergman**

PHD in Biochemistry - Massachusetts Institute Of Technology

Assistant Professor, School of Biology

**Roberta M Berry**

PHD in Philosophy - University of Notre Dame

Associate Professor, School of Public Policy

**Yves H Berthelot**

PHD in Mechanical Engineering - University of Texas-Austin

Professor, School of Mechanical Engineering

**Tibor Besedes**

PHD in Economics - Rutgers The State University of New Jersey -New Brunswick

Assistant Professor, School of Economics

**Michael L Best**

PHD in Educational/Instructional Media - Massachusetts Institute Of Technology

Assistant Professor, School of International Affairs

**Pamela T Bhatti**

PHD in Electrical Engineering - University of Michigan-Ann Arbor

Assistant Professor, School of Electrical & Computer Engineering

**Laura Elizabeth Bier**

PHD in History - New York University

Assistant Professor, School of History, Technology & Society

**Ronald Lester Billings**

PHD in Operations Research - University of Texas-Austin

Assistant Professor, School of Industrial & Systems Engineering

**Vicki L Birchfield**

PHD in Political Science - University Of Georgia

Assistant Professor, School of International Affairs

**Robert X Black**

PHD in Meterology - Massachusetts Institute Of Technology

Associate Professor, School of Earth & Atmospheric Sciences

**Barbara Blackbourn-Jansma**

PHD in French Language And Literature - University of Wisconsin-Madison

Associate Professor, School of Modern Languages

**Fredda Blanchard-Fields**

PHD in Developmental And Child Psychology - Wayne State University

Professor, School of Psychology

**Douglas M Blough**

PHD in Computer & Information Science - Johns Hopkins University

Professor, School of Electrical & Computer Engineering

**Terry C Blum**

PHD in Sociology - Columbia University-New York City

Professor, College of Management

**Aaron Bobick**

PHD in Cognitive Psychology & Psychology - Massachusetts Institute Of Technology

School Chair, College of Computing

**Ian S Bogost**

PHD in Comparative Literature - University Of California-Los Angeles

Assistant Professor, School of Literature, Communication & Culture (LCC)

**Alexandra O Boldyreva**

PHD in Computer & Information Science - University of California-San Diego

Assistant Professor, College of Computing

**Jay D Bolter**

PHD in Classics And Classical Language - University Of North Carolina-Chapel Hill

Professor, School of Literature, Communication & Culture (LCC)

**Andreas S Bommarius**

PHD in Chemical Engineering - Massachusetts Institute Of Technology

Professor, School of Chemical and Biomolecular Engineering

**Samuel Devere Bond**

PHD in Marketing Management And Research - Duke University

Assistant Professor, College of Management

**Federico Bonetto**

PHD in Applied Mathematics - Sapienza University of Rome

Assistant Professor, School of Mathematics

**Wayne J Book**

PHD in Mechanical Engineering - Massachusetts Institute Of Technology

Professor, School of Mechanical Engineering

**Mark Borodovsky**

PHD in Physics - Moscow P.T. State Conservatory
Regents Professor, School of Biology

**Thomas D Boston**
PHD in Economic Development - Cornell University Central Office
Professor, School of Economics

**Ann Bostrom**
PHD in Public Policy Analysis - Carnegie Mellon University
Adjunct Professor, School of Public Policy

**Lawrence A Bottomley**
PHD in Analytical Chemistry - University of Houston
Professor, School of Chemistry & Biochemistry

**Stephanie Boulard**
PHD in French Language And Literature - Emory University
Assistant Professor, School of Modern Languages

**Kirk S Bowman**
PHD in Political Science - University Of North Carolina-Chapel Hill
Associate Professor, School of International Affairs

**Barbara D Boyan**
PHD in Biomedical Engineering Technology - Rice University
Professor, School of Biomedical Engineeringgineering

**Annalisa Bracco**
PHD in Geophysics And Seismology - University of Genoa
Assistant Professor, School of Earth & Atmospheric Sciences

**Oliver Brand**
PHD in Natural Science - Swiss Federal Institute Technology
Associate Professor, School of Electrical & Computer Engineering

**Berdinus A Bras**
PHD in Operations Research - University of Houston
Professor, School of Mechanical Engineering

**Robert David Braun**
PHD in Aerospace, Aeronautical and Astronomy - Stanford University
Associate Professor, School of Aerospace Engineering

**Peter K Brecke**
PHD in Political Science And Governme - Massachusetts Institute Of Technology
Assistant Dean, School of International Affairs

**Jean-Luc E Bredas**
PHD in Theoretical Chemistry - University of Naples
Professor, School of Chemistry & Biochemistry

**Laurens Victor Adriaan Breedveld**
PHD in Chemical Engineering - Twente University
Assistant Professor, School of Chemical and Biomolecular Engineering

**Dan Breznitz**
PHD in Political Science & Government - Massachusetts Institute Of Technology
Assistant Professor, School of International Affairs

**Ron Broglio**
PHD in English - University of Florida
Assistant Professor, School of Literature, Communication & Culture (LCC)

**Marilyn Ann Brown**
PHD in Geography - Ohio State University

Professor, School of Public Policy

**Kenneth Ray Brown**
PHD in Physical And Theoretical Chemistry - University of California-Berkeley
Assistant Professor, School of Chemistry & Biochemistry

**Amy S Bruckman**
PHD in Educational/Instructional Media - Massachusetts Institute Of Technology
Associate Professor, College of Computing

**John A Buck**
PHD in Electrical, Electronics & Communication - University of California-Berkeley
Professor, School of Electrical & Computer Engineering

**David G Bucknall**
PHD in Polymer Chemistry - Imperial College Science & Technology
Associate Professor, School of Polymer, Textile & Fiber Engineering

**Leonid Bunimovich**
PHD in Applied Mathematics - Russian Academy of Sciences
Regents Professor, School of Mathematics

**Uwe H F Bunz**
PHD in Organic Chemistry - Ludwig Maximilian University of Munich
Professor, School of Chemistry & Biochemistry

**Thomas J Burkholder**
PHD in Bioengineering & Biomedical Engineering - University of California-San Diego
Associate Professor, School of Applied Physiology

**Rebecca E Burnett**
PHD in Speech And Rhetorical Studies - Carnegie Mellon University
Professor, School of Literature, Communication & Culture (LCC)

**Susan Elizabeth Burns**
DSC in Civil Engineering - Georgia Institute Of Technology
Associate Professor, School of Civil & Environmental Engineering

**Robert J Butera**
PHD in Electrical Engineering - Rice University
Associate Professor, School of Electrical & Computer Engineering

**John Cairney**
PHD in Biology - University of Dundee
Associate Professor, School of Biology

**Anthony J Calise**
PHD in Electrical, Electronics & Communication - University of Pennsylvania
Professor, School of Aerospace Engineering

**Wallace W Carr**
PHD in Textile Sciences And Engineering - Georgia Institute Of Technology
Professor, School of Polymer, Textile & Fiber Engineering

**William Brent Carter**
PHD in Physics - Georgia Institute Of Technology
Associate Professor, School of Materials Science & Engineering

**Marco Eduardo Castillo**
PHD in Applied Economics - University of Wisconsin-Madison
Assistant Professor, School of Public Policy

**Daniel Castro-Lacouture**
PHD in Construction/Building Technology - Purdue University
Assistant Professor, College of Architecture

**Richard Catrambone**
PHD in Psychology - University of Michigan-Ann Arbor
Associate Professor, School of Psychology

**Marco Ceccagnoli**
PHD in Business Administration & Management - Carnegie Mellon University
Assistant Professor, College of Management

**Goutam N Challagalla**
PHD in Business Marketing & Marketing - University of Texas-Austin
Associate Dean, College of Management

**Ronald Richard Chance**
PHD in Physical And Theoretical Chemistry - Dartmouth College
Professor of the Practice, School of Chemical and Biomolecular Engineering

**Young-Hui Chang**
PHD in Biology - University of California-Berkeley
Assistant Professor, School of Applied Physiology

**Yih-Long Chang**
PHD in Business Management & Administration - University of Texas-Austin
Professor, College of Management

**Gee-Kung Chang**
PHD in Physics - University of California-Riverside
Professor, School of Electrical & Computer Engineering

**Michael S Chapman**
PHD in Physics - Massachusetts Institute Of Technology
Professor, School of Physics

**Abhijit Chatterjee**
PHD in Electrical, Electronics & Communication - University Of Illinois-Urbana-Champaign
Professor, School of Electrical & Computer Engineering

**Xu-Yan Chen**
PHD in Applied Mathematics - Hiroshima University
Associate Professor, School of Mathematics

**Ruizhen Rachel Chen**
PHD in Chemical Engineering - California Institute Of Technology
Associate Professor, School of Chemical and Biomolecular Engineering

**Ye-Hwa Chen**
PHD in Mechanical Engineering - University of California-Berkeley
Professor, School of Mechanical Engineering

**Mohammed Cherkaoui**
PHD in Mechanical Engineering - University of Metz
Professor, School of Mechanical Engineering

**Yury O Chernoff**
PHD in Genetics, Plant And Animal - St. Petersburg State University
Professor, School of Biology

**Sang Hyun Cho**
PHD in Nuclear Engineering - Texas A and M University
Associate Professor, School of Mechanical Engineering

**Jung Ho Choi**
PHD in Biology - University of California-San Diego
Associate Chair, School of Biology

**Seung-Kyum Choi**

PHD in Mechanical Engineering - Wright State University

Assistant Professor, Georgia Tech Savannah

**Parag Pratap Chordia**

PHD in Music Theory And Composition - Stanford University

Assistant Professor, School of Music

**Mei-Yin Chou**

PHD in Physics - University of California-Berkeley

School Chair, School of Physics

**Ruchi Choudhary**

PHD in Architecture - University of Michigan-Ann Arbor

Assistant Professor, College of Architecture

**Shui-Nee Chow**

PHD in Mathematics - University Of Maryland-College Park

Professor, School of Mathematics

**Henrik Iskov Christensen**

PHD in Electrical, Electronics & Communication - Aalborg University

Professor, School of Interactive Computing

**Bryan K Church**

PHD in Accounting - University of Florida

Professor, College of Management

**Alka Varma Citrin**

PHD in Marketing - Washington State University

Assistant Professor, College of Management

**David S Citrin**

PHD in Physics - University Of Illinois-Urbana-Champaign

Professor, School of Electrical & Computer Engineering

**Nathan Thomas Clark**

PHD in Computer & Information Science - University of Michigan-Ann Arbor

Assistant Professor, School of Computing Science & Systems

**Jennifer Joy Clark**

PHD in Economics - Cornell University Central Office

Assistant Professor, School of Public Policy

**Frank Leo Clark**

PHD in Music Theory And Composition - University of Arizona

Professor, College of Architecture

**John-Paul B Clarke**

DSC in Aerospace, Aeronautical and Astronomy - Massachusetts Institute Of Technology

Associate Professor, School of Aerospace Engineering

**Jonathan E Clarke**

PHD in Finance - University of Pittsburgh

Associate Professor, College of Management

**Mark A Clements**

PHD in Electrical, Electronics & Communication - Massachusetts Institute Of Technology

Professor, School of Electrical & Computer Engineering

**Kim M Cobb**

PHD in Oceanography - Scripps College

Assistant Professor, School of Earth & Atmospheric Sciences

**Molly Cochran**

PHD in international Relations - London School Of Economics And Political Science

Associate Professor, School of International Affairs

**Carol A Colatrella**

PHD in Comparative Literature - Rutgers The State University of New Jersey -New Brunswick

Professor, School of Literature, Communication & Culture (LCC)

**David M Collard**

PHD in Chemistry - University of Massachusetts-Amherst

Professor, School of Chemistry & Biochemistry

**Jonathan S Colton**

PHD in Mechanical Engineering - Massachusetts Institute Of Technology

Professor, School of Mechanical Engineering

**Kelly Renee Comfort**

PHD in Comparative Literature - University of California-Davis

Assistant Professor, School of Modern Languages

**Eugene E Comiskey**

PHD in Business Administration & Management - Michigan State University

Associate Dean, College of Management

**Edward H Conrad**

PHD in Physics - University of Wisconsin-Madison

Associate Professor, School of Physics

**Cheryl K Contant**

PHD in Civil Engineering - Stanford University

Professor, College of Architecture

**William J Cook**

PHD in Applied Mathematics - University of Waterloo

Professor, School of Industrial & Systems Engineering

**Fred L Cook**

PHD in Textile Sciences And Engineering - Georgia Institute Of Technology

Professor, School of Polymer, Textile & Fiber Engineering

**John A Copeland**

PHD in Physics - Georgia Institute Of Technology

Professor, School of Electrical & Computer Engineering

**Paul M Corballis**

PHD in Psychology - Columbia University-New York City

Assistant Professor, School of Psychology

**Gregory M Corso**

PHD in Psychology - New Mexico State University

Associate Chair, School of Psychology

**Mark Francis Costello**

PHD in Aerospace, Aeronautical and Astronomy - Georgia Institute Of Technology

Associate Professor, School of Aerospace Engineering

**Bettina F Cothran**

PHD in German Language And Literature - Gesamthochschule Wuppertal (University of Wuppertal)

Professor, School of Modern Languages

**Nora C Cottille-Foley**

PHD in Philosophy - Northwestern University

Associate Professor, School of Modern Languages

**Mark H Cottle**

MARCH in Architecture - Rice University

Associate Professor, College of Architecture

**Edward J Coyle**
PHD in Electrical, Electronics & Communication - Princeton University
Professor, School of Electrical & Computer Engineering

**Susan E Cozzens**
PHD in Sociology - Columbia University-New York City
Associate Dean, School of Public Policy

**James I Craig**
PHD in Aeronautical & Aerospace Engin - Stanford University
Professor, School of Aerospace Engineering

**Robert M Craig**
PHD in Architecture - Cornell University Central Office
Professor, College of Architecture

**Thomas H Crawford**
PHD in English Language And Literature - Duke University
Associate Professor, School of Literature, Communication & Culture (LCC)

**John D Cressler**
PHD in Applied Physics - Columbia University-New York City
Professor, School of Electrical & Computer Engineering

**Ernest Samuel Croot**
PHD in Applied Mathematics - University Of Georgia
Associate Professor, School of Mathematics

**Kenneth A Cunefare**
PHD in Mechanical Engineering - Pennsylvania State University
Professor, School of Mechanical Engineering

**Judith A Curry**
PHD in Geophysics And Seismology - University of Chicago
School Chair, School of Earth & Atmospheric Sciences

**Jennifer Erin Curtis**
PHD in Physics - University of Chicago
Assistant Professor, School of Physics

**Predrag Cvitanovic**
PHD in Physics - Cornell University Central Office
Professor, School of Physics

**Richard L Dagenhart**
MARCH in Architecture - University of Pennsylvania
Associate Professor, College of Architecture

**Jiangang Dai**
PHD in Mathematics - Stanford University
Professor, School of Industrial & Systems Engineering

**Angela Dalle Vacche**
PHD in Film/Cinema Studies - University Of Iowa
Associate Professor, School of Literature, Communication & Culture (LCC)

**Amanda Kidd Damarin**
PHD in Sociology - Columbia University-New York City
Assistant Professor, School of History, Technology & Society

**Steven Danyluk**
PHD in Engineering Science - Cornell University Central Office
Professor, School of Mechanical Engineering

**Suman Das**

PHD in Mechanical Engineering - University of Texas-Austin
Associate Professor, School of Mechanical Engineering

**Nishant Dass**
PHD in Finance - INSEAD France
Assistant Professor, College of Management

**Dragomir Davidovic**
PHD in Physics - Johns Hopkins University
Associate Professor, School of Physics

**Jeffrey A Davis**
PHD in Electrical Engineering - Georgia Institute Of Technology
Associate Professor, School of Electrical & Computer Engineering

**Elizabeth Davis**
PHD in Experimental Psychology - Columbia University-New York City
Associate Professor, School of Psychology

**Walter A De Heer**
PHD in Physics - University of California-Berkeley
Professor, School of Physics

**Nico Felicien Declercq**
PHD in Engineering Physics - Ghent University
Assistant Professor, School of Mechanical Engineering

**F Levent Degertekin**
PHD in Electrical Engineering - Stanford University
Associate Professor, School of Mechanical Engineering

**Frank Dellaert**
PHD in Computer & Information Science - Carnegie Mellon University
Associate Professor, School of Interactive Computing

**Richard A DeMillo**
PHD in Computer & Information Science - Georgia Institute Of Technology
Dean Academic, College of Computing

**Yi Deng**
PHD in Atmospheric Sciences And Meteorology - University Of Illinois-Urbana-Champaign
Assistant Professor, School of Earth & Atmospheric Sciences

**Yulin Deng**
PHD in Chemistry - University of Manchester Institute Science and Technology
Associate Professor, School of Chemical and Biomolecular Engineering

**Shijie Deng**
PHD in industrial/Manufacturing Engineering - University of California-Berkeley
Associate Professor, School of Industrial & Systems Engineering

**Chaitanya Suresh Deo**
PHD in Materials Science - University of Michigan-Ann Arbor
Assistant Professor, School of Mechanical Engineering

**Reginald Desroches**
PHD in Civil Engineering - University of California-Berkeley
Associate Chair, School of Civil & Environmental Engineering

**Stephen P DeWeerth**
PHD in Electrical, Electronics & Communication - California Institute Of Technology
Professor, School of Electrical & Computer Engineering

**Emanuele Di Lorenzo**
PHD in Oceanography - Scripps College

Assistant Professor, School of Earth & Atmospheric Sciences

**Thomas J DiChristina**
PHD in Environmental Engineering Science - California Institute Of Technology
Professor, School of Biology

**Robert E. Dickinson**
PHD in Meterology - Massachusetts Institute Of Technology
Professor, School of Earth & Atmospheric Sciences

**Robert M Dickson**
PHD in Physical And Theoretical Chemistry - University of Chicago
Professor, School of Chemistry & Biochemistry

**Luca Dieci**
PHD in Mathematics - University of New Mexico
Associate Chair, School of Mathematics

**Harris Dimitropoulos**
PHD in Architecture - Aristotelian University Selan
Associate Professor, College of Architecture

**Michelle Lynn Dion**
PHD in Political Science - University Of North Carolina-Chapel Hill
Assistant Professor, School of International Affairs

**Carl F DiSalvo**
PHD in Design And Visual Communication - Carnegie Mellon University
Assistant Professor, School of Literature, Communication & Culture (LCC)

**Deepakraj M Divan**
PHD in Electrical, Electronics & Communication - University of Calgary
Professor, School of Electrical & Computer Engineering

**Yi-Luen Ellen Do**
PHD in Architecture - Georgia Institute Of Technology
Associate Professor, College of Architecture

**William A Doolittle**
PHD in Electrical Engineering - Georgia Institute Of Technology
Associate Professor, School of Electrical & Computer Engineering

**John F Dorsey**
PHD in Electrical, Electronics & Communication - Michigan State University
Professor, School of Electrical & Computer Engineering

**Konstantinos Dovrolis**
PHD in Computer And Information Scien - University of Wisconsin-Madison
Associate Professor, College of Computing

**Elizabeth M Dowling**
PHD in Architecture - University of Pennsylvania
Professor, College of Architecture

**Donald F Doyle**
PHD in Chemistry - University Of North Carolina-Chapel Hill
Associate Professor, School of Chemistry & Biochemistry

**Mulalo Doyoyo**
DSC in Structural Engineering - Brown University
Assistant Professor, School of Civil & Environmental Engineering

**William J Drummond**
MS in Theological Studies & Religious - Union Theological Seminary & Presbyterian School of Christian Education

Associate Professor, College of Architecture

**Audrey L Duarte**

PHD in Molecular & Cell Biology - University of California-Berkeley

Assistant Professor, School of Psychology

**Meghan Anne Duffy**

PHD in Natural Science - Michigan State University

Assistant Professor, School of Biology

**Ellen Dunham-Jones**

MS in Architecture - Princeton University

Associate Professor, College of Architecture

**Russell Dean Dupuis**

PHD in Electrical, Electronics & Communication - University Of Illinois-Urbana-Champaign

Professor, School of Electrical & Computer Engineering

**Gregory David Durgin**

PHD in Electrical Engineering - Virginia Polytechnic Institute and State University

Assistant Professor, School of Electrical & Computer Engineering

**Charles Eastman**

MARCH in Architectural Engineering Technology - University of California-Berkeley

Professor, College of Architecture

**Charles A Eckert**

PHD in Chemical Engineering - University of California-Berkeley

Professor, School of Chemical and Biomolecular Engineering

**Athanassios Economou**

PHD in Architecture - University Of California-Los Angeles

Associate Professor, College of Architecture

**Warren Keith Edwards**

PHD in Computer & Information Science - Georgia Institute Of Technology

Associate Professor, College of Computing

**Magnus Egerstedt**

PHD in Mathematics - Royal Veterinary College Sweden

Associate Professor, School of Electrical & Computer Engineering

**Bruce R Ellingwood**

PHD in Civil Engineering/Civil Technology - University Of Illinois-Urbana-Champaign

Professor, School of Civil & Environmental Engineering

**Michael L Elliott**

PHD in City/Urban, Community & Region - Massachusetts Institute Of Technology

Associate Professor, College of Architecture

**Mostafa A El-Sayed**

PHD in Chemistry - Florida State University

Regents Professor, School of Chemistry & Biochemistry

**Susan E Embretson**

PHD in Psychology - University Of Minnesota-Twin Cities

Professor, School of Psychology

**Leroy Z Emkin**

PHD in Civil Engineering - Massachusetts Institute Of Technology

Professor, School of Civil & Environmental Engineering

**Howard L Empie**

PHD in Chemical Engineering - University Of Minnesota-Twin Cities

Professor, School of Chemical and Biomolecular Engineering

**Randall W Engle**
PHD in Experimental Psychology - Ohio State University
School Chair, School of Psychology

**Ahmet Erbil**
PHD in Physics - Massachusetts Institute Of Technology
Professor, School of Physics

**Alan L Erera**
PHD in industrial/Manufacturing Engineering - University of California-Berkeley
Associate Professor, School of Industrial & Systems Engineering

**Ozlem Ergun**
PHD in Operations Research - Massachusetts Institute Of Technology
Assistant Professor, School of Industrial & Systems Engineering

**Augustine O Esogbue**
PHD in Engineering - University of Southern California
Professor, School of Industrial & Systems Engineering

**Irfan A Essa**
PHD in Educational/Instructional Media - Massachusetts Institute Of Technology
Associate Professor, College of Computing

**Harley F Etienne**
PHD in City Planning - Cornell University
Assistant Professor, College of Architecture

**John B Etnyre**
PHD in Applied Mathematics - University of Texas-Austin
Associate Professor, School of Mathematics

**Cheol Soo Eun**
PHD in international Finance - New York University
Professor, College of Management

**Christoph J. Fahrni**
PHD in Chemistry - University of Basle
Associate Professor, School of Chemistry & Biochemistry

**Yuhong Fan**
PHD in Cell And Molecular Biology - Yeshiva University New York
Assistant Professor, School of Biology

**Nihad M Farooq**
PHD in English Language And Literature - Duke University
Assistant Professor, School of Literature, Communication & Culture (LCC)

**Mervyn Fathianathan**
PHD in Mechanical Engineering - National University Singapore
Assistant Professor, Georgia Tech Savannah

**Nicholas G Feamster**
PHD in Computer Science - Massachusetts Institute Of Technology
Assistant Professor, School of Computing Science & Systems

**Francesco G Fedele**
PHD in Civil Engineering - University Of Vermont
Assistant Professor, School of Civil & Environmental Engineering

**Andrei G Fedorov**
PHD in Mechanical Engineering - Purdue University
Associate Professor, School of Mechanical Engineering

**Faramarz Fekri**

PHD in Electrical Engineering - Georgia Institute Of Technology
Associate Professor, School of Electrical & Computer Engineering

**Jack M Feldman**
PHD in Psychology - University Of Illinois-Chicago
Professor, School of Psychology

**Mark Ferguson**
PHD in Operations Management - Duke University
Associate Professor, College of Management

**Ian T Ferguson**
PHD in Physics - University of Saint Andrews
Professor, School of Electrical & Computer Engineering

**Facundo M Fernandez**
PHD in Analytical Chemistry - University of Buenos Aires
Assistant Professor, School of Chemistry & Biochemistry

**Alberto Fernandez De Las Nieves**
PHD in Physics - University of Granada
Assistant Professor, School of Physics

**Eric Marie J Feron**
PHD in Aerospace, Aeronautical and Astronomy - Stanford University
Professor, School of Aerospace Engineering

**Bonnie Heck Ferri**
PHD in Electrical, Electronics & Communication - Georgia Institute Of Technology
Associate Chair, School of Electrical & Computer Engineering

**Aldo A Ferri**
PHD in Mechanical Engineering - Princeton University
Associate Professor, School of Mechanical Engineering

**Phillip N First**
PHD in Physics - University Of Illinois-Urbana-Champaign
Associate Professor, School of Physics

**Arthur D Fisk**
PHD in Psychology - University Of Illinois-Urbana-Champaign
Professor, School of Psychology

**Douglas Flamming**
PHD in History - Vanderbilt University
Professor, School of History, Technology & Society

**Benjamin Sitton Flowers**
PHD in American Studies/Civilization - University Of Minnesota-Twin Cities
Assistant Professor, College of Architecture

**James D Foley**
PHD in Computer Engineering - University of Michigan-Ann Arbor
Professor, College of Computing

**Robert D Foley**
PHD in Operations Research - University of Michigan-Ann Arbor
Professor, School of Industrial & Systems Engineering

**Christopher Michael Forman**
PHD in Economics - Northwestern University
Assistant Professor, College of Management

**Larry J Forney**
PHD in Chemical Engineering - Harvard University

Associate Professor, School of Chemical and Biomolecular Engineering

**Paul Brendan Foster**
PHD in East Asian Studies - Ohio State University
Associate Professor, School of Modern Languages

**Lawrence Foster**
PHD in History - University of Chicago
Professor, School of History, Technology & Society

**Mary Frank Fox**
PHD in Sociology - University of Michigan-Ann Arbor
Professor, School of History, Technology & Society

**Stefan Anthony France**
PHD in Chemistry - Johns Hopkins University
Assistant Professor, School of Chemistry & Biochemistry

**Kurt L Frankel**
PHD in Geology - University of Southern California
Assistant Professor, School of Earth & Atmospheric Sciences

**Albert B Frazier**
PHD in Electrical Engineering - Georgia Institute Of Technology
Professor, School of Electrical & Computer Engineering

**William James Frederick**
PHD in Chemical Engineering - University of Maine-Augusta
Director Academic, Institute of Paper Science & Technology at GT

**Jason A Freeman**
MS in Music - Columbia University-New York City
Assistant Professor, College of Architecture

**Steven P French**
PHD in City/Urban, Community & Region - University Of North Carolina-Chapel Hill
Professor, College of Architecture

**Hermann Marc Fritz**
PHD in Civil Engineering - Swiss Federal Institute of Technology
Assistant Professor, Georgia Tech Savannah

**James David Frost**
PHD in Civil Engineering - Purdue University
Director Academic, Georgia Tech Savannah

**Rong Fu**
PHD in Atmospheric Sciences And Meteorology - Columbia University-New York City
Associate Professor, School of Earth & Atmospheric Sciences

**Richard M Fujimoto**
PHD in Computer & Information Science - University of California-Berkeley
Regents Professor, College of Computing

**Ingrid Smithey Fulmer**
PHD in Business Administration & Management - Vanderbilt University
Assistant Professor, College of Management

**Merrick L Furst**
PHD in Computer & Information Science - Cornell University Central Office
Associate Dean, College of Computing

**Cheryl Gaimon**
PHD in Operations Research - Carnegie Mellon University
Regents Professor, College of Management

**Kenneth A Gall**
PHD in Mechanical Engineering - University Of Illinois-Urbana-Champaign
Professor, School of Materials Science & Engineering

**Vicki B Galloway**
PHD in Spanish Language And Literature - University Of South Carolina-Columbia
Professor, School of Modern Languages

**Michael Gamble**
MARCH in Architecture - Georgia Institute Of Technology
Associate Professor, College of Architecture

**Wilfred Gangbo**
PHD in Applied Mathematics - Swiss Federal Institute Technology
Professor, School of Mathematics

**Andres J Garcia**
PHD in Bioengineering & Biomedical Engineering - University of Pennsylvania
Associate Professor, School of Mechanical Engineering

**Srinivas Garimella**
PHD in Nuclear Engineering - Ohio State University
Professor, School of Mechanical Engineering

**Hamid Garmestani**
PHD in Engineering Mechanics - Cornell University Central Office
Professor, School of Materials Science & Engineering

**Stavros Garoufalidis**
PHD in Applied Mathematics - University of Chicago
Professor, School of Mathematics

**Laurie Anne Garrow**
PHD in Civil Engineering - Northwestern University
Assistant Professor, School of Civil & Environmental Engineering

**John W Garver**
PHD in Political Science & Government - University Of Colorado-Boulder
Professor, School of International Affairs

**Thomas K Gaylord**
PHD in Electrical Engineering - Rice University
Regents Professor, School of Electrical & Computer Engineering

**Nagi Z Gebraeel**
PHD in industrial Engineering - Purdue University
Assistant Professor, School of Industrial & Systems Engineering

**T Russell Gentry**
PHD in Civil Engineering - University of Michigan-Ann Arbor
Associate Professor, College of Architecture

**Aris P Georgakakos**
PHD in Civil Engineering - Massachusetts Institute Of Technology
Associate Chair, School of Civil & Environmental Engineering

**Rosario A Gerhardt**
PHD in Metallurgical Engineering - Columbia University-New York City
Professor, School of Materials Science & Engineering

**Leonid Germanovich**
PHD in Engineering Sciences - Moscow M.V.L. State University
Professor, School of Civil & Environmental Engineering

**Carla Gerona**

PHD in History - Johns Hopkins University
Assistant Professor, School of History, Technology & Society

**Jeffrey Geronimo**
PHD in Physics - Rockefeller University
Professor, School of Mathematics

**Seyed M Ghiaasiaan**
PHD in Mechanical Engineering - University Of California-Los Angeles
Professor, School of Mechanical Engineering

**Mohammad Ghomi**
PHD in Applied Mathematics - Johns Hopkins University
Associate Professor, School of Mathematics

**Vivek Ghosal**
PHD in Economics - University of Florida
Associate Professor, School of Economics

**Soumen Ghosh**
PHD in Business Administration - Ohio State University
Professor, College of Management

**Maysam Ghovanloo**
PHD in Electrical Engineering - University of Michigan-Ann Arbor
Assistant Professor, School of Electrical & Computer Engineering

**Don P Giddens**
PHD in Aerospace, Aeronautical and Astronomy - Georgia Institute Of Technology
Dean Academic, College of Engineering

**August W Giebelhaus**
PHD in History - University of Delaware
Professor, School of History, Technology & Society

**Jonathon Thomas Giffin**
PHD in Computer Science - University of Wisconsin-Madison
Assistant Professor, College of Computing

**Jerry H Ginsberg**
PHD in Civil Engineering - Columbia University-New York City
Professor, School of Mechanical Engineering

**Rudolph Lawson Gleason**
PHD in Biomedical Engineering - Texas A and M University
Assistant Professor, School of Mechanical Engineering

**Ari Glezer**
PHD in Aerospace, Aeronautical and Astronomy - California Institute Of Technology
Professor, School of Mechanical Engineering

**Ashok K Goel**
PHD in Computer & Information Science - Ohio State University
Associate Professor, College of Computing

**Marc Goetschalckx**
PHD in industrial Engineering - Georgia Institute Of Technology
Associate Professor, School of Industrial & Systems Engineering

**Arun M Gokhale**
PHD in Materials Engineering - University of Florida
Professor, School of Materials Science & Engineering

**Stuart H Goldberg**
PHD in Slavic Language & Literature - University of Wisconsin-Madison

Assistant Professor, School of Modern Languages

**Daniel I Goldman**

PHD in Physics - University of Texas-Austin

Assistant Professor, School of Physics

**David Goldsman**

PHD in Operations Research - Cornell College

Professor, School of Industrial & Systems Engineering

**Guillermo H Goldsztein**

PHD in Mathematics - Massachusetts Institute Of Technology

Associate Professor, School of Mathematics

**James L Gole**

PHD in Computer And Information Science - Rice University

Professor, School of Physics

**Michael David Goodisman**

PHD in Genetics - University Of Georgia

Assistant Professor, School of Biology

**Seymour E Goodman**

PHD in Applied Mathematics - California Institute Of Technology

Professor, School of International Affairs

**Barry Goodno**

PHD in Civil Engineering - Stanford University

Professor, School of Civil & Environmental Engineering

**Samuel Graham**

PHD in Mechanical Engineering - Georgia Institute Of Technology

Assistant Professor, School of Mechanical Engineering

**Alexander G Gray**

PHD in Computer Science - Carnegie Mellon University

Assistant Professor, School of Interactive Computing

**William L Green**

PHD in Mathematics - University of Pennsylvania

Professor, School of Mathematics

**Itzhak Green**

DSC in Mechanical Engineering - Technion – Israel Institute of Technology

Professor, School of Mechanical Engineering

**Robert J Gregor**

PHD in Health-Related Knowledge - Pennsylvania State University

Professor, School of Applied Physiology

**Anselm C Griffin**

PHD in Chemistry - University of Texas-Austin

School Chair, School of Polymer, Textile & Fiber Engineering

**Zenzi M Griffin**

PHD in Cognitive Psychology & Psychology - University Of Illinois-Urbana-Champaign

Associate Professor, School of Psychology

**Paul M Griffin**

PHD in industrial/Manufacturing Engineering - Texas A and M University-Galveston

Professor, School of Industrial & Systems Engineering

**Roman O Grigoriev**

PHD in Physics - California Institute Of Technology

Associate Professor, School of Physics

**Rebecca Elizabeth Grinter**

PHD in Computer And Information Science - University of California-Irvine

Associate Professor, College of Computing

**Martha A Grover**

PHD in Mechanical Engineering - California Institute Of Technology

Assistant Professor, School of Chemical and Biomolecular Engineering

**Randall L Guensler**

PHD in Civil Engineering - University of California-Davis

Professor, School of Civil & Environmental Engineering

**Robert E Guldberg**

PHD in Mechanical Engineering - University of Michigan-Ann Arbor

Professor, School of Mechanical Engineering

**Mark Guzdial**

PHD in Computer & Information Science - University of Michigan-Ann Arbor

Professor, College of Computing

## FULL-TIME ACADEMIC FACULTY ( H-P )

As of May 7, 2008

**Kevin A Haas**
PHD in Civil Engineering - University of Delaware
Assistant Professor, Georgia Tech Savannah

**Thomas G Habetler**
PHD in Electrical, Electronics & Communication - University of Wisconsin-Madison
Professor, School of Electrical & Computer Engineering

**Steven T Hackman**
PHD in industrial/Manufacturing Engineering - University of California-Berkeley
Associate Professor, School of Industrial & Systems Engineering

**Wassim M Haddad**
PHD in Mechanical Engineering - Florida Institute of Technology
Professor, School of Aerospace Engineering

**Rami M Haj-Ali**
PHD in Civil Engineering - University Of Illinois-Urbana-Champaign
Associate Professor, School of Civil & Environmental Engineering

**James O Hamblen**
PHD in Electrical Engineering - Georgia Institute Of Technology
Professor, School of Electrical & Computer Engineering

**Sathyanaraya Hanagud**
PHD in Aeronautical & Aerospace Engin - Stanford University
Professor, School of Aerospace Engineering

**Ronald Gordon Harley**
PHD in Electrical, Electronics & Communication - University of London
Professor, School of Electrical & Computer Engineering

**Douglas A Harrell**
PHD in Computer Science - University of California-San Diego
Assistant Professor, School of Literature, Communication & Culture (LCC)

**Evans M Harrell**
PHD in Mathematics - Princeton University
Associate Dean, School of Mathematics

**Tequila A. L. Harris**
PHD in Mechanical Engineering - Rensselaer Polytechnic Institute
Assistant Professor, School of Mechanical Engineering

**Mary Jean Harrold**
PHD in Computer & Information Science - University of Pittsburgh
Professor, College of Computing

**Stephen C Harvey**
PHD in Biophysics - Dartmouth College
Professor, School of Biology

**Paul E Hasler**
PHD in Electrical, Electronics & Communication - California Institute Of Technology
Associate Professor, School of Electrical & Computer Engineering

**Narin F Hassan**
MA in English Language And Literature - University of Rochester

Assistant Professor, School of Literature, Communication & Culture (LCC)

**Mark Hay**
PHD in Biological Science - University of California-Irvine
Professor, School of Biology

**Monson H Hayes**
PHD in Electrical Engineering - Massachusetts Institute Of Technology
Associate Chair, School of Electrical & Computer Engineering

**Christopher E Heil**
PHD in Applied Mathematics - University Of Maryland-College Park
Professor, School of Mathematics

**Christine E Heitsch**
PHD in Mathematics - University of California-Berkeley
Assistant Professor, School of Mathematics

**Clifford L Henderson**
PHD in Chemical Engineering - University of Texas-Austin
Associate Professor, School of Chemical and Biomolecular Engineering

**Susan Herbst**
PHD in Communications - University of Southern California
Professor, School of Public Policy

**Rigoberto Hernandez**
PHD in Chemistry - University of California-Berkeley
Associate Professor, School of Chemistry & Biochemistry

**TyAnna K Herrington**
PHD in Rhetoric - Texas Tech University
Associate Professor, School of Literature, Communication & Culture (LCC)

**Nolan E Hertel**
PHD in Nuclear Engineering - University Of Illinois-Urbana-Champaign
Professor, School of Mechanical Engineering

**Christopher K Hertzog**
PHD in Psychology - University of Southern California
Professor, School of Psychology

**Peter J Hesketh**
PHD in Electrical Engineering - University of Pennsylvania
Professor, School of Mechanical Engineering

**Dennis W Hess**
PHD in Chemistry - Lehigh University
Professor, School of Chemical and Biomolecular Engineering

**Diana M Hicks**
PHD in Physics - University of Sussex
School Chair, School of Public Policy

**Matthew John Higgins**
PHD in Economics - Emory University
Assistant Professor, College of Management

**Dewey H Hodges**
PHD in Aerospace, Aeronautical and Astronomy - Stanford University
Professor, School of Aerospace Engineering

**Michael HG Hoffmann**
PHD in Philosophy - Ludwig Maximilian University of Munich
Associate Professor, School of Public Policy

**Christian Houdre**

PHD in Math and Statistics - McGill University

Professor, School of Mathematics

**Paul Lyon Houston**

PHD in Chemistry - Yale University

Dean Academic, College of Sciences

**Ayanna MacCalla Howard**

PHD in Electrical Engineering - University of Southern California

Associate Professor, School of Electrical & Computer Engineering

**Jeffery S Hsieh**

PHD in Chemical Engineering - Syracuse University

Professor, School of Chemical and Biomolecular Engineering

**Frances C Hsu**

PHDARC in Architecture - ETH-Zurich

Assistant Professor, College of Architecture

**Ching-Hua Huang**

PHD in Chemistry - Johns Hopkins University

Associate Professor, School of Civil & Environmental Engineering

**Haiying Huang**

DSC in Geological Engineering - University Of Minnesota-Twin Cities

Assistant Professor, School of Civil & Environmental Engineering

**Nicholas V Hud**

PHD in Engineering and Applied Science - University of California-Davis

Associate Professor, School of Chemistry & Biochemistry

**Lewis Gregory Huey**

PHD in Physical And Theoretical Chemistry - University of Wisconsin-Madison

Associate Professor, School of Earth & Atmospheric Sciences

**Joseph Blake Hughes**

PHD in Civil Engineering - University Of Iowa

School Chair, School of Civil & Environmental Engineering

**Joseph L A Hughes**

PHD in Electrical, Electronics & Communication - Stanford University

Associate Chair, School of Electrical & Computer Engineering

**William D Hunt**

PHD in Electrical Engineering - University Of Illinois-Urbana-Champaign

Professor, School of Electrical & Computer Engineering

**Michael P Hunter**

PHD in Civil Engineering - University of Texas-Austin

Assistant Professor, School of Civil & Environmental Engineering

**Xiaoming Huo**

PHD in Mathematical Statistics - Stanford University

Associate Professor, School of Industrial & Systems Engineering

**Maurizio Iacopetta**

PHD in Economics - New York University

Assistant Professor, School of Economics

**Plamen Ignatov Iliev**

PHD in Applied Mathematics - Catholic University Louvain

Assistant Professor, School of Mathematics

**Daniel W Immergluck**

PHD in City and Regional Planning - University Of Illinois-Chicago
Associate Professor, College of Architecture

**Ellery D ingall**
PHD in Geochemistry - Yale University
Associate Professor, School of Earth & Atmospheric Sciences

**Mary Ann ingram**
PHD in Electrical, Electronics & Communication - Georgia Institute Of Technology
Professor, School of Electrical & Computer Engineering

**Jean Christophe Ippolito**
PHD in French Language And Literature - Columbia University-New York City
Assistant Professor, School of Modern Languages

**Charles Lee Isbell**
PHD in Electrical and Computer Engineering - Massachusetts Institute Of Technology
Assistant Professor, College of Computing

**Karl I Jacob**
PHD in Textile Sciences And Engineering - Ohio State University
Professor, School of Polymer, Textile & Fiber Engineering

**Laurence J Jacobs**
PHD in Engineering Mechanics - Columbia University-New York City
Associate Dean, School of Civil & Environmental Engineering

**Jechiel Jagoda**
PHD in Physics - Imperial College Science & Technology
Associate Chair, School of Aerospace Engineering

**Lawrence Robert James**
PHD in industrial And Organizational Psychology - University of Utah
Professor, School of Psychology

**Jiri Janata**
PHD in Analytical Chemistry - Charles University
Professor, School of Chemistry & Biochemistry

**Seung Soon Jang**
PHD in Polymer Chemistry - Seoul National University
Assistant Professor, School of Materials Science & Engineering

**Christopher Jarrett**
MS in Architecture - Columbia University-New York City
Associate Director, College of Architecture

**Nikil S Jayant**
PHD in Electrical, Electronics & Communication - Stanford University
Professor, School of Electrical & Computer Engineering

**Sundaresan Jayaraman**
PHD in Chemistry - North Carolina State University
Professor, School of Polymer, Textile & Fiber Engineering

**Narayanan Jayaraman**
PHD in Financial Services Marketing - University of Pittsburgh
Professor, College of Management

**Sheldon M Jeter**
PHD in Mechanical Engineering - Georgia Institute Of Technology
Associate Professor, School of Mechanical Engineering

**Chuanyi Ji**
PHD in Electrical Engineering - California Institute Of Technology

Associate Professor, School of Electrical & Computer Engineering

**Lin Jiang**

PHD in Ecology - Rutgers The State University Of New Jersey-Newark

Assistant Professor, School of Biology

**Eric N Johnson**

PHD in Aerospace Engineering - Georgia Institute Of Technology

Associate Professor, School of Aerospace Engineering

**William Steven Johnson**

PHD in Engineering Mechanics - Duke University

Professor, School of Materials Science & Engineering

**Ellis L Johnson**

PHD in Engineering Science and Industrial Engineering - University of California-Berkeley

Professor, School of Industrial & Systems Engineering

**George Barnett Johnston**

MARCH in Architecture - Rice University

Associate Professor, College of Architecture

**Jon J Johnston**

MS in Physics - University of London

Assistant Professor, School of Public Policy

**Christopher W Jones**

PHD in Chemical Engineering - California Institute Of Technology

Associate Professor, School of Chemical and Biomolecular Engineering

**Irving King Jordan**

PHD in Genetics - University Of Georgia

Associate Professor, School of Biology

**Yogendra K Joshi**

PHD in Mechanical Engineering - University of Pennsylvania

Professor, School of Mechanical Engineering

**Biing Hwang Juang**

PHD in Electrical Engineering - University Of California-Santa Barbara

Professor, School of Electrical & Computer Engineering

**Lawrence F Kahn**

PHD in Civil Engineering - University of Michigan-Ann Arbor

Professor, School of Civil & Environmental Engineering

**Adam Kalai**

PHD in Computer Science - Carnegie Mellon University

Assistant Professor, School of Computing Science & Systems

**Yael T Kalai**

PHD in Computer Science - Massachusetts Institute Of Technology

Assistant Professor, School of Computing Science & Systems

**Kyriaki Kalaitzidou**

PHD in Chemical Engineering and Materials Science - Michigan State University

Assistant Professor, School of Mechanical Engineering

**Britta Kallin**

PHD in German Literature - University of Cincinnati

Assistant Professor, School of Modern Languages

**Ruth Kanfer**

PHD in Psychology - Arizona State University

Professor, School of Psychology

**Roozbeh Kangari**
PHD in Civil Engineering - University Of Illinois-Urbana-Champaign
Professor, College of Architecture

**George Kardomateas**
PHD in Mechanical Engineering - Massachusetts Institute Of Technology
Professor, School of Aerospace Engineering

**Howard J Karloff**
PHD in Computer & Information Science - University of California-Berkeley
Adjunct Professor, College of Computing

**Stylianos Kavadias**
PHD in Operations Research - INSEAD
Assistant Professor, College of Management

**Edward Keene**
PHD in international Relations - London School of Economics and Political Science
Associate Professor, School of International Affairs

**David C Keezer**
PHD in Electrical, Electronics & Communication - Carnegie Mellon University
Professor, School of Electrical & Computer Engineering

**Wendy L Kelly**
PHD in Organic Chemistry - Johns Hopkins University
Assistant Professor, School of Chemistry & Biochemistry

**Melissa Lambeth Kemp**
PHD in Bioengineering & Biomedical Engineering - University Of Washington-Seattle
Assistant Professor, School of Biomedical Engineeringgineering

**Charles C Kemp**
PHD in Electrical Engineering - Massachusetts Institute Of Technology
Assistant Professor, School of Biomedical Engineeringgineering

**T A Brian Kennedy**
PHD in Physics - Queen's University Of Belfast
Professor, School of Physics

**Robert Kennedy**
PHD in Political Science And Government - Georgetown University
Professor, School of International Affairs

**James Stevenson Kenney**
PHD in Electrical, Electronics and Communication - Georgia Institute Of Technology
Associate Professor, School of Electrical & Computer Engineering

**Robert P Kertz**
PHD in Applied Mathematics - Northwestern University
Professor, School of Mathematics

**Pinar Keskinocak**
PHD in Operations Research - Carnegie Mellon University
Associate Professor, School of Industrial & Systems Engineering

**William C Kessler**
DSC in Chemical Engineering - Washington University
Professor of the Practice, School of Industrial & Systems Engineering

**Sabir Khan**
MARCH in Architecture - Rice University
Associate Dean, College of Architecture

**Masato Kikuchi**

MS in Japanese Language And Literature - University of Pittsburgh
Associate Professor, School of Modern Languages

**Rehim Kilic**
PHD in Economics - Michigan State University
Assistant Professor, School of Economics

**Jongman Kim**
PHD in Computer Science - Pennsylvania State University
Assistant Professor, School of Electrical & Computer Engineering

**Hyesoon Kim**
PHD in Electrical Engineering - University of Texas-Austin
Assistant Professor, School of Computing Science & Systems

**Jaehong Kim**
DSC in Civil Engineering - University Of Illinois-Urbana-Champaign
Assistant Professor, School of Civil & Environmental Engineering

**Seong-Hee Kim**
PHD in industrial/Manufacturing Engineering - Northwestern University
Associate Professor, School of Industrial & Systems Engineering

**Markus Erich Kindermann**
PHD in Physics - Leiden State University
Assistant Professor, School of Physics

**Gordon A Kingsley**
PHD in Public Administration - Syracuse University
Associate Professor, School of Public Policy

**Bernard Kippelen**
PHD in Physics - University of Louis Pasteur
Professor, School of Electrical & Computer Engineering

**Robert J Kirkman**
PHD in Philosophy - State University Of New York-Stony Brook
Assistant Professor, School of Public Policy

**Benjamin D.B. Klein**
PHD in Electrical Engineering - University Of Illinois-Urbana-Champaign
Assistant Professor, Georgia Tech Savannah

**Hans K Klein**
PHD in Political Science & Government - Massachusetts Institute Of Technology
Associate Professor, School of Public Policy

**Anton J Kleywegt**
PHD in industrial/Manufacturing Engineering - Purdue University
Associate Professor, School of Industrial & Systems Engineering

**Mikhail M Klimenko**
PHD in Business Administration - Stanford University
Associate Professor, School of Economics

**Kenneth J Knoespel**
PHD in English Literature (British & Comparative Literature) - University of Chicago
School Chair, School of Literature, Communication & Culture (LCC)

**Arthur Koblasz**
PHD in Computer & Information Science - California Institute Of Technology
Associate Professor, School of Electrical & Computer Engineering

**Paul A Kohl**
PHD in Analytical Chemistry - University of Texas-Austin

Regents Professor, School of Chemical and Biomolecular Engineering

**Janet L Kolodner**

PHD in Computer & Information Science - Yale University

Regents Professor, College of Computing

**Vladimir I Koltchinskii**

PHD in Applied Mathematics - Kiev University

Professor, School of Mathematics

**Narayanan M Komerath**

PHD in Aerospace Engineering - Georgia Institute Of Technology

Professor, School of Aerospace Engineering

**Konstantinos T Konstantinidis**

PHD in Microbial Genetics - Michigan State University

Assistant Professor, School of Civil & Environmental Engineering

**Kevin T Kornegay**

PHD in Electrical, Electronics & Communication - University of California-Berkeley

Associate Professor, School of Electrical & Computer Engineering

**William J Koros**

PHD in Chemical Engineering - University of Texas-Austin

Professor, School of Chemical and Biomolecular Engineering

**Gerhard Jean Marie Krige**

PHD in Philosophy - University of Sussex

Professor, School of History, Technology & Society

**Nils Klaus Kroger**

PHD in Biochemistry - University of Regensburg

Assistant Professor, School of Chemistry & Biochemistry

**David N Ku**

PHD in Aerospace Engineering - Georgia Institute Of Technology

Regents Professor, School of Mechanical Engineering

**Xi Kuang**

PHD in Accounting - University of Pittsburgh

Assistant Professor, College of Management

**Julia M Kubanek**

PHD in Organic Chemistry - University of British Columbia

Associate Professor, School of Biology

**Satish Kumar**

PHD in Textile Sciences And Engineering - Indian Institutes of Technology

Professor, School of Polymer, Textile & Fiber Engineering

**Kimberly E Kurtis**

PHD in Civil Engineering - University of California-Berkeley

Associate Professor, School of Civil & Environmental Engineering

**Alexander M Kuzmich**

PHD in Physics - University of Rochester

Associate Professor, School of Physics

**Paul H Kvam**

PHD in Mathematical Statistics - University of California-Davis

Professor, School of Industrial & Systems Engineering

**Angela Labarca**

PHD in Philosophy - Ohio State University

Professor, School of Modern Languages

**Michael Lacey**
PHD in Applied Mathematics - University Of Illinois-Urbana-Champaign
Professor, School of Mathematics

**Uzi Landman**
PHD in Physics - Technion – Israel Institute of Technology
Regents Professor, Provost & Exec VP Academic Affairs

**C John Langley**
PHD in Logistics And Materials Management - Pennsylvania State University
Professor of the Practice, School of Industrial & Systems Engineering

**Aaron D Lanterman**
PHD in Electrical Engineering - Washington University
Associate Professor, School of Electrical & Computer Engineering

**Michelle C LaPlaca**
PHD in Bioengineering & Biomedical Engineering - University of Pennsylvania
Associate Professor, School of Biomedical Engineeringgineering

**Joy Laskar**
PHD in Electrical Engineering - University Of Illinois-Urbana-Champaign
Professor, School of Electrical & Computer Engineering

**Jorge A Laval**
DSC in Transportation And Highway Engineering - University of California-Berkeley
Assistant Professor, School of Civil & Environmental Engineering

**Thang Tu Quoc Le**
PHD in Mathematics - Moscow M.V.L. State University
Professor, School of Mathematics

**Joseph M Le Doux**
PHD in Chemical Engineering - Rutgers The State University Of New Jersey-Newark
Associate Professor, School of Biomedical Engineeringgineering

**W Marshall Leach**
PHD in Electrical Engineering - Georgia Institute Of Technology
Professor, School of Electrical & Computer Engineering

**Michael Joseph Leamy**
PHD in Mechanical Engineering - University of Michigan-Ann Arbor
Assistant Professor, School of Mechanical Engineering

**W Jude Leblanc**
MARCH in Architecture - Harvard University
Associate Professor, College of Architecture

**Eva K Lee**
PHD in Applied Mathematics - Rice University
Associate Professor, School of Industrial & Systems Engineering

**Jay H Lee**
PHD in Chemical Engineering - California Institute Of Technology
Professor, School of Chemical and Biomolecular Engineering

**Wenke Lee**
PHD in Computer & Information Science - Columbia University-New York City
Associate Professor, College of Computing

**Hsien-Hsin Sean Lee**
PHD in Computer Science and Engineering - University of Michigan-Ann Arbor
Assistant Professor, School of Electrical & Computer Engineering

**Chin-Hui Lee**

PHD in Electrical Engineering - University Of Washington-Seattle

Professor, School of Electrical & Computer Engineering

**Seo Yeon Lee**

PHD in Finance - University of Chicago

Assistant Professor, College of Management

**Kok-Meng Lee**

PHD in Mechanical Engineering - Massachusetts Institute Of Technology

Professor, School of Mechanical Engineering

**Jeongsik J Lee**

PHD in Strategic Management - University Of California-Los Angeles

Assistant Professor, College of Management

**Cheryl Leggon**

PHD in Sociology - University of Chicago

Associate Professor, School of Public Policy

**Nancey Green Leigh**

PHD in City/Urban, Community & Region - University of California-Berkeley

Professor, College of Architecture

**Blake Leland**

PHD in English Literature - Cornell University Central Office

Associate Professor, School of Literature, Communication & Culture (LCC)

**Roberto T Leon**

PHD in Civil Engineering - University of Texas-Austin

Professor, School of Civil & Environmental Engineering

**John D Leonard**

PHD in Civil Engineering - University of California-Irvine

Associate Dean, School of Civil & Environmental Engineering

**Marc E Levenston**

PHD in Mechanical Engineering - Stanford University

Adjunct Associate Professor, School of Mechanical Engineering

**Aaron David Levine**

PHD in Urban Affairs/Studies - Princeton University

Assistant Professor, School of Public Policy

**Mo Li**

PHD in Applied Physics - California Institute Of Technology

Associate Professor, School of Materials Science & Engineering

**Xiaoliang Li**

PHD in Chinese Language And Literature - University Of Virginia

Associate Professor, School of Modern Languages

**Haizheng Li**

PHD in Economics - University Of Colorado-Boulder

Associate Professor, School of Economics

**Ye Li**

PHD in Electrical, Electrical and Communications - Auburn University

Professor, School of Electrical & Computer Engineering

**Minqiang Li**

PHD in Finance - University Of Illinois-Urbana-Champaign

Assistant Professor, College of Management

**Wing Suet Li**

PHD in Mathematics - University of Michigan-Ann Arbor

Professor, School of Mathematics

**Steven Y Liang**

PHD in Mechanical Engineering - University of California-Berkeley

Professor, School of Mechanical Engineering

**Raquel L Lieberman**

PHD in Chemistry - Northwestern University

Assistant Professor, School of Chemistry & Biochemistry

**Timothy Charles Lieuwen**

PHD in Mechanical Engineering - Georgia Institute Of Technology

Associate Professor, School of Aerospace Engineering

**Sung-Kyu Lim**

PHD in Computer & Information Science - University Of California-Los Angeles

Associate Professor, School of Electrical & Computer Engineering

**Stanley Lindsey**

PHD in Civil Engineering - Vanderbilt University

Professor of the Practice, School of Civil & Environmental Engineering

**Charles L Liotta**

PHD in Chemistry - University Of Maryland University College

Professor, Provost & Exec VP Academic Affairs

**Harvey Lipkin**

PHD in Mechanical Engineering - University of Florida

Associate Professor, School of Mechanical Engineering

**Richard Lipton**

PHD in Computer & Information Science - Carnegie Mellon University

Professor, College of Computing

**Yingjie Liu**

PHD in Applied Mathematics - University of Chicago

Assistant Professor, School of Mathematics

**Ling Liu**

PHD in Computer & Information Science - Tilburg University

Associate Professor, College of Computing

**Cheng-Yun Karen Liu**

PHD in Computer Science - University Of Washington-Seattle

Assistant Professor, School of Interactive Computing

**Meilin Liu**

PHD in Materials Engineering - University of California-Berkeley

Professor, School of Materials Science & Engineering

**Kirill S Lobachev**

PHD in Molecular Biology - Leningrad Pedagogical University

Assistant Professor, School of Biology

**Frank E Loeffler**

PHD in Microbiology - University of Hamburg

Associate Professor, School of Civil & Environmental Engineering

**Robert G Loewy**

PHD in Engineering Mechanics - University of Pennsylvania

School Chair, School of Aerospace Engineering

**Gabriel H Loh**

PHD in Computer Science - Yale University

Assistant Professor, College of Computing

**Jack R Lohmann**
PHD in industrial/Manufacturing Engineering - Stanford University
Vice Provost, School of Industrial & Systems Engineering

**William J Long**
PHD in Political Science And Government - Columbia University-New York City
School Chair, School of International Affairs

**Michael Loss**
PHD in Mathematics - Swiss Federal Institute Technology
Professor, School of Mathematics

**Hang Lu**
PHD in Chemical Engineering - Massachusetts Institute Of Technology
Assistant Professor, School of Chemical and Biomolecular Engineering

**Hanchao Lu**
PHD in History - University Of California-Los Angeles
Professor, School of History, Technology & Society

**Jye-Chyi Lu**
PHD in Mathematical Statistics - University of Wisconsin-Madison
Professor, School of Industrial & Systems Engineering

**Doron S Lubinsky**
PHD in Applied Mathematics - University Of Witwatersrand
Professor, School of Mathematics

**Peter J Ludovice**
PHD in Chemical Engineering - Massachusetts Institute Of Technology
Associate Professor, School of Chemical and Biomolecular Engineering

**Jian Luo**
PHD in Hydrology - Stanford University
Assistant Professor, School of Civil & Environmental Engineering

**Nicholas H Lurie**
PHD in Business Administration - University of California-Berkeley
Assistant Professor, College of Management

**Thomas N Lux**
BA in English Literature - Emerson College
Professor, School of Literature, Communication & Culture (LCC)

**Christopher S Lynch**
PHD in Mechanical Engineering - University Of California-Santa Barbara
Adjunct Professor, School of Mechanical Engineering

**Jean Lynch-Stieglitz**
PHD in Geological Sciences - Columbia University-New York City
Associate Professor, School of Earth & Atmospheric Sciences

**Louis Andrew Lyon**
PHD in Physical Chemistry - Northwestern University
Professor, School of Chemistry & Biochemistry

**Xiaoli Ma**
PHD in Electrical Engineering - University Of Minnesota-Twin Cities
Assistant Professor, School of Electrical & Computer Engineering

**Blair MacIntyre**
PHD in Computer & Information Science - Columbia University-New York City
Associate Professor, College of Computing

**Vijay K Madisetti**

PHD in Computer Engineering - University of California-Berkeley
Professor, School of Electrical & Computer Engineering

**Brian S Magerko**
PHD in Computer Science - University of Michigan-Flint
Assistant Professor, School of Literature, Communication & Culture (LCC)

**Andrew V Makeev**
PHD in Aerospace Engineering - Georgia Institute Of Technology
Assistant Professor, School of Aerospace Engineering

**Naresh K Malhotra**
PHD in Marketing - State University Of New York-Buffalo
Regents Professor, College of Management

**Alexei Marchenkov**
PHD in Physics - Leiden State University
Assistant Professor, School of Physics

**Seth Richard Marder**
PHD in Chemistry - University of Wisconsin-Madison
Professor, School of Chemistry & Biochemistry

**Miroslav I Marek**
PHD in Metallurgical Engineering - Georgia Institute Of Technology
Temp Professional Advisor Hrly, School of Materials Science & Engineering

**Leo Mark**
PHD in Computer & Information Science - University of Aarhus
Associate Professor, College of Computing

**Luis D L Martins**
PHD in Management - New York University
Associate Professor, College of Management

**Marianne Mason**
PHD in Linguistics - University Of Georgia
Assistant Professor, School of Modern Languages

**Kyoko Masuda**
PHD in Languages - University of Arizona
Assistant Professor, School of Modern Languages

**Heinrich Felix Matzinger**
PHD in Applied Mathematics - Cornell University Central Office
Assistant Professor, School of Mathematics

**Dimitri Mavris**
PHD in Aerospace Engineering - Georgia Institute Of Technology
Professor, School of Aerospace Engineering

**Sheldon W May**
PHD in Chemistry - University of Chicago
Regents Professor, School of Chemistry & Biochemistry

**Gary S May**
PHD in Electrical, Electronics & Communication - University of California-Berkeley
School Chair, School of Electrical & Computer Engineering

**Paul W Mayne**
PHD in Civil Engineering - Cornell University Central Office
Professor, School of Civil & Environmental Engineering

**James Rhett Mayor**
PHD in Mechanical Engineering - University of Natal

Assistant Professor, School of Mechanical Engineering

**Alexandra Mazalek**

PHD in Educational/Instructional Media - Massachusetts Institute Of Technology

Assistant Professor, School of Literature, Communication & Culture (LCC)

**Patrick S McCarthy**

PHD in Economics - Claremont Graduate University

School Chair, School of Economics

**Nael A McCarty**

PHD in Physiology, Human And Animal - University Of Texas Health Science Center-Houston

Adjunct Associate Professor, School of Biology

**James H McClellan**

PHD in Electrical Engineering - Rice University

Professor, School of Electrical & Computer Engineering

**John McCuan**

PHD in Applied Mathematics - Stanford University

Associate Professor, School of Mathematics

**Todd C McDevitt**

PHD in Bioengineering & Biomedical Engineering - University Of Washington-Seattle

Assistant Professor, School of Biomedical Engineeringgineering

**John F McDonald**

PHD in Genetics - University of California-Davis

School Chair, School of Biology

**David L McDowell**

PHD in Mechanical Engineering - University Of Illinois-Chicago

Regents Professor, School of Mechanical Engineering

**Leon F McGinnis**

PHD in industrial/Manufacturing Engineering - North Carolina State University

Professor, School of Industrial & Systems Engineering

**Larry Vern McIntire**

PHD in Chemical Engineering - Princeton University

School Chair, School of Biomedical Engineeringgineering

**John R. McIntyre**

MPA in Political Science and Government - Northeastern University

Professor, College of Management

**Phillip McKnight**

PHD in German Language And Literature - Brown University

School Chair, School of Modern Languages

**Steven W McLaughlin**

PHD in Electrical, Electronics & Communication - University of Michigan-Ann Arbor

Vice Provost, International Initiatives, School of Electrical & Computer Engineering

**Yajun Mei**

PHD in Mathematics - California Institute Of Technology

Assistant Professor, School of Industrial & Systems Engineering

**James D Meindl**

PHD in Electrical Engineering - Carnegie Mellon University

Professor, School of Electrical & Computer Engineering

**A P Meliopoulos**

PHD in Electrical Engineering - Georgia Institute Of Technology

Professor, School of Electrical & Computer Engineering

**Julia Ellen Melkers**
PHD in Public Administration - Syracuse University
Associate Professor, School of Public Policy

**Shreyes N Melkote**
PHD in Mechanical Engineering - Michigan Technological University
Professor, School of Mechanical Engineering

**Suresh Menon**
PHD in Aerospace Engineering - University Of Maryland-College Park
Professor, School of Aerospace Engineering

**James Carson Meredith**
PHD in Chemical Engineering - University of Texas-Austin
Associate Professor, School of Chemical and Biomolecular Engineering

**Alfred H Merrill**
PHD in Biochemistry - Cornell University Medical Campus
Professor, School of Biology

**Russell M Mersereau**
PHD in Electrical Engineering - Massachusetts Institute Of Technology
Regents Professor, School of Electrical & Computer Engineering

**Michael D Meyer**
PHD in Civil Engineering - Massachusetts Institute Of Technology
Professor, School of Civil & Environmental Engineering

**Jennifer E Michaels**
PHD in Engineering Mechanics - Cornell University Central Office
Associate Professor, School of Electrical & Computer Engineering

**Thomas E Michaels**
PHD in Physics - Washington State University
Professor of the Practice, School of Electrical & Computer Engineering

**Kalomire-Eleni Mihail**
PHD in Computer And Information Scien - Harvard University
Associate Professor, College of Computing

**William T Mikolowsky**
PHD in Aerospace Engineering - Georgia Institute Of Technology
Professor of the Practice, School of Aerospace Engineering

**Valeria Tohver Milam**
PHD in Materials Science - University Of Illinois-Urbana-Champaign
Assistant Professor, School of Materials Science & Engineering

**Melinda Millard-Stafford**
PHD in Sports And Exercise - University Of Georgia
Associate Chair, School of Applied Physiology

**Linda S Milor**
PHD in Electrical, Electronics and Communication - University of California-Berkeley
Associate Professor, School of Electrical & Computer Engineering

**Farrokh Mistree**
PHD in Naval Architecture & Marine Engineering - University of California-Berkeley
Associate Chair, School of Mechanical Engineering

**Christine Mitchell**
PHD in industrial Systems Engineering - Ohio State University
Professor, School of Industrial & Systems Engineering

**Sabyasachi Mitra**

PHD in Business Management & Administration - University Of Iowa
Associate Professor, College of Management

**Renato DC Monteiro**
PHD in industrial Engineering - University of California-Berkeley
Professor, School of Industrial & Systems Engineering

**Cecilia Montes-Alcala**
PHD in Linguistics - University of California-Berkeley
Assistant Professor, School of Modern Languages

**Joseph P. Montoya**
PHD in Biology - Harvard University
Professor, School of Biology

**Vincent J Mooney**
PHD in Electrical, Electronics and Communication - Stanford University
Associate Professor, School of Electrical & Computer Engineering

**Elliot Moore**
PHD in Electrical Engineering - Georgia Institute Of Technology
Assistant Professor, School of Electrical & Computer Engineering

**Christopher J Moore**
MFA in Music - East Carolina University
Assistant Professor, College of Architecture

**Thomas Morley**
PHD in Mathematics - Chestnut Hill College
Professor, School of Mathematics

**Rafi L Muhanna**
PHD in Civil Engineering - University Of Sofia
Associate Professor, Georgia Tech Savannah

**Saibal Mukhopadhyay**
PHD in Electrical, Electronics & Communication - Purdue University
Assistant Professor, School of Electrical & Computer Engineering

**Charles W Mulford**
PHD in Management Science - Florida State University
Professor, College of Management

**James A Mulholland**
PHD in Chemical Engineering - Massachusetts Institute Of Technology
Professor, School of Civil & Environmental Engineering

**Abir Mullick**
MS in City/Urban, Community & Region - Ohio State University
Professor, College of Architecture

**Janet H Murray**
PHD in English Language And Literature - Harvard University
Professor, School of Literature, Communication & Culture (LCC)

**Niren Murthy**
PHD in Bioengineering & Biomedical Engineering - University Of Washington-Seattle
Assistant Professor, School of Biomedical Engineeringgineering

**Elizabeth D Mynatt**
PHD in Computer & Information Science - Georgia Institute Of Technology
Associate Professor, College of Computing

**Dennis H Nagao**
PHD in industrial/Organization Psychology - University Of Illinois-Chicago

Associate Professor, College of Management

**Sankar Nair**
PHD in Chemical Engineering - University of Massachusetts-Amherst
Assistant Professor, School of Chemical and Biomolecular Engineering

**Usha C Nair-Reichert**
PHD in Economics - Purdue University
Associate Professor, School of Economics

**Sridhar Narasimhan**
PHD in Business Administration & Management - Ohio State University
Professor, College of Management

**Shamkant B Navathe**
PHD in Engineering - University of Michigan-Ann Arbor
Professor, College of Computing

**G Paul Neitzel**
PHD in Mechanical Engineering - Johns Hopkins University
Professor, School of Mechanical Engineering

**George L Nemhauser**
PHD in Operations Research - Northwestern University
Professor, School of Industrial & Systems Engineering

**Arkadi S Nemirovski**
PHD in Mathematics - Moscow M.V.L. State University
Professor, School of Industrial & Systems Engineering

**Athanasios Nenes**
PHD in Chemical Engineering - California Institute Of Technology
Assistant Professor, School of Earth & Atmospheric Sciences

**Robert M Nerem**
PHD in Aerospace, Aeronautical and Astronomy - Ohio State University
Professor, School of Mechanical Engineering

**Nancy J Nersessian**
PHD in Philosophy - Case Western Reserve University
Regents Professor, School of Interactive Computing

**Richard W Neu**
PHD in Mechanical Engineering - University Of Illinois-Urbana-Champaign
Professor, School of Mechanical Engineering

**Andrew Vern Newman**
PHD in Geological Sciences - Northwestern University
Assistant Professor, School of Earth & Atmospheric Sciences

**Toan T Nguyen**
PHD in Physics - University Of Minnesota-Twin Cities
Assistant Professor, School of Physics

**T Richard Nichols**
PHD in Physiology - Harvard University
School Chair, School of Applied Physiology

**Michael Nitsche**
PHD in Architecture - University Of Cambridge
Assistant Professor, School of Literature, Communication & Culture (LCC)

**Gregory H Nobles**
PHD in American Literature - University of Michigan-Ann Arbor
Director Academic, School of History, Technology & Society

**Douglas Simpson Noonan**
PHD in Public Policy Analysis - University of Chicago
Assistant Professor, School of Public Policy

**Bryan G Norton**
PHD in Philosophy - University of Michigan-Ann Arbor
Professor, School of Public Policy

**Edward R Omiecinski**
PHD in Computer Science - Northwestern University
Associate Professor, College of Computing

**Thomas Orlando**
PHD in Chemistry - State University Of New York-Stony Brook
School Chair, School of Chemistry & Biochemistry

**David I Orloff**
PHD in Applied Mechanics - Drexel University
Professor, School of Mechanical Engineering

**Alessandro Orso**
PHD in Computer Science - Politecnico di Milano University
Assistant Professor, College of Computing

**Abdallah Ougazzaden**
PHD in Materials Science - University of Paris XII
Professor, School of Electrical & Computer Engineering

**Eric Marvin Overby**
PHD in information Sciences And Systems - Emory University
Assistant Professor, College of Management

**Henry L Owen**
PHD in Electrical Engineering - Georgia Institute Of Technology
Professor, School of Electrical & Computer Engineering

**Adegboyega K Oyelere**
PHD in Organic Chemistry - Brown University
Assistant Professor, School of Chemistry & Biochemistry

**Ronghua Pan**
PHD in Applied Mathematics - Chinese Academy Of Sciences
Associate Professor, School of Mathematics

**Santosh Pande**
PHD in Computer And Information Science - North Carolina State University
Associate Professor, College of Computing

**Ioannis Papapolymerou**
PHD in Electrical, Electronics & Communication - University of Michigan-Ann Arbor
Associate Professor, School of Electrical & Computer Engineering

**John G Papastavridis**
PHD in Engineering Science - Purdue University
Associate Professor, School of Mechanical Engineering

**Christiaan Jos Jan Paredis**
PHD in Electrical Engineering - Carnegie Mellon University
Assistant Professor, School of Mechanical Engineering

**Haesun Park**
PHD in Computer Science - Cornell University
Professor, School of Computing Science & Systems

**Robert G Parker**

PHD in Engineering - Kansas State University

Associate Chair, School of Industrial & Systems Engineering

**Charles K Parsons**

PHD in industrial/Organizational Psychology - University Of Illinois-Urbana-Champaign

Professor, College of Management

**Timothy Patterson**

PHD in Engineering - Georgia Institute Of Technology

Assistant Professor, School of Mechanical Engineering

**Spyros G Pavlostathis**

PHD in Environmental/Environmental Health - Cornell University Central Office

Professor, School of Civil & Environmental Engineering

**Christine K Payne**

PHD in Physical And Theoretical Chemistry - University of California-Berkeley

Assistant Professor, School of Chemistry & Biochemistry

**Celia Pearce**

PHD in Educational/Instructional Media - University of London

Assistant Professor, School of Literature, Communication & Culture (LCC)

**Willie Pearson**

PHD in Sociology - Southern Illinois University-Carbondale

Professor, School of History, Technology & Society

**John B Peatman**

PHD in Electrical Engineering - Case Western Reserve University

Professor, School of Electrical & Computer Engineering

**Zhigang Peng**

PHD in Geophysics And Seismology - University of Southern California

Assistant Professor, School of Earth & Atmospheric Sciences

**Liang Peng**

PHD in Probability - Netherlands School of Business I (aka RSM Erasmus University)

Associate Professor, School of Mathematics

**Kurt D Pennell**

PHD in Soil Sciences - University of Florida

Professor, School of Civil & Environmental Engineering

**John Peponis**

PHD in Architecture - University College London

Professor, College of Architecture

**E Michael Perdue**

PHD in Geochemistry - Georgia Institute Of Technology

Professor, School of Earth & Atmospheric Sciences

**Joseph W. Perry**

PHD in Chemistry - California Institute Of Technology

Professor, School of Chemistry & Biochemistry

**Georgia A Persons**

PHD in Political Science And Government - Massachusetts Institute Of Technology

Professor, School of Public Policy

**Andrew F Peterson**

PHD in Electrical Engineering - University Of Illinois-Urbana-Champaign

Associate Chair, School of Electrical & Computer Engineering

**Bojan Petrovic**

PHD in Nuclear Engineering - Pennsylvania State University

Professor, School of Mechanical Engineering

**Olivier N Pierron**

PHD in Materials Engineering - Pennsylvania State University

Assistant Professor, School of Mechanical Engineering

**Ionel Popescu**

PHD in Mathematics - Massachusetts Institute Of Technology

Assistant Professor, School of Mathematics

**Steven M Potter**

PHD in Biological Science - University of California-Irvine

Assistant Professor, School of Biomedical Engineeringgineering

**Colin Potts**

PHD in Psychology - University Of Sheffield

Associate Professor, College of Computing

**James C Powers**

PHD in Organic Chemistry - Massachusetts Institute Of Technology

Regents Professor, School of Chemistry & Biochemistry

**J V R Prasad**

PHD in Aerospace Engineering - Georgia Institute Of Technology

Professor, School of Aerospace Engineering

**Mark R Prausnitz**

PHD in Chemical Engineering - Massachusetts Institute Of Technology

Professor, School of Chemical and Biomolecular Engineering

**Boris I Priloutski**

PHD in Biomechanics - Unknown

Associate Professor, School of Applied Physiology

**Amy R Pritchett**

SCD in Aerospace, Aeronautical and Astronomy - Massachusetts Institute Of Technology

Associate Professor, School of Industrial & Systems Engineering

**Milos Prvulovic**

PHD in Computer Science - University Of Illinois-Urbana-Champaign

Assistant Professor, College of Computing

**Calton Pu**

PHD in Computer Science - University Of Washington-Seattle

Professor, College of Computing

**Gerald S Pullman**

PHD in Plant Pathology - University of California-Davis

Professor, School of Biology

**Domonic Derrell Purviance**

MS in City/Urban, Community & Region - Georgia Institute Of Technology

Part-Time Lecturer, College of Architecture

**Michael Pustilnik**

PHD in Physics - Bar-Ilan University

Assistant Professor, School of Physics

## FULL-TIME ACADEMIC FACULTY ( Q-Z )

As of May 7, 2008

**Jianmin Qu**
PHD in Theoretical Engineering and Applied Mechanics - Northwestern University
Associate Chair, School of Mechanical Engineering

**Arthur J Ragauskas**
PHD in Chemistry - University of Western Ontario
Professor, School of Chemistry & Biochemistry

**Farzad Rahnema**
PHD in Nuclear Engineering - University Of California-Los Angeles
Associate Chair, School of Mechanical Engineering

**Stephen E Ralph**
PHD in Electrical Engineering - Cornell University Central Office
Professor, School of Electrical & Computer Engineering

**Ashwin Ram**
PHD in Computer Science - Yale University
Associate Professor, College of Computing

**Umakishore Ramachandran**
PHD in Computer Science - University of Wisconsin-Madison
Professor, College of Computing

**Chandra S Raman**
PHD in Physics - University of Michigan-Ann Arbor
Associate Professor, School of Physics

**Dana Randall**
PHD in Applied Mathematics - University of California-Berkeley
Associate Professor, College of Computing

**Matthew J Realff**
PHD in Chemical Engineering - Massachusetts Institute Of Technology
Associate Professor, School of Chemical and Biomolecular Engineering

**Mary Lynn Realff**
PHD in Mechanical Engineering - Massachusetts Institute Of Technology
Associate Professor, School of Polymer, Textile & Fiber Engineering

**James Matthew Rehg**
PHD in Electrical, Electronics and Communications - Carnegie Mellon University
Associate Professor, College of Computing

**Elsa Reichmanis**
PHD in Chemistry - Madonna University
Professor, School of Chemical and Biomolecular Engineering

**Spiridon A Reveliotis**
PHD in industrial/Manufacturing Engineering - University Of Illinois-Urbana-Champaign
Associate Professor, School of Industrial & Systems Engineering

**Mark O Riedl**
PHD in Computer Science - North Carolina State University
Assistant Professor, School of Interactive Computing

**Elisa Riedo**
PHD in Physics - University of Milan

Assistant Professor, School of Physics

**Christine P. Ries**

PHD in Economics - University of Chicago

Professor, School of Economics

**Gernot Riether**

MARCH in Architecture - Columbia University-New York City

Assistant Professor, College of Architecture

**George F Riley**

PHD in Computer Science - Georgia Institute Of Technology

Associate Professor, School of Electrical & Computer Engineering

**Gabriel A Rincon-Mora**

PHD in Electrical Engineering - Georgia Institute Of Technology

Associate Professor, School of Electrical & Computer Engineering

**David A Ringholz**

MA in industrial Design - North Carolina State University

Assistant Professor, College of Architecture

**Glenn J Rix**

PHD in Civil Engineering - University of Texas-Austin

Professor, School of Civil & Environmental Engineering

**Haney Randall Roark**

MCP in City/Urban, Community & Region - University of Pennsylvania

Associate Professor Emeritus, College of Architecture

**Philip J W Roberts**

PHD in Environmental/Environmental Health - California Institute Of Technology

Professor, School of Civil & Environmental Engineering

**James S Roberts**

PHD in Psychology - University Of South Carolina-Columbia

Associate Professor, School of Psychology

**Peter Rogers**

PHD in Physics - Brown University

Professor, School of Mechanical Engineering

**Wendy A Rogers**

PHD in Psychology - Georgia Institute Of Technology

Professor, School of Psychology

**Juan Rogers**

PHD in Public Policy Analysis - Virginia Polytechnic Institute and State University

Associate Professor, School of Public Policy

**Ajeet Rohatgi**

PHD in Metallurgical Engineering - Lehigh University

Regents Professor, School of Electrical & Computer Engineering

**Howard A Rollins**

PHD in Psychology - University Of California-Los Angeles

Professor, School of Psychology

**Justin Keith Romberg**

PHD in Electrical and Computer Engineering - Rice University

Assistant Professor, School of Electrical & Computer Engineering

**Kathy O Roper**

MS in Communications - Georgia State University

Assistant Professor, College of Architecture

**David W Rosen**
PHD in Mechanical Engineering - University of Massachusetts-Amherst
Associate Chair, School of Mechanical Engineering

**Catherine L Ross**
PHD in City/Urban, Community & Region - Cornell University Central Office
Director Academic, College of Architecture

**Sue V Rosser**
PHD in Zoology - University of Wisconsin-Madison
Dean Academic, Ivan Allen College

**Jaroslaw R Rossignac**
PHD in Electrical, Electronics & Communication - University of Rochester
Professor, College of Computing

**Frank T Rothaermel**
PHD in Strategic Management - University Of Washington-Seattle
Associate Professor, College of Management

**William Rouse**
PHD in Mechanical Engineering - Massachusetts Institute Of Technology
Professor, School of Industrial & Systems Engineering

**Ronald W Rousseau**
PHD in Chemical Engineering - Louisiana State University, Baton Rouge
School Chair, School of Chemical and Biomolecular Engineering

**Charles F Rudolph**
MBA in Architecture & Related Program - Columbia University-New York City
Associate Professor, College of Architecture

**Stephen M Ruffin**
PHD in Aerospace, Aeronautical and Astronomy - Stanford University
Associate Professor, School of Aerospace Engineering

**Ryan P Russell**
PHD in Aerospace, Aeronautical and Astronomy - University of Texas-Austin
Assistant Professor, School of Aerospace Engineering

**Armistead G Russell**
PHD in Civil Engineering - California Institute Of Technology
Professor, School of Civil & Environmental Engineering

**Massimo Ruzzene**
PHD in Applied Mechanics - Polytechnic University of Turin
Associate Professor, School of Aerospace Engineering

**Erica Eileen Ryherd**
PHD in Architecture - University of Nebraska-Lincoln
Assistant Professor, School of Mechanical Engineering

**Carlos A.R. Sa De Melo**
PHD in Physics - Stanford University
Associate Professor, School of Physics

**Karim G Sabra**
PHD in Mechanical Engineering - University of Michigan-Ann Arbor
Assistant Professor, School of Mechanical Engineering

**Nader Sadegh**
PHD in Mechanical Engineering - University of California-Berkeley
Associate Professor, School of Mechanical Engineering

**Richard F Salant**

PHD in Mechanical Engineering - Massachusetts Institute Of Technology

Professor, School of Mechanical Engineering

**Steven Salbu**

PHD in Business Administration & Management - University of Pennsylvania

Dean Academic, College of Management

**Joseph Homer Saleh**

PHD in Aerospace, Aeronautical and Astronomy - Massachusetts Institute Of Technology

Assistant Professor, School of Aerospace Engineering

**Michael D Salomone**

PHD in Political Science And Governme - University of Pittsburgh

Professor, School of International Affairs

**Athanassios Sambanis**

PHD in Chemical Engineering - University Of Minnesota-Twin Cities

Professor, School of Chemical and Biomolecular Engineering

**Thomas H B Sanders**

PHD in Metallurgical Engineering - Georgia Institute Of Technology

Regents Professor, School of Materials Science & Engineering

**Kenneth H. Sandhage**

PHD in Ceramic Sciences And Engineering - Massachusetts Institute Of Technology

Professor, School of Materials Science & Engineering

**Lakshmi N Sankar**

PHD in Aerospace Engineering - Georgia Institute Of Technology

Associate Chair, School of Aerospace Engineering

**Juan C Santamarina**

PHD in Civil Engineering - Purdue University

Professor, School of Civil & Environmental Engineering

**Philip J Santangelo**

PHD in Engineering - University of California-Davis

Assistant Professor, School of Biomedical Engineeringgineering

**Mathieu W Savelsbergh**

PHD in Operations Research - Netherlands School of Business I (aka RSM Erasmus University)

Professor, School of Industrial & Systems Engineering

**David S Sawicki**

PHD in City/Urban, Community & Region - Cornell University Central Office

Professor, College of Architecture

**Dirk Schaefer**

PHD in Computer Science - University of Stuttgart

Assistant Professor, Georgia Tech Savannah

**Michael F Schatz**

PHD in Physics - University of Texas-Austin

Associate Professor, School of Physics

**David E Schimmel**

PHD in Electrical, Electronics & Communication - Cornell University Central Office

Associate Professor, School of Electrical & Computer Engineering

**Howard Anthony Schmidt**

MA in Organizational Management - University Of Phoenix

Professor of the Practice, School of Computing Science & Systems

**Jan Cornelius Schmidt**

PHD in Physics - Johannes Gutenberg University of Mainz

Associate Professor, School of Public Policy

**Ingeborg Schmidt-Krey**
PHD in Biophysics - University of Stockholm
Assistant Professor, School of Biology

**Jonathan Schneer**
PHD in History - Columbia University-New York City
Professor, School of History, Technology & Society

**Arnold Schneider**
PHD in Management Information Systems & Business Data - Ohio State University
Professor, College of Management

**Daniel P Schrage**
DSC in Mechanical Engineering - Washington University
Professor, School of Aerospace Engineering

**Eric H Schumacher**
PHD in Psychology - University of Michigan-Ann Arbor
Assistant Professor, School of Psychology

**Gary B Schuster**
PHD in Chemistry - University of Rochester
Provost & Executive VP for Academic Affairs, College of Sciences

**Karsten Schwans**
PHD in Computer & Information Science - Carnegie Mellon University
Professor, College of Computing

**David W Scott**
PHD in Civil Engineering - Georgia Institute Of Technology
Associate Professor, School of Civil & Environmental Engineering

**Waymond R Scott**
PHD in Electrical Engineering - Georgia Institute Of Technology
Professor, School of Electrical & Computer Engineering

**Jerry M Seitzman**
PHD in Mechanical Engineering - Stanford University
Associate Professor, School of Aerospace Engineering

**Carol A Senf**
PHD in English Language And Literature - State University Of New York-Buffalo
Professor, School of Literature, Communication & Culture (LCC)

**Nicoleta Serban**
PHD in Statistics - Carnegie Mellon University
Assistant Professor, School of Industrial & Systems Engineering

**Marion B Sewer**
PHD in Biomedical and Biological Sciences - Emory University
Assistant Professor, School of Biology

**Christina E Shalley**
PHD in Organizational Behavior Studies - University Of Illinois-Urbana-Champaign
Professor, College of Management

**Jeff S Shamma**
PHD in Systems Engineering - Massachusetts Institute Of Technology
Professor, School of Electrical & Computer Engineering

**Philip P Shapira**
PHD in City & Regional Planning - University of California-Berkeley
Professor, School of Public Policy

**Alexander Shapiro**
PHD in Applied Mathematics - Unknown
Professor, School of Industrial & Systems Engineering

**Gunter P Sharp**
PHD in industrial/Manufacturing Engineering - Georgia Institute Of Technology
Associate Professor, School of Industrial & Systems Engineering

**Samuel V Shelton**
PHD in Mechanical Engineering - Georgia Institute Of Technology
Temp Principal Research Engineer, School of Mechanical Engineering

**Olga N Shemyakina**
PHD in Economics - University Of California-Los Angeles
Assistant Professor, School of Economics

**Shyh-Chiang Shen**
PHD in Electrical Engineering - University Of Illinois-Urbana-Champaign
Assistant Professor, School of Electrical & Computer Engineering

**Charles David Sherrill**
PHD in Theoretical Chemistry - University Of Georgia
Associate Professor, School of Chemistry & Biochemistry

**Jianjun Jan Shi**
PHD in Mechanical Engineering - University of Michigan-Ann Arbor
Professor, School of Industrial & Systems Engineering

**Minoru Shinohara**
PHD in Physiology Of Exercise - The University Tokyo
Associate Professor, School of Applied Physiology

**Meisha Lei Shofner**
PHD in Materials Science - Rice University
Assistant Professor, School of Polymer, Textile & Fiber Engineering

**David S Sholl**
PHD in Applied Mathematics - University Of Colorado-Boulder
Professor, School of Chemical and Biomolecular Engineering

**David John Shook**
PHD in Spanish Language And Literature - University Of Illinois-Urbana-Champaign
Associate Professor, School of Modern Languages

**Emilson Caputo Delfino Silva**
PHD in Economics - University Of Illinois-Urbana-Champaign
Professor, School of Economics

**Rumiko S Simonds**
PHD in Linguistics - University of Hawaii-Manoa
Professor, School of Modern Languages

**Preet M Singh**
PHD in Metallurgical Engineering - University Newcastle On Tyne
Associate Professor, School of Materials Science & Engineering

**Vinod R Singhal**
MS in Operations Management - University of Rochester
Professor, College of Management

**William E Singhose**
PHD in Mechanical Engineering - Massachusetts Institute Of Technology
Associate Professor, School of Mechanical Engineering

**Suresh K Sitaraman**

PHD in Mechanical Engineering - Ohio State University
Professor, School of Mechanical Engineering

**Raghupathy Sivakumar**
PHD in Computer & Information Science - University Of Illinois-Urbana-Champaign
Associate Professor, School of Electrical & Computer Engineering

**Jeffrey Skolnick**
PHD in Chemistry - Yale University
Professor, School of Biology

**Oskar Skrinjar**
PHD in Electrical Engineering - Yale University
Assistant Professor, School of Biomedical Engineeringgineering

**Sandra A Slaughter**
PHD in Management Information Systems & Business Data - University Of Minnesota-Twin Cities
Professor, College of Management

**Marc K Smith**
PHD in Applied Math - Northwestern University
Professor, School of Mechanical Engineering

**Anderson D Smith**
PHD in Experimental Psychology - University Of Virginia
Senior Vice Provost, College of Sciences

**Glenn S Smith**
PHD in Applied Physics - Harvard University
Regents Professor, School of Electrical & Computer Engineering

**Marilyn J Smith**
PHD in Aerospace Engineering - Georgia Institute Of Technology
Associate Professor, School of Aerospace Engineering

**Terry W Snell**
PHD in Biology - University of South Florida
Associate Chair, School of Biology

**Robert L Snyder**
PHD in Physical Chemistry - Fordham University
School Chair, School of Materials Science & Engineering

**Patricia A Sobecky**
PHD in Microbiology/Bacteriology - University Of Georgia
Associate Professor, School of Biology

**Joel S Sokol**
PHD in Operations Research - Massachusetts Institute Of Technology
Associate Professor, School of Industrial & Systems Engineering

**Irina N Sokolik**
PHD in Atmospheric Sciences And Meteorology - Russian Academy of Sciences
Professor, School of Earth & Atmospheric Sciences

**Jake D Soper**
PHD in Chemistry - University Of Washington-Seattle
Assistant Professor, School of Chemistry & Biochemistry

**Jim C Spain**
DSC in Microbiology/Bacteriology - University of Texas-Austin
Professor, School of Civil & Environmental Engineering

**Robert F Speyer**
PHD in Ceramic Sciences And Engineering - University Of Illinois-Urbana-Champaign

Professor, School of Materials Science & Engineering

**Daniel H Spieler**

PHD in Experimental Psychology - Washington State University

Associate Professor, School of Psychology

**Stephen H Sprigle**

PHD in Biomechanics - University Of Virginia

Associate Professor, College of Architecture

**Lars Mathias M Spuijbroek**

MARCH in Architecture - Delft University Technology

Professor, College of Architecture

**Mohan Srinivasarao**

PHD in Chemistry - Carnegie Mellon University

Professor, School of Polymer, Textile & Fiber Engineering

**Weston M Stacey**

PHD in Nuclear Engineering - Massachusetts Institute Of Technology

Regents Professor, School of Mechanical Engineering

**Andrew Gregory Stack**

PHD in Geology - University of Wyoming

Assistant Professor, School of Earth & Atmospheric Sciences

**Garrett Baker Stanley**

PHD in Mechanical Engineering - University of California-Berkeley

Associate Professor, School of Biomedical Engineeringgineering

**Thad E Starner**

PHD in Computer & Information Science - Massachusetts Institute Of Technology

Associate Professor, College of Computing

**John T Stasko**

PHD in Computer & Information Science - Brown University

Professor, College of Computing

**Paul G Steffes**

PHD in Electrical Engineering - Stanford University

Associate Chair, School of Electrical & Computer Engineering

**Marc Stieglitz**

PHD in Geological Sciences - Columbia University-New York City

Associate Professor, School of Civil & Environmental Engineering

**Michael Stilman**

PHD in Robotics Technology/Technician - Carnegie Mellon University

Assistant Professor, School of Interactive Computing

**Thorsten Stoesser**

PHD in Civil Engineering - University of Bristol

Assistant Professor, School of Civil & Environmental Engineering

**Brian Stone**

PHD in Architecture - Georgia Institute Of Technology

Assistant Professor, College of Architecture

**Francesca Storici**

PHD in Molecular Genetics - University of Trieste

Assistant Professor, School of Biology

**Jeffrey L Streator**

PHD in Mechanical Engineering - University of California-Berkeley

Associate Professor, School of Mechanical Engineering

**Jeffrey Todd Streelman**
PHD in Biology - University of South Florida
Assistant Professor, School of Biology

**Gordon L Stuber**
PHD in Electrical, Electronics & Communication - University of Waterloo
Professor, School of Electrical & Computer Engineering

**Adam N Stulberg**
PHD in Political Science - University Of California-Los Angeles
Associate Professor, School of International Affairs

**Terry W Sturm**
PHD in Engineering - University Of Iowa
Professor, School of Civil & Environmental Engineering

**Ravi Subramanian**
ABD in Operations Research - University of Michigan-Ann Arbor
Assistant Professor, College of Management

**Christopher Summers**
PHD in Physics-Physical & Inorganic - University Of Reading
Professor, School of Materials Science & Engineering

**Madhavan Swaminathan**
PHD in Electrical Engineering - Syracuse University
Professor, School of Electrical & Computer Engineering

**Julie L Swann**
PHD in industrial/Manufacturing Engineering - Northwestern University
Assistant Professor, School of Industrial & Systems Engineering

**Andrzej Swiech**
PHD in Applied Mathematics - University Of California-Santa Barbara
Professor, School of Mathematics

**Martial Taillefert**
PHD in Civil Engineering - Northwestern University
Associate Professor, School of Earth & Atmospheric Sciences

**Lakeshia J Taite**
PHD in Chemical and Biomolecular Engineering - Rice University
Assistant Professor, School of Chemical and Biomolecular Engineering

**Rina Tannenbaum**
DSC in Chemical Engineering - Swiss Federal Institute Technology
Professor, School of Materials Science & Engineering

**Allen R Tannenbaum**
PHD in Mathematics - Harvard University
Professor, School of Electrical & Computer Engineering

**David G Taylor**
PHD in Electrical Engineering - University Of Illinois-Urbana-Champaign
Professor, School of Electrical & Computer Engineering

**Mark Zachary Taylor**
PHD in Political Science - Massachusetts Institute Of Technology
Assistant Professor, School of International Affairs

**Jochen Teizer**
PHD in Civil Engineering - University of Texas-Austin
Assistant Professor, School of Civil & Environmental Engineering

**Amyn S Teja**

PHD in Chemical Engineering - Imperial College Science & Technology

Regents Professor, School of Chemical and Biomolecular Engineering

**Jay P Telotte**

PHD in English Language And Literature - University of Florida

Professor, School of Literature, Communication & Culture (LCC)

**Johnna Sue Temenoff**

PHD in Bioengineering & Biomedical Engineering - Rice University

Assistant Professor, School of Biomedical Engineeringgineering

**Emmanouil M Tentzeris**

PHD in Electrical, Electronics and Communications - University of Michigan-Ann Arbor

Associate Professor, School of Electrical & Computer Engineering

**Prasad Tetali**

PHD in Computer & Information Science - New York University

Professor, School of Mathematics

**Eugene Thacker**

PHD in Comparative Literature - Rutgers The State University of New Jersey -New Brunswick

Associate Professor, School of Literature, Communication & Culture (LCC)

**Naresh N Thadhani**

PHD in Metallurgical Engineering - New Mexico Institute Of Mining and Technology

Associate Chair, School of Materials Science & Engineering

**Yonathan S Thio**

PHD in Chemical Engineering - Massachusetts Institute Of Technology

Assistant Professor, School of Polymer, Textile & Fiber Engineering

**Robin Thomas**

PHD in Applied Mathematics - Charles University

Professor, School of Mathematics

**Robert Nelson Thomas**

PHD in Higher Education Administration - University Of Georgia

Professor of the Practice, College of Management

**Valerie M Thomas**

PHD in Physics - Cornell University

Associate Professor, School of Industrial & Systems Engineering

**Linda M Thomas-Mobley**

PHD in Construction/Building Technology - Georgia Institute Of Technology

Associate Professor, College of Architecture

**Andrea Lockerd Thomaz**

PHD in Media - Massachusetts Institute Of Technology

Assistant Professor, School of Interactive Computing

**Marie C Thursby**

PHD in Economics - University Of North Carolina-Chapel Hill

Professor, College of Management

**Jerry Gilbert Thursby**

PHD in Economics - University Of North Carolina-Chapel Hill

Professor, College of Management

**Latife Beril Toktay-Tsiotras**

PHD in Operations Management - Massachusetts Institute Of Technology

Associate Professor, College of Management

**Laren M Tolbert**

PHD in Chemistry - University of Wisconsin-Madison

Regents Professor, School of Chemistry & Biochemistry

**John L Tone**
PHD in History - Columbia University-New York City
Associate Dean, School of History, Technology & Society

**Craig A Tovey**
PHD in Operations Research - Stanford University
Professor, School of Industrial & Systems Engineering

**Rick P Trebino**
PHD in Applied Physics - Stanford University
Professor, School of Physics

**William T Trotter**
PHD in Mathematics - University of Alabama
School Chair, School of Mathematics

**Franca Trubiano**
MA in Architecture - McGill University
Assistant Professor, College of Architecture

**Yi-Chang James Tsai**
PHD in Civil Engineering - Georgia Institute Of Technology
Associate Professor, School of Civil & Environmental Engineering

**Panagiotis Tsiotras**
PHD in Aerospace, Aeronautical and Astronomy - Purdue University
Professor, School of Aerospace Engineering

**Kwok-Leung Tsui**
PHD in Mathematical Statistics - University of Wisconsin-Madison
Professor, School of Industrial & Systems Engineering

**Vladimir V Tsukruk**
PHD in Polymer Chemistry - National Academy of Sciences Ukraine
Professor, School of Materials Science & Engineering

**Rao R Tummala**
PHD in Ceramic Engineering - University Of Illinois-Urbana-Champaign
Professor, School of Electrical & Computer Engineering

**Gregory Turk**
PHD in Computer & Information Science - University Of North Carolina-Chapel Hill
Associate Professor, College of Computing

**Deborah H Turner**
PHD in Accounting - Georgia State University
Associate Professor, College of Management

**Francis M Ulgado**
PHD in Business Management & Administration - University Of Illinois-Urbana-Champaign
Associate Professor, College of Management

**Jerry A Ulrich**
PHD in Choral Conducting - University of Cincinnati
Associate Professor, College of Architecture

**Ifeanyi Charles Ume**
PHD in Mechanical Engineering - University Of South Carolina-Columbia
Professor, School of Mechanical Engineering

**Steven W Usselman**
PHD in History - University of Delaware
Associate Professor, School of History, Technology & Society

**Ruth O Uwaifo**
PHD in Agriculture and Resource Economics - University of California-Berkeley
Assistant Professor, School of Economics

**Ahmet Turgay Uzer**
PHD in Chemistry Physics - Harvard University
Regents Professor, School of Physics

**Koert Van Ittersum**
PHD in Social Sciences - Wageningen University and Research Centre
Assistant Professor, College of Management

**Willem F. G. Van Rooijen**
PHD in Nuclear Physics - Delft University Technology
Assistant Professor, School of Mechanical Engineering

**John Vande Vate**
PHD in Computer Engineering - Massachusetts Institute Of Technology
Professor, School of Industrial & Systems Engineering

**Vijay V Vazirani**
PHD in Computer & Information Science - University of California-Berkeley
Professor, College of Computing

**Patricio Antonio Vela**
PHD in Control and Dynamic Systems - California Institute Of Technology
Assistant Professor, School of Electrical & Computer Engineering

**Santosh Srinivas Vempala**
PHD in industrial Administration - Carnegie Mellon University
Professor, College of Computing

**Roshan J Vengazhiyil**
PHD in Statistics - University of Michigan-Ann Arbor
Assistant Professor, School of Industrial & Systems Engineering

**H Venkateswaran**
PHD in Computer & Information Science - University Of Washington-Seattle
Associate Professor, College of Computing

**Paul Michel Bernard Verhaeghen**
PHD in Psychology - Catholic University Louvain
Associate Professor, School of Psychology

**Erik I Verriest**
PHD in Electrical Engineering - Stanford University
Professor, School of Electrical & Computer Engineering

**Branislav Vidakovic**
PHD in Statistics - Purdue University
Professor, School of Industrial & Systems Engineering

**Eric Joseph Vigoda**
PHD in Computer & Information Science - University of California-Berkeley
Associate Professor, College of Computing

**Raymond P Vito**
PHD in Theoretical and Applied Mechanics - Cornell University Central Office
VP Graduate & Undergraduate Studies, Provost & Exec VP Academic Affairs

**Nicholas D Voigt**
MS in Management - Georgia Institute Of Technology
Professor of the Practice, College of Management

**Eberhard O Voit**

PHD in Biology - University of Koln (Cologne)
Professor, School of Biology

**Vitali Volovoi**
PHD in Aerospace Engineering - Georgia Institute Of Technology
Assistant Professor, School of Aerospace Engineering

**Paul L Voss**
PHD in Electrical and Computer Engineering - Northwestern University
Assistant Professor, School of Electrical & Computer Engineering

**Richard Wilson Vuduc**
PHD in Computer Science - University of California-Berkeley
Assistant Professor, School of Computational Science & Engineering

**Mitchell L.R. Walker**
PHD in Aerospace Engineering - University of Michigan-Ann Arbor
Assistant Professor, School of Aerospace Engineering

**Bruce N Walker**
PHD in Psychology - Rice University
Assistant Professor, School of Psychology

**John P Walsh**
PHD in Sociology - Northwestern College - Orange City
Associate Professor, School of Public Policy

**Yadong Wang**
PHD in Chemistry - Stanford University
Assistant Professor, School of Biomedical Engineeringgineering

**Yang Wang**
PHD in Civil Engineering - Stanford University
Assistant Professor, School of Civil & Environmental Engineering

**Dongmei Wang**
PHD in Electrical Engineering - Georgia Institute Of Technology
Assistant Professor, School of Biomedical Engineeringgineering

**Qinghai Wang**
PHD in Finance - Ohio State University
Associate Professor, College of Management

**Fei-Ling Wang**
PHD in Political Science - University of Pennsylvania
Professor, School of International Affairs

**Youjiang Wang**
PHD in Mechanical Engineering - Massachusetts Institute Of Technology
Professor, School of Polymer, Textile & Fiber Engineering

**C K Chris Wang**
PHD in Nuclear Engineering - Ohio State University
Associate Professor, School of Mechanical Engineering

**Zhong Lin Wang**
PHD in Physics - Arizona State University
Regents Professor, School of Materials Science & Engineering

**Yuhang Wang**
PHD in Earth and Planetary Sciences - Harvard University
Associate Professor, School of Earth & Atmospheric Sciences

**Yorai Wardi**
PHD in Electrical, Electronics & Communication - University of California-Berkeley

Professor, School of Electrical & Computer Engineering

**Roger M Wartell**

PHD in Physics & Astronomy - University of Rochester

Professor, School of Biology

**Rodney J Weber**

PHD in Mechanical Engineering - University Of Minnesota-Twin Cities

Associate Professor, School of Earth & Atmospheric Sciences

**Katja Weber**

PHD in Political Science - University Of California-Los Angeles

Associate Professor, School of International Affairs

**Peter J Webster**

PHD in Atmospheric Sciences And Meteorology - Massachusetts Institute Of Technology

Professor, School of Civil & Environmental Engineering

**Donald R Webster**

PHD in Mechanical Engineering - University of California-Berkeley

Associate Chair, School of Civil & Environmental Engineering

**Christopher M Weible**

PHD in Ecology - University of California-Davis

Assistant Professor, School of Public Policy

**Gil Weinberg**

ABD in Visual And Performing Arts - Massachusetts Institute Of Technology

Assistant Professor, College of Architecture

**Howard Weiss**

PHD in Applied Mathematics - University Of Maryland-College Park

Professor, School of Mathematics

**Marc J Weissburg**

PHD in Ecology - State University Of New York-Stony Brook

Associate Professor, School of Biology

**Joshua Stephen Weitz**

PHD in Physics - Massachusetts Institute Of Technology

Assistant Professor, School of Biology

**William J Wepfer**

PHD in Mechanical Engineering - University of Wisconsin-Madison

School Chair, School of Mechanical Engineering

**Benjamin H West**

MS in Public Administration - University Of Georgia

Professor of the Practice, College of Architecture

**Maria G Westdickenberg**

PHD in Applied Mathematics - New York University

Assistant Professor, School of Mathematics

**Michael Westdickenberg**

PHD in Applied Mathematics - University of Bonn

Assistant Professor, School of Mathematics

**Robert L Whetten**

PHD in Chemistry Physics - Cornell University Central Office

Professor, School of Chemistry & Biochemistry

**Donald W White**

PHD in Structural Engineering - Cornell University

Professor, School of Civil & Environmental Engineering

**Chelsea C White**
PHD in Computer Engineering - University of Michigan-Ann Arbor
School Chair, School of Industrial & Systems Engineering

**Kurt A Wiesenfeld**
PHD in Physics - University of California-Berkeley
Professor, School of Physics

**Alan W Wilhite**
PHD in Aerospace Engineering - North Carolina State University
Professor, School of Aerospace Engineering

**Angus P Wilkinson**
PHD in Chemistry - University of Oxford
Professor, School of Chemistry & Biochemistry

**Kenneth M Will**
PHD in Civil Engineering - University of Texas-Austin
Associate Chair, School of Civil & Environmental Engineering

**Douglas B Williams**
PHD in Electrical, Computer Engineering - Rice University
Associate Chair, School of Electrical & Computer Engineering

**Loren D Williams**
PHD in Physical And Theoretical Chemistry - Duke University
Professor, School of Chemistry & Biochemistry

**Linda M Wills**
PHD in Computer And Information Science - Massachusetts Institute Of Technology
Associate Professor, School of Electrical & Computer Engineering

**Donald Scott Wills**
PHD in Electrical Engineering and Computer Science - Massachusetts Institute Of Technology
Professor, School of Electrical & Computer Engineering

**William P Winders**
PHD in Sociology - Emory University
Assistant Professor, School of History, Technology & Society

**Paul H Wine**
PHD in Physical And Theoretical Chemistry - Florida State University
Professor, School of Chemistry & Biochemistry

**Claudia Rebola Winegarden**
PHD in industrial Design - North Carolina State University
Assistant Professor, College of Architecture

**Ward O Winer**
PHD in Physics - University of Michigan-Ann Arbor
School Chair Emeritus, School of Mechanical Engineering

**Wayne H Wolf**
PHD in Electrical Engineering - Stanford University
Professor, School of Electrical & Computer Engineering

**Nancy Wong**
PHD in Business Administration - University of Michigan-Ann Arbor
Assistant Professor, College of Management

**C P Wong**
PHD in Organic Chemistry - Pennsylvania State University
Regents Professor, School of Materials Science & Engineering

**John L Wood**

PHD in Chemistry - Clark University
Professor, School of Physics

**Robert E Wood**
PHD in Comparative Literature - University of Virginia
Associate Professor, School of Literature, Communication & Culture (LCC)

**Brian E Woodall**
PHD in Political Science - University of California-Berkeley
Associate Professor, School of International Affairs

**Paul A Work**
PHD in Ocean Engineering - University of Florida
Associate Chair, School of Civil & Environmental Engineering

**Hongwei Wu**
PHD in Electrical, Electronics & Communication - University of Southern California
Assistant Professor, School of Electrical & Computer Engineering

**Dongjun Wu**
PHD in Operations and Information Management - University of Pennsylvania
Associate Professor, College of Management

**Chien-Fu Jeff Wu**
PHD in Mathematical Statistics - University of California-Berkeley
Professor, School of Industrial & Systems Engineering

**Jun Xu**
PHD in Computer & Information Science - Ohio State University
Associate Professor, College of Computing

**Sudhakar Yalamanchili**
PHD in Electrical, Electronics & Communication - University of Texas-Austin
Professor, School of Electrical & Computer Engineering

**Jiawen Yang**
PHD in Urban Affairs/Studies - Massachusetts Institute Of Technology
Assistant Professor, College of Architecture

**Donggang Yao**
PHD in Mechanical Engineering - University Of Massachusetts-Boston
Assistant Professor, School of Polymer, Textile & Fiber Engineering

**Lisa Yaszek**
PHD in English Language And Literature - University of Wisconsin-Madison
Associate Professor, School of Literature, Communication & Culture (LCC)

**Arash Yavari**
DSC in Mechanical Engineering - California Institute Of Technology
Assistant Professor, School of Civil & Environmental Engineering

**Jeannette Yen**
PHD in Oceanography - University Of Washington-Seattle
Professor, School of Biology

**Pui-Kuen Yeung**
PHD in Mechanical Engineering - Cornell University Central Office
Professor, School of Aerospace Engineering

**Anthony Joseph Yezzi**
PHD in Electrical Engineering - University Of Minnesota-Twin Cities
Associate Professor, School of Electrical & Computer Engineering

**Yingfei Yi**
PHD in Applied Mathematics - University of Southern California

Professor, School of Mathematics

**Soojin Yi**

PHD in Ecology - University of Chicago

Assistant Professor, School of Biology

**Sotira Yiacoumi**

PHD in Civil Engineering - Syracuse University

Professor, School of Civil & Environmental Engineering

**Minami Yoda**

PHD in Aerospace, Aeronautical and Astronomy - Stanford University

Professor, School of Mechanical Engineering

**Paul Douglas Yoder**

PHD in Electrical Engineering - University Of Illinois-Urbana-Champaign

Associate Professor, Georgia Tech Savannah

**Ajit Yoganathan**

PHD in Chemical Engineering - California Institute Of Technology

Associate Chair, School of Chemical and Biomolecular Engineering

**Li You**

PHD in Physics - University Of Colorado-Boulder

Professor, School of Physics

**Xing Xing Yu**

PHD in Applied Mathematics - Vanderbilt University

Professor, School of Mathematics

**Ming Yuan**

PHD in Statistics - University of Wisconsin-Madison

Assistant Professor, School of Industrial & Systems Engineering

**Gleb Yushin**

PHD in Materials Science - North Carolina State University

Assistant Professor, School of Materials Science & Engineering

**Evan A Zamir**

DSC in Bioengineering & Biomedical Engineering - Washington University

Assistant Professor, School of Mechanical Engineering

**Andrew Zangwill**

PHD in Physics - University of Pennsylvania

Professor, School of Physics

**Ellen Zegura**

PHD in Computer & Information Science - Washington University

School Chair, College of Computing

**Chongchun Zeng**

PHD in Applied Mathematics - Brigham Young University

Associate Professor, School of Mathematics

**Hongyuan Zha**

PHD in Computer & Information Science - Stanford University

Professor, School of Computing Science & Systems

**Z John Zhang**

PHD in Chemistry - University of Wisconsin-Madison

Professor, School of Chemistry & Biochemistry

**Ying Zhang**

PHD in Civil Engineering - University of California-Berkeley

Assistant Professor, Georgia Tech Savannah

**Fumin Zhang**

PHD in Electrical, Electronics & Communication - University Of Maryland-College Park

Assistant Professor, School of Electrical & Computer Engineering

**Han Zhang**

PHD in Management Science - University of Texas-Austin

Associate Professor, College of Management

**Zhuomin Zhang**

PHD in Mechanical Engineering - Massachusetts Institute Of Technology

Professor, School of Mechanical Engineering

**Haomin Zhou**

PHD in Applied Mathematics - University Of California-Los Angeles

Assistant Professor, School of Mathematics

**Guotong Zhou**

PHD in Electrical, Electronics & Communication - University of Virginia

Professor, School of Electrical & Computer Engineering

**Chen Zhou**

PHD in Engineering - Pennsylvania State University

Associate Chair, School of Industrial & Systems Engineering

**Min Zhou**

PHD in Mechanical Engineering - Brown University

Professor, School of Mechanical Engineering

**Cheng Zhu**

PHD in Engineering Mechanics - Columbia University-New York City

Regents Professor, School of Biomedical Engineeringgineering

**Ting Zhu**

PHD in Mechanical Engineering - Massachusetts Institute Of Technology

Assistant Professor, School of Mechanical Engineering

**Craig M Zimring**

PHD in Architecture - Wellesley College

Professor, College of Architecture

**Ben T Zinn**

PHD in Aerospace Engineering - Princeton University

Regents Professor, School of Aerospace Engineering

**Abdulhamid Zureick**

PHD in Civil Engineering - University Of Illinois-Urbana-Champaign

Professor, School of Civil & Environmental Engineering

**Albertus Petrus Zwart**

PHD in Mathematics - Eindhoven University of Technology

Associate Professor, School of Industrial & Systems Engineering

## GENERAL INFORMATION FOR FRESHMAN ADMISSION

Freshmen may apply only for the summer or fall terms. Following the completion of the junior year of high school, freshman applicants may submit the completed Application for Freshman Admission, nonrefundable application fee, and SAT I and/or ACT scores to the Office of Undergraduate Admission. International applicants and applicants who have been homeschooled will be required to submit additional information. Freshman applicants may choose to submit a paper copy of the application or complete one of the options found online at www.apply.gatech.edu. The Self-Reported Academic Record (SRAR) must cover the first three years of high school, with the applicant's senior year schedule indicated by semesters or quarters. The SRAR should show the type of grading system and any honors-level or advanced courses completed by the applicant.

It is the applicant's responsibility to ensure that all required elements, including the application, nonrefundable application fee, and SAT I and/or ACT scores are submitted on time. All elements must be postmarked October 31 to guarantee consideration for the President's Scholarship or postmarked January 15 to guarantee consideration for admission to Georgia Tech.

The Office of Undergraduate Admission will consider all completed applications on file by the stated deadlines provided spaces are available for the particular term or academic year for which the student applies. An application submitted after the deadline may receive consideration, but only at the discretion of the Institute.

For more information regarding freshman admission to the Georgia Institute of Technology, visit www.admission.gatech.edu, call 404.894.4154, or write to:

Director of Undergraduate Admission
Georgia Institute of Technology
Atlanta, Georgia 30332-0320

## ACADEMIC ADVISING

The appointed academic advisor is the key source of information about the college. All entering students are assigned an academic advisor depending on their declared majors at Georgia Tech. To find the assigned advisor, please visit the advising Web page. Students will meet their assigned advisors at orientation and at regular intervals during their college careers. Advisors welcome questions about different programs and areas.

Academic advisors are the guides through the college experience. They will help to identify the correct major, curriculum, minor, certificates, study abroad, internships, campus resources, and much more.

While the degree requirements are posted on the Registrar's Office Web page, it is essential to check in with the assigned advisor at least once a year (if not more) to ensure that requirements are being met and communication lines are open. Also, regular contact with the advisor will enhance each student's college experience and help them reach their future goals.

## POLICY ON COMPETITIVE ADMISSION (FRESHMAN APPLICANTS)

All qualified persons are equally welcome to seek admission to the Georgia Institute of Technology, and all persons may apply for and accept admission confident that the policy and regular practice of the Institute will not discriminate against them on the basis of race, religion, sex, or national origin.

Projections of the number of students to be admitted and enrolled in any year will be determined (a) by the capacity of the Institute and (b) by approved enrollment levels. If the number of qualified applicants for admission exceeds the number of applicants who can be admitted and enrolled, those to be offered admission will be selected on the basis of (a) the Institute's judgment of the applicant's relative qualifications for satisfactory performance in the Institute and (b) recognition of the Institute's special responsibilities to the residents of Georgia.

The policy on competitive admission, set forth above, will not prevent the admission of selected applicants who give evidence of possessing special talents for the Institute's programs requiring such special talents. In the application of this policy of competitive admission to nonresident students, preference for admission may be given to nonresident applicants who are legacies of the Institute.

The admission of undergraduate students to pursue programs leading to a bachelor's degree shall be the responsibility of the Office of Undergraduate Admission. That office will apply policies and procedures that are approved by the Office of the President and the Board of Regents of the University System of Georgia. Preference for admission will be given to qualified residents of the state of Georgia.

The criteria used in determining each applicant's qualifications for admission shall include satisfactory evidence of scholastic promise based upon the applicant's previous academic record, scores on selected tests of aptitude or achievement, and evaluation of the applicant's Personal Statement and Leadership and Activity Record.

Appeals concerning individual admission decisions shall be addressed to the director of the Office of Undergraduate Admission.

This policy is in accordance with the Institute's Mission and Vision statement, which can be located at www.gatech.edu/president/strategicplan.html.

## REQUIRED STUDENT COMPUTER OWNERSHIP

In an effort to foster equal access to computers and to make the most of the teaching and learning technology available at Georgia Tech, all undergraduate students entering Georgia Tech under this or subsequent catalogs are required to own or lease a computer. The minimum hardware and software requirements (as well as purchasing and financing options) are sent each spring to students accepted for the summer and fall semesters, and in the fall to students accepted for spring semester.

Because computer ownership is mandatory, an average cost for the minimum hardware and software required can be included in computing a new student's cost of education for the purpose of determining their eligibility for all forms of student financial aid. Students should contact the Office of Student Financial Planning and Services for more information.

## INTERNATIONAL STUDENTS

International students should access further information regarding application policies and procedures and other basic information helpful to applicants from other countries by visiting www.admiss.gatech.edu/international. International students will not receive financial aid or institutional scholarships.

For more information, contact the Office of Undergraduate Admission at 404.894.4154.

## FASET ORIENTATION (NEW STUDENT ORIENTATION)

The student/parent orientation program informs new students and their parents/guests of academic programs and requirements, in addition to familiarizing them with Georgia Tech traditions and the activities and services available on campus.

For more information, call 404.894.6897 or visit www.faset.gatech.edu.

## REGENTS’ TESTING PROGRAM

To establish eligibility for an undergraduate degree, every student in the University System of Georgia must pass the Regents’ Test, an examination designed to measure proficiency in reading and English composition. Students are invited to take this examination when they have earned ten hours of college credit. Any student accumulating forty-five hours of college credit toward a degree without passing the Regents’ Test must schedule remedial English or reading along with other credit coursework. If a student fails in the first attempt, he or she must repeat the test. Alternative tests of competence and remediation are offered to non-native speakers of English. In addition, alternative tests are offered for students with disabilities documented through the Dean of Students’ Office. Listed below are test scores that can be used to satisfy the Regents' Test requirements.

- The READING portion of the test can be satisfied with:
  - SAT Verbal score of 510 or higher
  - ACT Reading score of 23 or higher
- The ESSAY portion of the test can be satisfied with:

  SAT II English Writing score of 650 or higher

  SAT Reasoning, Writing Section score of 560 (effective Spring 2007)

  AP English score of 3 or higher

  International Baccalaureate higher-level English score of 4 or higher

  * SAT-I Verbal score of at least 530 and a grade of "A" in English 1101

  * SAT-I Verbal score of at least 590 and a grade of "B" in English 1101

  * ACT English score of at least 23 and a grade of "A" in English 1101

  * ACT English score of at least 26 and a grade of "B" in English 1101

*
(These exemptions are only available for students enrolled in the University System Fall 2005 through Spring 2008).

Scores must be from a national administration of the SAT or ACT. Scores from institutional SAT or residual ACT tests will not be acceptable for this purpose.

## GENERAL INFORMATION FOR TRANSFER ADMISSION

Transfer applicants may apply for the summer, fall, or spring terms. Transfer applicants must submit the completed Application for Transfer Admission, nonrefundable application fee, official college transcript(s) from all colleges attended, and, if appropriate, any additional forms related to a special transfer program. Applicants who apply with fewer than 30 semester/45 quarter transferable hours at the time of application must submit a final high school transcript. Transfer applicants may choose to submit a paper copy of the application or complete one of the online options at www.apply.gatech.edu.

It is the applicant's responsibility to ensure that all required elements, including the application, nonrefundable application fee, and official transcript(s), are submitted on time. All elements must be postmarked February 1 to guarantee consideration for summer or fall semester admission, or postmarked October 1 to guarantee consideration for spring semester admission.

The Office of Undergraduate Admission will consider all applications on file by the stated deadlines, provided spaces are available for the particular term or academic year for which the applicant applies. An application submitted after the deadline may receive consideration, but only at the discretion of the Institute.

For more information regarding transfer admission to the Georgia Institute of Technology or any of the special transfer programs offered, visit www.transfer.gatech.edu, call 404.894.4154, or write to:

Office of Undergraduate Admission
Georgia Institute of Technology
Atlanta, Georgia 30332-0320

## POLICY ON COMPETITIVE ADMISSION (TRANSFER APPLICANTS)

All qualified persons are equally welcome to seek transfer admission to the Georgia Institute of Technology, and all persons may apply for and accept admission confident that the policy and regular practice of the Institute will not discriminate against them on the basis of race, religion, sex, or national origin.

Projections of the number of transfer students to be admitted and enrolled in any year will be determined (a) by the capacity of the Institute and (b) by approved enrollment levels. If the number of qualified applicants for admission exceeds the number of applicants who can be admitted and enrolled, those to be offered admission will be selected on the basis of (a) the Institute's judgment of the applicant's relative qualifications for satisfactory performance in the Institute and (b) recognition of the Institute's special responsibilities to the residents of Georgia.

The policy of competitive admissions, set forth above, will not prevent the admission of selected applicants who give evidence of possessing special talents for the Institute's programs requiring such special talents.

The admission of undergraduate students to pursue programs leading to a baccalaureate degree shall be the responsibility of the Office of Undergraduate Admission. That office will apply policies and procedures that are approved by the Office of the President and the Board of Regents of the University System of Georgia. Preference for admission will be given to qualified residents of the state of Georgia.

The criteria used in determining each transfer applicant's qualifications for admission will include satisfactory evidence of scholastic promise based upon the applicant's previous academic transfer record.

Appeals concerning individual admission decisions shall be addressed to the Director of the Office of Undergraduate Admission.

This policy is in accordance with the Institute's Mission and Vision statement, which can be located at www.gatech.edu/president/strategicplan.html.

## ACADEMIC ADVISING

The appointed academic advisor is the key source of information about the college. All entering students are assigned an academic advisor depending on their declared majors at Georgia Tech. To find the assigned advisor, please visit the advising Web page. Students will meet their assigned advisors at orientation and at regular intervals during their college careers. Advisors welcome questions about different programs and areas.

Academic advisors are the guides through the college experience. They will help to identify the correct major, curriculum, minor, certificates, study abroad, internships, campus resources, and much more.

While the degree requirements are posted on the Registrar's Office Web page, it is essential to check in with the assigned advisor at least once a year (if not more) to ensure that requirements are being met and communication lines are open. Also, regular contact with the advisor will enhance each student's college experience and help them reach their future goals.

## REQUIRED STUDENT COMPUTER OWNERSHIP

In an effort to foster equal access to computers and to make the most of the teaching and learning technology available at Georgia Tech, all undergraduate students entering Georgia Tech under this or subsequent catalogs are required to own or lease a computer. The minimum hardware and software requirements (as well as purchasing and financing options) are sent each spring to students accepted for the summer and fall semesters, and in the fall to students accepted for spring semester.

Because computer ownership is mandatory, an average cost for the minimum hardware and software required can be included in computing a new student's cost of education for the purpose of determining their eligibility for all forms of student financial aid. Students should contact the Office of Student Financial Planning and Services for more information.

## INTERNATIONAL STUDENTS

International students should access further information regarding application policies and procedures and other basic information helpful to applicants from other countries by visiting www.admiss.gatech.edu/international. International students will not receive financial aid or institutional scholarships.

For more information, contact the Office of Undergraduate Admission at 404.894.4154.

## FASET ORIENTATION (NEW STUDENT ORIENTATION)

The student/parent orientation program informs new students and their parents/guests of academic programs and requirements, in addition to familiarizing them with Georgia Tech traditions and the activities and services available on campus.

For more information, call 404.894.6897 or visit www.faset.gatech.edu.

## REGENTS’ TESTING PROGRAM

To establish eligibility for an undergraduate degree, every student in the University System of Georgia must pass the Regents’ Test, an examination designed to measure proficiency in reading and English composition. Students are invited to take this examination when they have earned ten hours of college credit. Any student accumulating forty-five hours of college credit toward a degree without passing the Regents’ Test must schedule remedial English or reading along with other credit coursework. If a student fails in the first attempt, he or she must repeat the test. Alternative tests of competence and remediation are offered to non-native speakers of English. In addition, alternative tests are offered for students with disabilities documented through the Dean of Students’ Office. Listed below are test scores that can be used to satisfy the Regents' Test requirements.

- The READING portion of the test can be satisfied with:
  - SAT Verbal score of 510 or higher
  - ACT Reading score of 23 or higher
- The ESSAY portion of the test can be satisfied with:

  SAT II English Writing score of 650 or higher

  SAT Reasoning, Writing Section score of 560 (effective Spring 2007)

  AP English score of 3 or higher

  International Baccalaureate higher-level English score of 4 or higher

  * SAT-I Verbal score of at least 530 and a grade of "A" in English 1101

  * SAT-I Verbal score of at least 590 and a grade of "B" in English 1101

  * ACT English score of at least 23 and a grade of "A" in English 1101

  * ACT English score of at least 26 and a grade of "B" in English 1101

*
(These exemptions are only available for students enrolled in the University System Fall 2005 through Spring 2008).

Scores must be from a national administration of the SAT or ACT. Scores from institutional SAT or residual ACT tests will not be acceptable for this purpose.

## TRANSFER CREDIT

The basic policy regarding the acceptance of courses by transfer is to allow credit for courses completed with satisfactory grades (*C* or better) at other accredited colleges and universities in the United States and Canada, provided the courses correspond in time and content to courses offered at the Georgia Institute of Technology. Georgia Tech will not accept credit for courses successfully completed at another institution but previously taken at Georgia Tech unless the final grade received at Georgia Tech is a W. The student must request and file an official transcript of transfer courses before the Institute can award credit. Coursework completed at colleges and universities outside the United States and Canada will be evaluated on a case-by-case basis. Transfer credit is not calculated in the Georgia Tech grade point average.

Students may attend another institution as a transient student during terms when not enrolled at Georgia Tech. Students should discuss their course selection with their academic advisor to ensure transferability and applicability toward their degree programs. With the exception of officially sanctioned crossenrolled programs, students are not to be enrolled at Georgia Tech and another institution during the same term without the specific approval of the appropriate curriculum committee.

## GENERAL INFORMATION FOR READMISSION

Georgia Tech students who are not enrolled for two or more consecutive terms must apply for readmission. The Application for Readmission, with all pertinent supporting information, must be submitted to the Registrar's Office before the deadline for the term for which readmission is requested as listed below:

**Term Deadline ***

| Term | Date |
|---|---|
| Fall | 1-July |
| Spring | 1-December |
| Summer | 1-April |

*** Former students on drop or review status should apply at least two months prior to these deadlines in order to ensure sufficient time for the review process.** The section "Rules and Regulations" in this catalog contains additional information on readmission.

Students who withdraw from school (receiving all Ws) will not ordinarily be permitted to enroll the next succeeding term. If an exception is requested due to unusual circumstances, a Petition to the Faculty must be filed.

Students who have been out two or more terms are required to obtain a Tuberculosis Screening form signed, dated, and addressed by a medical practitioner. Please refer to www.health.gatech.edu/policies_procedures/docs.htm for a form to download. Depending on how long you have been out of school, you may be required to have additional immunizations. Should you have additional questions regarding your immunizations, e-mail the Health Center by clicking below. You must satisfy all immunization requirements prior to registration.

## ACADEMIC ADVISING

The appointed academic advisor is the key source of information about the college. All entering students are assigned an academic advisor depending on their declared majors at Georgia Tech. To find the assigned advisor, please visit the advising Web page. Students will meet their assigned advisors at orientation and at regular intervals during their college careers. Advisors welcome questions about different programs and areas.

Academic advisors are the guides through the college experience. They will help to identify the correct major, curriculum, minor, certificates, study abroad, internships, campus resources, and much more.

While the degree requirements are posted on the Registrar's Office Web page, it is essential to check in with the assigned advisor at least once a year (if not more) to ensure that requirements are being met and communication lines are open. Also, regular contact with the advisor will enhance each student's college experience and help them reach their future goals.

## READMISSION IMMUNIZATION REQUIREMENTS

Students who have been out two or more terms are required to obtain a Tuberculosis Screening form signed, dated, and addressed by a medical practitioner. Please refer to www.health.gatech.edu/policies_procedures/docs.htm for a form to download. Depending on how long you have been out of school, you may be required to have additional immunizations. Should you have additional questions regarding your immunizations, e-mail the Health Center by clicking below. You must satisfy all immunization requirements prior to registration.

## REGENTS’ TESTING PROGRAM

To establish eligibility for an undergraduate degree, every student in the University System of Georgia must pass the Regents’ Test, an examination designed to measure proficiency in reading and English composition. Students are invited to take this examination when they have earned ten hours of college credit. Any student accumulating forty-five hours of college credit toward a degree without passing the Regents’ Test must schedule remedial English or reading along with other credit coursework. If a student fails in the first attempt, he or she must repeat the test. Alternative tests of competence and remediation are offered to non-native speakers of English. In addition, alternative tests are offered for students with disabilities documented through the Dean of Students’ Office. Listed below are test scores that can be used to satisfy the Regents' Test requirements.

- The READING portion of the test can be satisfied with:
  - SAT Verbal score of 510 or higher
  - ACT Reading score of 23 or higher
- The ESSAY portion of the test can be satisfied with:

  SAT II English Writing score of 650 or higher

  SAT Reasoning, Writing Section score of 560 (effective Spring 2007)

  AP English score of 3 or higher

  International Baccalaureate higher-level English score of 4 or higher

  * SAT-I Verbal score of at least 530 and a grade of "A" in English 1101

  * SAT-I Verbal score of at least 590 and a grade of "B" in English 1101

  * ACT English score of at least 23 and a grade of "A" in English 1101

  * ACT English score of at least 26 and a grade of "B" in English 1101

*
(These exemptions are only available for students enrolled in the University System Fall 2005 through Spring 2008).

Scores must be from a national administration of the SAT or ACT. Scores from institutional SAT or residual ACT tests will not be acceptable for this purpose.

## TRANSFER CREDIT

The basic policy regarding the acceptance of courses by transfer is to allow credit for courses completed with satisfactory grades (*C* or better) at other accredited colleges and universities in the United States and Canada, provided the courses correspond in time and content to courses offered at the Georgia Institute of Technology. Georgia Tech will not accept credit for courses successfully completed at another institution but previously taken at Georgia Tech unless the final grade received at Georgia Tech is a W. The student must request and file an official transcript of transfer courses before the Institute can award credit. Coursework completed at colleges and universities outside the United States and Canada will be evaluated on a case-by-case basis. Transfer credit is not calculated in the Georgia Tech grade point average.

Students may attend another institution as a transient student during terms when not enrolled at Georgia Tech. Students should discuss their course selection with their academic advisor to ensure transferability and applicability toward their degree programs. With the exception of officially sanctioned crossenrolled programs, students are not to be enrolled at Georgia Tech and another institution during the same term without the specific approval of the appropriate curriculum committee.

## ADMISSIONS INFORMATION

Applicants for the master's program should have received a bachelor's degree from an accredited institution and graduated in the upper half of their class. Students must show evidence of preparation in their chosen field sufficient to ensure profitable graduate study.

Ordinarily, the graduate school admits to the doctoral program only those students who have graduated in the upper quarter of their class.

Prospective students may obtain information and apply for admission via the graduate admissions Web page at www.gradadmiss.gatech.edu.

Unless otherwise instructed by the major school/college under the "Degree Programs" listing at www.gradadmiss.gatech.edu, the student must submit the online application and all required supporting documentation (see mailing instructions at www.gradadmiss.gatech.edu) to the Graduate Admissions Office by June 1, November 1, or March 1 for fall, spring, or summer terms, respectively. Some programs have earlier deadlines, and some programs admit students for the fall term only. Students are advised to check the graduate program of interest in the "Degree Programs" listing at www.gradadmiss.gatech.edu before applying. It is strongly recommended that international students submit their materials at least six months before the proposed registration date. Students applying for admission with financial assistance for any term are strongly advised to submit their materials by February 1 of the preceding academic year.

## GRADUATE RECORD EXAMINATIONS (GRE)

Official GRE general test scores are generally required by all graduate programs with the exception of the M.B.A., Master of Business Administration - Global Business, and the Executive Management of Technology programs, which require official Graduate Management Admission Test (GMAT) scores. In addition, official GRE subject test scores are required for applicants to the College of Computing and the Schools of Chemistry and Biochemistry and Mathematics. Test scores must be reported directly to the Institute by the testing agency in order to be considered official. Self-reported scores or photocopies are not considered official scores.

Information concerning these tests can be obtained from Graduate Record Examinations, Educational Testing Service, Box 6000, Princeton, New Jersey 08541-6000, or www.gre.org.

General information on the GMAT is available from Educational Testing Service, Box 966, Princeton, New Jersey 08540, or www.gmac.com. On-campus applicants may pick up GRE information from the Graduate Admissions Office and GMAT information from the College of Management.

## ORIENTATION - NEW STUDENTS

During the week preceding first registration, each new student should plan to attend the Institute's orientation session. Information will be posted on the Graduate Admissions Web site at www.gradadmiss.gatech.edu. In some cases, individual programs will also hold program orientations. New students should plan to attend both the Institute and the program orientation as the same information is not covered in these separate sessions. In addition, they should consult with the graduate coordinator of their major schools to prepare a plan of study and to receive instructions regarding registration procedures. Complete instructions on how and when to register can be found at www.registrar.gatech.edu.

**Note:**
All new students must submit health forms to Student Health Services before they can register. All new international students must check in with the Office of International Education as soon as they arrive.

## REACTIVATION OF APPLICATION

Applicants to a Georgia Tech graduate program who do not enter in the term for which they originally applied and subsequently wish to be considered for a later term must reactivate their applications for the new term by written request to the program to which they originally applied. Since the Graduate Admissions Office keeps files on never entered students for one academic year only, students who delay more than one academic year in the reactivation request must reapply and provide a new set of application materials. The number of reactivations per applicant is limited.

## READMISSION

Students who interrupt the continuity of their graduate programs by not registering for two or more consecutive terms must seek readmission by filing with the registrar a completed Request for Readmission form. Individuals who have received a graduate degree from Georgia Tech and who wish to reenter to receive an additional graduate degree (at the same level or higher) must also request readmission through this process (it is not necessary to file a new application). Readmission forms are available from the Registrar's Office. For more information, see Rules and Regulations.

Students who have been out two or more terms are required to obtain a Tuberculosis Screening form signed, dated, and addressed by a medical practitioner. Please refer to www.health.gatech.edu/policies_procedures/docs.htm for a form to download. Depending on how long you have been out of school, you may be required to have additional immunizations. Should you have additional questions regarding your immunizations, e-mail the Health Center by clicking below. You must satisfy all immunization requirements prior to registration.

## TOEFL FOR INTERNATIONAL STUDENTS

All international students from countries in which English is not the primary native language must take the Test of English as a Foreign Language (TOEFL). Since the results of this test constitute part of the material reviewed for admission to graduate study at Georgia Tech, students must arrange to have the Educational Testing Service (ETS) send their official scores to the Graduate Admissions Office as early as possible. Official scores must be sent directly from the testing service to the Institute. Self-reported scores or photocopies are not considered official. The minimum score for graduate admission required by Georgia Tech is 550 paper-based, 213 computer-based, or 79 internet-based. Some academic programs require higher scores-see the program(s) of choice in the degree program listing found at www.gradadmiss.gatech.edu to determine the minimum scores required by each program.

**Exception:**
International students who have attended a college or university in the United States for at least one academic year (two semesters or three quarters) are exempt from the TOEFL requirement.

**Note:**
No other language test may be substituted. The TOEFL is the only test accepted by Georgia Tech.

Students who wish to take the TOEFL may obtain more information and materials at www.toefl.org. Applicants may also acquire copies of the *TOEFL Bulletin of Information for Candidates, International Edition*, and the registration form through the offices of the United States Information Service (USIS), American embassies and consulates, and U.S. educational commissions and foundations in a number of cities outside the United States. In addition, several private organizations distribute the TOEFL Bulletin. These groups include the Institute of International Education (IIE); the African American Institute (AAI); the American Mideast Educational and Training Services (AMIDEAST); and the American-Korean Foundation.

Students who cannot obtain a *TOEFL Bulletin* and registration form locally or via the Web should write well in advance of application to Test of English as a Foreign Language, Box 6151, Princeton, New Jersey, 08541-6151, USA.

Official TOEFL scores must be current within two years-ETS will not report test scores older than two years. Georgia Tech will accept scores in all formats as long as they are reported directly to us by ETS. Therefore, tests taken prior to updates to the test or format changes are acceptable as long as the scores are reported directly to the Institute by the testing service.

## TRANSFER OF CREDIT

A student may not apply for transfer credit until after matriculation at Georgia Tech. The courses to be transferred would typically be those appearing on the approved program of study form for the master's degree. A doctoral student normally does not request transfer credit. The rules relative to and the process for obtaining transfer of credit for graduate-level courses are as follows:

1. A student in a master's degree program requiring fewer than thirty-three semester credit hours may receive up to six hours of transfer credit for graduate-level courses taken at an institution accredited by a Canadian or U.S. regional accrediting board, or at a foreign school or university that has a signed partner agreement with Georgia Tech Lorraine, and not used for credit toward another degree. A student in a master's degree program requiring thirty-three semester credit hours or more may receive up to nine hours of transfer credit for graduate-level courses taken at an institution accredited by a Canadian or U.S. regional accrediting board, or at a foreign school or university that has a signed partner agreement with Georgia Tech Lorraine, and not used for credit toward another degree. The student must supply a current transcript for this evaluation.
2. To obtain transfer of credit, the student must complete the following procedure:
    a. The student will confer with the graduate advisor to ascertain whether the courses to be transferred are a logical part of the student's graduate program;
    b. If the courses are appropriate, the student will deliver to the school that teaches such courses a copy of the current transcript, necessary descriptive materials including catalog descriptions, and textbooks used for evaluation. The faculty of the appropriate school will determine the equivalent Georgia Tech course and the number of credit hours accepted. The faculty member who prepares the transfer credit form should have the school chair cosign it. The school should then send the form directly to the registrar with a copy of the student's Approved Program of Study attached;
    c. If the student wishes to transfer more than the number of hours permitted in paragraph 1), a petition must be submitted to the Institute Graduate Committee including statements of possible justification for the granting of such a petition, transfer credit forms, and the recommendation of the student's school chair.
3. A joint enrollment student may receive graduate credit for up to one-third of the hours required for the degree for graduate courses taken at Emory University or Georgia State University provided that
    a. Georgia Tech does not offer such courses;
    b. the student's advisor and school chair approve the courses in writing in advance; c) and the student passes the courses with a *C* or better. Advance approval is satisfied when the courses appear on the student's proposed Program of Study.
4. A student may not receive transfer credit from universities outside the United States and Canada except if the courses were taken at a foreign school or university that is accredited by a Canadian or U.S. regional accrediting board or has a signed partner agreement with Georgia Tech Lorraine. In any other case, an international student can obtain credit for courses previously taken but not applied toward another degree by filling out an Examination for Advanced Standing Authorization Request Form, paying the appropriate fee at the Cashier's Office, and passing the examination for advanced standing. The school or college that normally teaches the equivalent course will administer any necessary examinations.

## TYPES OF STANDING

Applicants holding a bachelor's degree in an appropriate field from an accredited institution will be accorded full graduate standing provided their previous work is of sufficient quality to indicate immediate success in advanced study.

If the work of an applicant holding an approved bachelor's degree is deficient in content or quality so that supplemental study or demonstrated ability is necessary, the applicant may be accorded conditional graduate standing.

Students who do not wish to qualify for an advanced degree at Georgia Tech, but demonstrate the potential benefits of their participation in advanced study, may gain admission as special non-degree graduate students. Students who are admitted with special non-degree standing for failure to submit official transcripts or for other administrative reasons may apply not more than sixteen semester credit hours taken on special non-degree standing toward a degree.

Graduate students in good standing at other U.S. universities may enroll at Georgia Tech as transient graduate students by filing an application for admission and by providing a letter of verification of good standing status from the registrar of the institution in which they are currently enrolled. Work undertaken in transient standing will not apply, however, toward a Georgia Tech degree.

The undergraduate school, not the graduate school, will admit students working toward a second bachelor's degree.

In addition to full, conditional, and special non-degree graduate standing, graduate students will be classified by academic standing according to their grade point averages: good standing, warning, probation, or drop. For specific information, see Rules and Regulations.

The graduate average includes the grades on all courses scheduled by the student after admission to graduate study.

# COLLEGE OF ARCHITECTURE

College established in 1975,
School in 1948, Department in 1908
Location: 247 Fourth Street,
Atlanta, Georgia 30332-0155
Phone: 404.894.3880
Fax: 404.894.2678
Web site: www.coa.gatech.edu

## GENERAL INFORMATION

The College of Architecture offers three undergraduate programs - Architecture, Building Construction, Industrial Design - leading to the bachelor of science degree and graduate programs in architecture, building construction, city and regional planning, industrial design, and music, leading to the Master of Architecture, Master of Science in Building Construction and Integrated Facility Management, Master of City and Regional Planning, Master of Industrial Design, Master of Science in Music Technology, Master of Science, and Doctor of Philosophy degrees.

The original mission of the College, established as the Department of Architecture in 1908, was to prepare students for the professional practice of architecture. During the past ninety years, the mission of the College has expanded, both to provide continued leadership and to respond to changes in the professions and society. From its original focus on the practice of architecture, the College has become a multidisciplinary setting for teaching, research, and service at every scale of the constructed environment ranging from the design and production of the smallest utilitarian object to the planning and design of the city. The undergraduate programs of study and the graduate programs of study and research are fully described in the following sections.

All work executed in the College becomes the property of the College and will be retained or returned at the discretion of the faculty. The faculty also reserves the right to refuse for credit any project executed outside the precincts of the College or otherwise executed without proper coordination with the faculty.

## COMMON FIRST YEAR

All freshmen enter as undesignated majors within the College of Architecture. All students, including transfer students, must complete a three-course sequence (COA 1060 - Introduction to Design and the Built Environment, COA 1011 - Fundamentals of Design and the Built Environment I, and COA 1012 - Fundamentals of Design and the Built Environment II), in addition to other courses scheduled for the freshman year or appropriate courses for transfer students. During the spring semester of the first year, students enrolled in COA 1012 will prepare a portfolio and application to one of the three undergraduate programs within the College of Architecture: Architecture, Building Construction, or Industrial Design. Admission to one of the three programs will be determined by the student's performance at Georgia Tech, portfolio review, program application information, and other academic information that was used to admit the student to Georgia Tech. Admission to a specific program may be limited by available space and resources needed to accommodate a maximum number of majors in the second-year program courses. Students will be notified concerning their acceptance to a specific program before the end of the spring semester.

## COLLEGE OF ARCHITECTURE ACCREDITATION STATEMENT

The National Architectural Accrediting Board (NAAB) has certified the curriculum leading to the Master of Architecture; the American Council for Construction Education (ACCE) has accredited the curriculum leading to the Bachelor of Science in Building Construction; the Master of Science in Building Construction and Integrated Facility Management is recognized by the International Facility Management Association (IFMA), and the Design Build Institute of America (DBIA); the Planning Accreditation Board has accredited the curriculum leading to the Master of City and Regional Planning; the Bachelor of Science in Industrial Design has been accredited by the National Association of Schools in Art and Design (NASAD) and is recognized by the Industrial Designers Society of America (IDSA).

## FACULTY

### Interim Dean

Douglas C. Allen

### Associate Dean

Sabir Khan

### Thomas W. Ventulett III Distinguished Chair in Architectural Design

Lars Spuybroek

### Harry West Chair of City and Regional Planning

Catherine L. Ross

### Professors

Libero Andreotti, Philip Bryant, Frank Clark, Robert M. Craig, Elizabeth M. Dowling, Charles Eastman, Steven P. French, Roozbeh Kangari, Nancey Green Leigh, John Peponis, David S. Sawicki, Craig M. Zimring.

### Professors Emeriti

Arnall T. Connel, Thomas N. Debo, Rufus Hughes, E. Larry Keating, John Kelly, Ronald Lewcock, H. Randal Roark, Roger F. Rupnow, John A. Templer.

### Associate Professors

Godfried Augenbroe, Richard Dagenhart, Mark Cottle, Harris H. Dimitropoulos, Ellen Yi-Luen Do, Michael Dobbins, William J. Drummond, Ellen Dunham-Jones, Athanassios Economou, Michael L. P. Elliott, Michael Gamble, T. Russell Gentry, Dan Immergluck, Christopher Jarrett, George B. Johnston, Jude LeBlanc, Kathy Roper, Charles Rudolph, Saeid Sadri, Stephen Sprigle, Brian Stone, Linda Thomas-Mobley, Jerry Ulrich.

### Assistant Professors

Tristan Al-Haddad, Sonit Bafna, W. J. Blane, Daniel Castro-Lacouture, Parag Chordia, Ruchi Choudhary, Ruth Dusseault, Harley Etienne, Benjamin Flowers, Jason Freeman, Frances Hsu, Ron Mendola, Chris Moore, Gernot Riether, William H. Russell, Clifford H. Stern, Franca Trubiano, Gil Weinberg, Claudia Winegarden, Jiawen Yang.

### Instructors

Ed Akins, Donald Allen, April Atkins, Joseph Ballay, Marc Bedarida, Suzanne Boyden, Marilyn Bright, Richard Braunstein, James Butler, Stephen Chininis, Peter Ciaschini, Jamie Cochran, Mark Collins, Ryan Crooks, Carla Diana, Danny England, Lane Duncan, Nickolas Faust, Tim Frank, Michael Glaser, Judy O'Buck Gordon, David Green, David Haddow, Samuel Harris, Tim Harrison, Timothy Johnson, Raja Jones, Lee Kean, Thomas Keel, Michael Kenig, Jonathan LaCrosse, John Lau, Brian Leary, David Lynn, Mark McJunkin, Joyce Medina, Joseph Minatta, Craig Mitchell, Frederick M. Pearsall, Debbie Phillips, Richard Porter, Tim Purdy, Daniel Reuter, Richard Rodgers, Stuart M. Romm, Soheil Rouhi, Kevin Shankwiler, Carlos Tardio, Damien Valero, Greg Walker, Maureen Weidner, Jack Wexler, Tom Whatley, Xavier Wrona, David Yocum.

### Professors of Practice

Brian Bowen, Harry West.

### Research Engineers

Scott Haynes, Linghua Kong, Maureen Linden, Karen Milchus, Ramachandra Sivakumar.

### Research Scientists/Associates

Danielle Ayan, Jason Barringer, Karl N. Brohammer, Carrie Bruce, Joanie Chembars, Sarah Endicott, Anthony Giarrusso, Alan Harp, Frances Harris, Karen Leone de Nie, Subrahmanyan Muthukumar, Erik Palmquist, Dory Sabata, Jon Sanford, Jonathan Shaw, Xuan Shi, Matthew Swarts, Robert Szurgot, Robert Todd, Zhaohua Wang, Mike Williams, Graceline Williams.

### Senior Academic Professional

Anatoliusz Lesniewski

### Academic Professional

Tripp Edwards

## SUMMER STUDY IN GREECE AND ITALY (AVAILABLE TO ALL MAJORS)

The College of Architecture offers a summer semester program intended to provide students the opportunity to study the art and architecture of Greece and Italy. The primary academic mission of the program is to expand the opportunities for study of the humanities at Georgia Tech. Headquartered in Athens, Rome, Florence, and Venice, the program involves an eight-week concentrated and intensive study at the buildings, sites, and museums where the foundations of western civilization began. The program extends through the Renaissance with the study of works by Michelangelo, Uccello, Leonardo, Brunelleschi, and Caravaggio. In addition to painting, sculpture, and architecture, attention is given to the urban context extending from classical antiquity through the Renaissance and late Baroque periods. On-site studies at the Athenian Agora, the Acropolis, Olympia, Delphi, the Roman Forum, Pompeii, Herculaneum, Ostia, and Paestum, as well as Renaissance sites including Villa D'Este, Villa Giulia, The Vatican Museum, Borghese Museum, Basilica of St. Peter, and other sites provide students with a deeper understanding and appreciation for the role that Mediterranean and Classical civilization has played as the artistic, engineering, and political cornerstone of the western world. Twelve credit hours are offered, nine of which satisfy Institute undergraduate humanities requirements. The remaining three hours are taken as free electives and involve faculty-directed independent study of topics developed during the spring term.

# COLLEGE OF ARCHITECTURE

## ARCHITECTURE PROGRAM

Bachelor of Science in Architecture

Additional Options:

- International Plan

Master of Architecture

Master of Science with a Major in Architecture

Concentrations:

- Advanced Architectural Design
- Architecture, Culture, & Behavior
- Building Ecology & Emerging Technologies
- Building Technology
- Classical Design
- Computation, Composition, & Construction
- History, Theory, & Criticism of Architecture
- Morphology and Design
- Urban Design

Dual Degree Programs:

Architecture & City and Regional Planning

Doctor of Philosophy with a Major in Architecture

## BUILDING CONSTRUCTION PROGRAM

Bachelor of Science in Building Construction

Master of Science in Building Construction and Integrated Facility Management

Concentrations:

- Integrated Facility Management
- Integrated Project Delivery Systems
- Residential Construction Development

Doctor of Philosophy with a Major in Architecture (Concentration: BC & Integrated Facility Management)

## CITY AND REGIONAL PLANNING PROGRAM

B.S. / M.CRP

Master of City and Regional Planning

Dual Degree Programs:

City and Regional Planning & Civil and Environmental Engineering

With a focus in:

- Environmental Planning and Engineering
- Transportation
- Water Resources

City and Regional Planning & Architecture

City and Regional Planning & Georgia State University Juris Doctor degree program

City and Regional Planning & Public Policy

Doctor of Philosophy with a Major in Architecture (Concentration: City and Regional Planning)

## INDUSTRIAL DESIGN PROGRAM

Bachelor of Science in Industrial Design

Master of Industrial Design

Doctor of Philosophy with a Major in Architecture (Concentration: Industrial Design)

## DEPARTMENT OF MUSIC

Master of Science in Music Technology

## GENERAL INFORMATION

Within the overall mission of the Architecture Program, the undergraduate program in architecture has three major objectives:

1. To provide a general university education within the context of Georgia Tech and within the study of architecture, both as an intellectual discipline and as a profession. The objective of the program is to expose students to many different fields of study while demonstrating how they are related.
2. To provide a multidisciplinary foundation of education in architecture, with a focus on the architectural design studio as its primary setting. In addition to design studios, the program includes required courses in the subject areas of architectural history and theory, architectural technology, and visual arts and design computing.
3. To provide for the development of individual student interests through a substantial number of free and required electives, which comprise almost one-third of the undergraduate curriculum. This flexibility allows a student to pursue specific interests within the discipline of architecture; within the associated programs of City Planning, Building Construction or Industrial Design; or in joint programs with other disciplines on campus.

## ACCREDITATION

The Master of Architecture degree offered by the Georgia Tech Architecture Program is fully accredited by the National Architectural Accrediting Board (NAAB). The current term of accreditation is for years 2002-2008. The NAAB will conduct the accredition team visit for this program in Spring 2008.

In the United States, most state registration boards require a degree from an accredited professional degree program as a prerequisite for licensure. The NAAB, which is the sole agency authorized to accredit U.S. professional degree programs in architecture, recognizes three degrees: the five-year Bachelor of Architecture, the Master of Architecture, and the Doctor of Architecture.

The Master of Architecture degree may consist of an entirely graduate course of study (3.5 years at Georgia Tech) or a pre-professional undergraduate degree in Architecture combined with a professional graduate degree, (at Georgia Tech this is the 4-year Bachelor of Science in Architecture plus the 2-year Master of Architecture degree). However, the pre-professional four-year Bachelor of Science in Architecture degree is not, by itself, recognized as a NAAB accredited degree.

## COMMON FIRST YEAR

All freshmen enter as undesignated majors within the College of Architecture. All students, including transfer students, must complete a three-course sequence consisting of:

- COA 1060 - Introduction to Design and the Built Environment
- COA 1011 - Fundamentals of Design and the Built Environment I, and
- COA 1012 - Fundamentals of Design and the Built Environment II

in addition to other courses scheduled for the freshman year, or appropriate courses for transfer students. During the spring semester of the first year, students enrolled in COA 1012 will prepare a portfolio and application to one of the three undergraduate programs within the College of Architecture: Architecture, Building Construction, or Industrial Design. Admission to one of the three programs will be determined by the student's performance at Georgia Tech, portfolio review, program application information, and other academic information that was used to admit the student to Georgia Tech. Admission to a specific program may be limited by available space and resources needed to accommodate a maximum number of majors in the second-year program courses. Students will be notified concerning their acceptance to a specific program before the end of the spring semester.

## BACHELOR OF SCIENCE IN ARCHITECTURE

The undergraduate program in architecture is a four-year, preprofessional program leading to the Bachelor of Science degree. It seeks to provide:

1. a general university education in the liberal arts, fine arts, and technology;
2. a multidisciplinary foundation in architectural studies with the design studio as a major focus of the curriculum; and
3. substantial opportunities for students to explore other disciplines and to concentrate studies in certificate programs, cluster electives, or dual-degree programs.

This Bachelor of Science program prepares students for graduate-level studies in architecture, for graduate study in related fields, or a variety of careers related to architecture, the building industry, or government service.

Telephone: 404.894.4885
Web site: www.coa.gatech.edu/arch/

# BACHELOR OF SCIENCE IN ARCHITECTURE
## 2008 - 2009 DEGREE REQUIREMENTS
### ARCHITECTURE PROGRAM
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| COA 1011 FUNDAMENTALS OF DESIGN I | 3 |
| COA 1060 INTRODUCTION TO DESIGN | 3 |
| COMPUTING REQUIREMENT | 3 |
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| COA 1012 FUNDAMENTALS OF DESIGN II | 4 |
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-FALL | HRS |
|---|---|
| ARCH 2011 DESIGN STUDIO I | 4 |
| ARCH 2111 HISTORY OF ARCHITECTURE I | 3 |
| ARCH 2211 CONSTRUCTION TECHNOLOGY & DESIGN | 3 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| ARCH 2012 DESIGN STUDIO II | 4 |
| ARCH 2112 HISTORY OF ARCHITECTURE II | 3 |
| LAB SCIENCE (BIOL, CHEM, EAS, PHYS) | 4 |
| WELLNESS | 2 |
| HUMANITIES ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| ARCH 3011 DESIGN STUDIO III | 5 |
| ARCH 3241 FUNDAMENTALS OF STRUCTURES | 3 |
| COLLEGE OF ARCHITECTURE ELECTIVE | 3 |
| FREE ELECTIVE | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| ARCH 3012 DESIGN STUDIO IV | 5 |
| ARCH 3231 ENVIRONMENTAL SYSTEMS & DESIGN INTEGRATION I | 3 |
| HUMANITIES ELECTIVE | 3 |
| VISUAL ARTS/DESIGN-COMPUTING REQUIREMENT<br>(ARCH 4411, ARCH 4414, ARCH 4415, ARCH 4420) | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| ARCH 4011 DESIGN STUDIO V or CLUSTER ELECTIVES | 5 |
| COLLEGE OF ARCHITECTURE ELECTIVE | 3 |
| FREE ELECTIVES | 9 |
| **TOTAL SEMESTER HOURS =** | **17** |

| FOURTH YEAR-SPRING | HRS |
|---|---|

| | |
|---|---|
| ARCH 4012 DESIGN STUDIO VI or CLUSTER ELECTIVES | 5 |
| COLLEGE OF ARCHITECTURE ELECTIVE | 3 |
| FREE ELECTIVES | 6 |
| **TOTAL SEMESTER HOURS =** | **14** |

**TOTAL PROGRAM HOURS = 129 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

## ELECTIVES

### COMPUTING REQUIREMENT

Students must complete either CS 1315, CS 1301, or a computer programming course approved as satisfying the general education requirements in computer literacy.

### WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

### HUMANITIES ELECTIVES

Twelve credit hours of humanities courses are required. The required ENGL 1101 and 1102, and any other six credit hours of Institute-approved humanities courses, satisfy this requirement. Courses with ARCH prefixes will not satisfy this requirement for ARCH majors.

### SOCIAL SCIENCES ELECTIVES

Twelve credit hours of approved social sciences courses are required. To satisfy the state requirement regarding coursework in the history and constitutions of the United States and Georgia, students must complete one of the following courses: HIST 2111, HIST 2112, POL 1101, INTA 1200, or PUBP 3000. Either ARCH 4126 or HTS 3011 is also required. Any other six credit hours of Institute-approved social science courses will satisfy the remainder of this requirement.

### SCIENCE ELECTIVES

Eight credit hours of science courses are required. The required PHYS 2211 and any other four credit hours of Institute-approved science courses satisfy this requirement.

### COLLEGE OF ARCHITECTURE ELECTIVES

Twelve credit hours of approved College of Architecture electives are required, including one course from ARCH 4411, 4414, 4415, or 4420. Courses chosen from the list of required courses for the M.Arch. degree or any other courses taught in the College and not otherwise required will satisfy this requirement. The selection of any architecture elective should be made in consultation with the student's academic advisor.

### CLUSTER ELECTIVES

A minimum of ten credit hours in a concentrated cluster is required for the B.S. degree. Clusters may be made up from courses from within or outside of the College. This requirement may be fulfilled by the senior-year sequence of architectural design (ARCH 4011 and ARCH 4012), by a ten-hour concentration approved by the architecture faculty, or by several existing certificate programs offered on the campus.

### FREE ELECTIVES

Twenty-one credit hours of free electives are included in the curriculum to allow students to pursue architectural studies in additional depth or to pursue other educational interests within or outside the College. Courses chosen from the list of required courses for the M.Arch. degree or any other courses taught in the College or Institute and not otherwise required will satisfy this requirement.

The selection of these courses should be made in consultation with the student's advisor. Military training is an optional program of the Institute. A degree program may include a maximum of four hours of basic ROTC and a maximum of six hours of advanced ROTC. No course covering the same material as other courses may be applied for credit for the B.S. degree.

## GRADE REQUIREMENTS

Students must maintain a minimum 2.0 grade point average in each year's grouping of architectural design studio courses (e.g., ARCH 2011, 2012, etc.) in order to enter the next sequence of studio courses. Each sequence of design studio courses must be started in the fall semester. A maximum of nine credit hours may be taken on a pass/fail basis. Only courses taken as free electives within the undergraduate curriculum are eligible for pass/fail credit. See Institute regulations regarding pass/fail courses.

Students who complete both the Bachelor of Science (B.S.) and Master of Architecture (M.Arch.) in the College may apply up to six credit hours of graduate coursework toward both degrees. In order to qualify for this option, the student must complete the undergraduate degree with a cumulative grade point average of 3.5 or higher and complete the master's degree within a four-year period from the award date of the bachelor's degree.

## BACHELOR OF SCIENCE IN ARCHITECTURE - INT'L PLAN

The International Plan in the Architecture Program [IPAP] is a challenging and coherent academic program for undergraduate students who will develop an introductory level of global competence within the study of architecture. The International Plan is an intensive degree-long program designed to prepare students with the ability to:

1. assimilate comfortably in a constantly evolving international context within the profession of architecture,
2. value how architecture is practiced in different global contexts,
3. function effectively in a multi-national academic and work environment, and
4. understand the complexity of the global economy and the importance of developing a sensibility to international relations.

While many students gain some exposure to these aspects of today's world through the patchwork of traditional international opportunities such as study abroad and international internships, IPAP is designed to develop a deeper level of competency in these areas within the study of architecture.

The requirements of IPAP are:

1. Proficiency in a Foreign Language
2. Globally Focused Courses
3. International Experience
4. Capstone Course

IPAP students can fulfill the International Experience requirement of the International Plan in one of two ways:

1. participation in the College of Architecture Paris Program or
2. participation in a university-approved international program with the approval of the Architecture Program.

Undergraduate students in the Architecture Program must hold a minimum 2.5 GPA at the time of application to be eligible for the International Plan in the Architecture Program [IPAP]. Students must maintain a minimum 3.0 grade point average in each year's grouping of architectural design studio courses (e.g., ARCH 2011, 2012, etc.) in order to maintain eligibility for IPAP. Each sequence of design studio courses must be started in the fall semester.

For more information on IPAP, visit: www.coa.gatech.edu/arch/international/international.php/

## CERTIFICATE PROGRAMS

The Architecture Program offers three certificate programs for which students may apply:

- **American Architectural History** - The American Architectural History Certificate recognizes completion of a general survey of American architecture with designated, specialized studies.
- **European Design History** - The European Design History Certificate is especially appropriate for students in the Paris Study Abroad Program and/or the Italy Summer Program and recognizes the successful completion of a focused program of study in various areas of the history of European architecture.
- **History of Architecture and Design** - The History of Architecture and Design Certificate recognizes completion of focused study in the history of architcture and design from a wide range of designated courses.

Certificates will be granted only to students who, in addition to the certificate program requirements, have satisfied requirements for a Georgia Tech degree. Each certificate requires a minimum of twelve credit hours, at least nine of which are at the 3000 level or higher in the designated area. Courses required by a student's program of study may not be credited by that student toward a certificate. Courses counting toward a certificate must be taken on a letter-grade basis, and a *C* or better must be received in each course. Interested students should consult www.coa.gatech.edu/arch for more details.

## UNDERGRADUATE MINORS

The Architecture Program offers an undergraduate minor in Architectural History for students in all disciplines at Georgia Tech. The minor requires completion of a two-semester core sequence of ARCH 2111 and 2112 or ARCH 4105 and 4106, in addition to four courses (six courses for Architecture Program students) from an approved list. Interested students should consult http://www.catalog.gatech.edu/academics/minorguide.php for detailed information.

In addition, the College of Architecture (COA) offers a separate minor in Multidisciplinary Design/Arts History for students in all disciplines at Georgia Tech. The minor requires completion of one of three available core survey sequences in the history of design (ARCH 2111 and 2112 [or ARCH 4105 and 4106] or COA 2241 and 2242 or ID 2202) in addition to four courses from at least three lists of courses in: history of architecture, the history of industrial design, the history of the city/landscape/garden, history of art and foreign study, and music history. Architecture and Industrial Design program students must select a core-survey sequence outside their major, or select two additional electives from approved lists. Interested students should see http://www.catalog.gatech.edu/academics/minorguide.php and consult with the associate dean for Undergraduate Studies and Creative Activity for more details.

## FOREIGN STUDY PROGRAMS

Undergraduate students are eligible to participate in two COA-affiliated foreign study programs. The first is the Summer Study in Italy Program, which focuses on architecture, painting, and sculpture at a variety of sites in Italy. The second is the Barcelona Study Abroad Program in Spain, which is jointly administered by Georgia Tech and the Facultat d'Informatica de Barcelona (FIB) at Universidad Politecnica de Catalonia (UPC), and offers summer courses ranging from architecture to computing and Spanish-language instruction as part of a cross-disciplinary, transcultural experience. Graduate students may also participate in both programs. Interested students should contact the Architecture Program Office for more details.

## STUDY IN PARIS (ARCHITECTURE STUDENTS ONLY)

The College of Architecture conducts an annual Study Abroad Program in Paris, France, in association with the Ecole Supérieure Nationale d'Architecture de Paris-La Villette. This program is designed to give qualified senior students in architecture the opportunity to complete all or part of their senior year in residence in Paris as part of a true cultural exchange. The year-long program offers courses taught by Georgia Tech faculty and native French faculty that parallel those courses taught in Atlanta, while offering an international experience. Group field trips to significant French architectural and cultural sites and a jointly taught Franco-American studio broaden and enhance the program's cultural value. Opportunities also exist for individual study and travel. Due to the importance of communication skills in a successful exchange experience, students planning to participate in the Paris Study Abroad Program are required to complete a minimum of one year of college-level French language courses well in advance of their senior year. Further details of the Paris Study Abroad Program are available in the Undergraduate Architecture Student Handbook.

## SUMMER STUDY IN GREECE AND ITALY (AVAILABLE TO ALL MAJORS)

The College of Architecture offers a summer semester program intended to provide students the opportunity to study the art and architecture of Greece and Italy. The primary academic mission of the program is to expand the opportunities for study of the humanities at Georgia Tech. Headquartered in Athens, Rome, Florence, and Venice, the program involves an eight-week concentrated and intensive study at the buildings, sites, and museums where the foundations of western civilization began. The program extends through the Renaissance with the study of works by Michelangelo, Uccello, Leonardo, Brunelleschi, and Caravaggio. In addition to painting, sculpture, and architecture, attention is given to the urban context extending from classical antiquity through the Renaissance and late Baroque periods. On-site studies at the Athenian Agora, the Acropolis, Olympia, Delphi, the Roman Forum, Pompeii, Herculaneum, Ostia, and Paestum, as well as Renaissance sites including Villa D'Este, Villa Giulia, The Vatican Museum, Borghese Museum, Basilica of St. Peter, and other sites provide students with a deeper understanding and appreciation for the role that Mediterranean and Classical civilization has played as the artistic, engineering, and political cornerstone of the western world. Twelve credit hours are offered, nine of which satisfy Institute undergraduate humanities requirements. The remaining three hours are taken as free electives and involve faculty-directed independent study of topics developed during the spring term.

## GRADUATE STUDIES IN ARCHITECTURE

Graduate studies in architecture at Georgia Tech are comprised of two distinct degree-granting programs: the Master of Architecture (M.Arch) and the Master of Science (M.S.).

The M.Arch. Program is the professional program in architecture leading to the NAAB-accredited Master of Architecture degree. This program accommodates both a two-year curriculum for those students with a four-year, preprofessional degree in architecture and a three-and-a-half-year curriculum for those students without a preprofessional degree in architecture.

The M.S. Program is a nonprofessional, research-oriented degree program that requires a minimum of thirty hours of coursework. The Master of Science is administered through the Ph.D. Program.

Together, these programs are linked through a rich array of studios and courses that engage both theoretical discourse and design speculation about architecture. Topical offerings in the areas of design, theory, history, technology, professional and social practice, culture and behavior, visual arts, and design computing comprise the five fields of study available within the graduate program:

1. The program emphasizes the city and its many manifestations as a context for architectural and urban speculation and explores solutions to urban problems through direct engagement with Atlanta and other environs as working design laboratories.
2. The program promotes the knowledge of architectural and urban history as a basis for theoretical discourse and as an impetus for both critical reflection and design speculation upon the social, economic, and political dimensions of a diverse cultural landscape.
3. The program stresses the central engagement of technology as both philosophical framework and constructional means for the generation of culturally responsible form that accommodates and integrates human, functional, and environmental concerns.
4. The program engages the intertwined contexts of both professional and social practice as fertile realms of inquiry across a wide range of issues - from the legal, financial, and business aspects of professional action to the cultural, behavioral, and experiential dimensions of everyday life.
5. The program cultivates the relationship between architecture and art and encourages the critical exploration of representational means in design ranging from traditional techniques to electronic media for purposes of both speculation about and production of architecture.

## APPLICATIONS

The deadline for applications is January 15 for the following fall semester. Each applicant must have an outstanding undergraduate record and must submit a portfolio of creative work. The Graduate Record Examination (GRE) is required for all applicants. A minimum TOEFL score of 600 (paper-based), 250 (computer-based), or 100 (Internet-based) is required for all foreign applicants. All applicants should be aware that the Master's Program in Architecture has specific application requirements; therefore, all applicants should request a complete application package and instructions by calling 404.894.4885, faxing to 404.894.0572, or writing to:

Architecture Program Graduate Admissions
College of Architecture
Georgia Institute of Technology
Atlanta, Georgia 30332-0155

## MASTER OF SCIENCE WITH A MAJOR IN ARCHITECTURE

The College of Architecture's (COA) Master of Science (MS) Program is a non-professional program requiring a minimum of thirty semester hours of advanced study and is oriented toward advanced practice, scholarship and research. Applicants may have previous degrees in architecture or other related fields. The program accepts students with a professional degree in a design or design-related field, as well as students with a baccalaureate degree in a non-design field who wish to pursue an area of study offered in the Master of Science degree.

The areas of specialized study include:

- Advanced Architectural Design
- Architecture, Culture, and Behavior
- Building Ecology and Emerging Technologies
- Building Technology
- Classical Design
- Computation, Composition, and Construction
- History, Theory, and Criticism of Architecture
- Morphology and Design
- Urban Design

Specific requirements for the areas of study may be found at the College of Architecture Web site.

For further details on the program, contact:

M.S. Program Advisor
Ph.D. Office, College of Architecture
Georgia Institute of Technology
Atlanta, Georgia 30332-0155

## MASTER OF ARCHITECTURE (M.ARCH)

The M.Arch. Program, leading to the Master of Architecture as the first professional degree, is oriented toward the professional practice of architecture and is fully accredited by the National Architectural Accrediting Board (NAAB). This degree option provides flexibility for students who have an undergraduate degree with a major in architecture as well as those who have a degree in a field other than architecture. The M.Arch. Program requires a minimum of 60 credit hours and a maximum of 108 credit hours of study, depending upon the applicant's prior education in architecture and the amount of advanced standing credit granted upon admission to the program.

Normally, a student admitted to the program with maximum advanced standing can expect to complete the program within two academic years of full-time study. A student admitted to the program with no advanced standing can expect the program to require three and one-half academic years of full-time study. Graduates from four-year undergraduate programs in architecture similar to that at Georgia Tech can normally expect to complete the program in two academic years, provided they have pursued architecturally related elective coursework during their undergraduate years. In all cases, the Master's Project, or the optional Master's Thesis, is required for award of the Master of Architecture degree. Specific information regarding applications for advanced standing and degree requirements is available from the Architecture Program.

The minimum requirements for the M.Arch. degree, for a student with a previous degree in architecture, are as follows:

| Course | Credit Hours |
|---|---|
| Architectural Design Studios | 18 |
| Professional Core Requirements | 12 |
| Master's Project/Thesis Option | 9 |
| Approved Professional Electives | 21 |
| TOTAL (Minimum) | 60 |

**Total Minimum Required Credit Hours for M.Arch. Program = 60**

The maximum requirements for the M.Arch. degree, for a student with a previous degree in a discipline other than architecture, are as follows:

| Course | Credit Hours |
|---|---|
| Architectural Design Studios | 33 |
| Preparatory Requirements | 15 |
| Professional Core Requirements | 30 |
| Master's Project/Thesis Option | 9 |
| Approved Professional Electives | 21 |
| TOTAL (Minimum) | 108 |

**Total Maximum Required Credit Hours for M.Arch. Program = 108**

## DUAL DEGREE M.ARCH/M.CRP (URBAN DESIGN)

The joint Master of Architecture and Master of City and Regional Planning degree seeks to educate those who wish to engage directly in the process of city building. The program is intended to meet the needs of planning agencies, consultants, institutions, and architectural firms for graduates who can deal competently with the design complexities of urban areas. The curriculum is comprised of the core requirements for each of the two professional programs and, in addition, a set of joint requirements that focus upon urban design as a common ground linking the theory and practice of the two disciplines. The joint curriculum builds upon four major bodies of material:

- Urban history and design theory as a way of understanding the formal and architectural order of the city
- Economics and development methods as a basis for formulating development projects
- Process and methods as a means of understanding professional practice and of designing policies and strategies that can be implemented in a private market regulated by public bodies
- Design studios as a basis for exploring architectural, urban design, and development issues utilizing theory, method, and professional practice paradigms

## MASTER'S CERTIFICATE PROGRAM IN DESIGN COMPUTING

Graduate students in the College of Architecture and the College of Computing may sign up to participate in the Certificate Program in Design Computing. This option allows students to enroll in a program jointly administered by the College of Architecture and the College of Computing, providing studies in computing, computer graphics, Web technologies, and other digital technology areas.

Students eligible for this certificate program are master's students in the Colleges of Architecture or Computing. They are admitted through the regular admissions process, but are designated as being also signed up for this certificate option. Students admitted to the certificate program through the College of Architecture may do so through multiple degree programs:

a. Master of Architecture program: Students in the M.Arch. program may also enroll in this certificate program as part of their professional electives.
b. Master of Science with a major in architecture in the College of Architecture, Master of Building Construction, and Master of Industrial Design: Students in these programs may enroll in this certificate program if their interests and background correspond to those of the certificate.

The requirements for the certificate program for College of Architecture students are fifteen units of coursework in computing or design. Students taking the certificate program from the College of Architecture are expected to focus on courses in computer science and design computing within the College. The core courses in design computing are those identified as crucial for base knowledge in the field. Students interested in the certificate program should discuss it with their advisor. For further details on the program, contact:

Design Computing Certificate Advisor
Ph.D. Office, College of Architecture
Georgia Institute of Technology
Atlanta, Georgia 30332-0155

## MULTIDISCIPLINARY STUDY

Multidisciplinary studies are strongly encouraged in all of the master's programs in architecture. These studies may be part of formal dual-degree programs, including architecture and city and regional planning, architecture and civil engineering, architecture and management, etc. Other multidisciplinary studies are possible within the College of Architecture, the Institute, and at Emory University, Georgia State University, and the Atlanta College of Art, among other Atlanta area colleges and universities. Coursework outside the Architecture Program frequently includes city and regional planning, public policy, history, philosophy, real estate development, engineering, and studio art.

## FOREIGN STUDY PROGRAMS

Graduate students in architecture are eligible to participate in three COA-affiliated foreign study programs. The first is the Graduate Summer Program in Europe - Modern Architecture and the Modern City, which has a primary focus on modern and contemporary architecture in Paris, Berlin, and Holland. The second is the Summer Study in Greece and Italy Program, which focuses on architecture, painting, and sculpture at a variety of sites in Greece and Italy. The third is the Barcelona Study Abroad Program, which is jointly administered by Georgia Tech and the Facultat d'Informatica de Barcelona (FIB) at Universidad Politecnica de Catalonia (UPC). This program offers summer courses ranging from architecture to computing and Spanish-language instruction as part of a cross-disciplinary, transcultural experience. Based on space availability, graduate students may also participate. Interested students should contact the Architecture Program office.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN ARCHITECTURE

The program leading to the Doctor of Philosophy degree in the College of Architecture has been developed to enable students of exceptional ability to undertake advanced study and original research in the fields of study within the College of Architecture. Currently the program includes several fields of study:

1. Architectural History, Theory, and Criticism
2. Architecture, Culture, and Behavior
3. Building Construction
4. Building Technology
5. City and Regional Planning
6. Design Cognition
7. Design Computing
8. Industrial Design
9. Spatial and Architectural Morphology

Several areas of study within city and regional planning are available for dissertation research: environmental planning, economic development, transportation planning, land and housing economics, urban and regional development, information systems, and land use planning.

The field of Architecture, Culture, and Behavior explores how individual, organizational, and cultural behavior, performance, and experience relate to the design of buildings and urban space. Current studies explore the following topics, among others: healthcare facilities that support higher quality care; workplaces that support new models of work; building and urban designs that promote health and active living; public buildings that promote functional and symbolic needs; wayfinding and environmental cognition and perception, and others.

The Architectural History, Theory, and Criticism (HTC) field is oriented toward historical and critical inquiry of architectural practice, thought, and criticism. Studies on topics related to interpretive methodology such as representation, meaning, and style are a distinctive focus of the HTC program at Georgia Tech.

Studies in Building Technology are concerned with the lifecycle performance of technical building systems, including the development and application of advanced knowledge in design processes, evaluation methods, intelligent and adaptive technologies, and indoor environmental factors.

Building Construction has several areas of research including: construction management; risk management and decision support systems; integrated construction project delivery systems (design-build, construction management, negotiated team, cost-plus with gmp, bridging, and others); integrated facility management; indoor environment; international construction; construction robotics and automation; e-business in construction; and life cycle cost analysis.

Design Computing focuses on the development of information technologies in support of design and construction. Current areas of research include building repositories, electronic design environments, human computer interfaces, building product models, formal approaches to composition, smart buildings and objects, direct fabrication of designs (building CAD/CAM), and parametric modeling.

Design Cognition is concerned with the reasoning, processes, models, and methods about how design skills, information, behaviors, and expertise are learned, applied, and represented. Research areas include sketch understanding, visual and spatial reasoning, mental imaging, cognitive process of problem solving, design moves, and creativity.

Spatial and Architectural Morphology is concerned with the principles that govern layouts and their meaning, functions, and social implications at urban and building scales. It includes analytical studies of spatial form.

Industrial Design is concerned with the understanding of design as a process of identifying, analyzing, and solving design problems of human interface with the physical environment.

For further details on the program, contact:

Ph.D. Program Director
College of Architecture
Georgia Institute of Technology
Atlanta, Georgia 30332-0155
Phone: 404.894.3476
Web site: www.coa.gatech.edu/phd/

## GENERAL INFORMATION

The construction industry is among the largest in the United States, employing more than 8 million people and contributing eight percent of the United States gross national product. The Building Construction (BC) Program at Georgia Tech is one of the leading programs in building construction in the nation. The program's mission is to prepare students to serve in the global construction industry as professional managers and leaders.

Employment prospects for BC students are excellent. Students are recruited by general contractors, residential home builders, project management firms, cost value and consulting firms, real estate and property development companies, building material suppliers, and local/state/federal government agencies. The average starting salary for the BC graduate is among the highest on the Georgia Tech campus and ranks at the top of the industry. The degree granted is a Bachelor of Science in Building Construction.

Students in the BC Program learn the basic principles and practices of construction management, real estate development, science, and technology. BC students are educated on how to manage the functions and processes of every aspect of the construction industry. The business climate in Atlanta is vibrant and provides an excellent laboratory opportunity for students to observe various construction sites and activities. The construction companies in the Atlanta area also provide many internships and part-time jobs to students during their study in the BC Program.

Telephone: 404.894.4875

## ACCREDITATION

The Building Construction Program is accredited by the American Council for Construction Education (ACCE). This accreditation ensures a high level of quality in both the curriculum and overall educational experience in the Building Construction Program. Additionally, it helps the Program remain a cutting edge and innovative construction management education program. ACCE is recognized by the Council for Higher Education Accreditation as the only accrediting agency for baccalaureate and associate degree programs in construction education.

The Building Construction Program has received international recognition through accreditation by the Royal Institute of Chartered Surveyors (RICS). The RICS' designation provides accredited programs' faculty and student members access to online forums, professional development opportunities and the world's most extensive international library of research and policy analysis on land, property, economics and environmental issues. Additionally, with RICS accreditation, program alumni may be eligible for an expedited route to RICS membership.

The Master of Science in Building Construction and Integrated Facility Management is recognized by the International Facility Management Association (IFMA), and the Design Build Institute of America (DBIA).

## COMMON FIRST YEAR

All freshmen enter as undesignated majors within the College of Architecture. All students, including transfer students, must complete a three-course sequence consisting of:

- COA 1060 - Introduction to Design and the Built Environment
- COA 1011 - Fundamentals of Design and the Built Environment I, and
- COA 1012 - Fundamentals of Design and the Built Environment II

in addition to other courses scheduled for the freshman year, or appropriate courses for transfer students. During the spring semester of the first year, students enrolled in COA 1012 will prepare a portfolio and application to one of the three undergraduate programs within the College of Architecture: Architecture, Building Construction, or Industrial Design. Admission to one of the three programs will be determined by the student's performance at Georgia Tech, portfolio review, program application information, and other academic information that was used to admit the student to Georgia Tech. Admission to a specific program may be limited by available space and resources needed to accommodate a maximum number of majors in the second-year program courses. Students will be notified concerning their acceptance to a specific program before the end of the spring semester.

## BACHELOR OF SCIENCE IN BUILDING CONSTRUCTION

The Georgia Tech Building Construction (BC) Program is a management-based course of study that prepares students for leadership roles in the construction industry. The curriculum is designed to teach students the basic principles and practices of construction management, real estate development, science, and technology. Students are taught to manage the functions and processes of every aspect of the construction industry. The curriculum provides a well-rounded course of study conducted by award-winning faculty and staff and offers hands-on experience and guidance by industry professionals.

# BACHELOR OF SCIENCE IN BUILDING CONSTRUCTION
## 2008 - 2009 DEGREE REQUIREMENTS
### BUILDING CONSTRUCTION
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| COA 1011 FUNDAMENTALS OF DESIGN I | 3 |
| COA 1060 INTRODUCTION TO DESIGN | 3 |
| COMPUTING REQUIREMENT | 3 |
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| COA 1012 FUNDAMENTALS OF DESIGN II | 4 |
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-FALL | HRS |
|---|---|
| BC 2600 CONSTRUCTION CONTRACTING | 3 |
| BC 2610 CONSTRUCTION TECHNOLOGY I | 3 |
| ACCT 2101 ACCOUNTING I | 3 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| BC 2620 CONSTRUCTION TECHNOLOGY II | 3 |
| BC 2630 CONSTRUCTION SEMINAR | 1 |
| MGT 2200 MANAGEMENT APPLICATIONS OF INFORMATION TECHNOLOGY | 3 |
| EAS 2600 EARTH PROCESSES | 4 |
| WELLNESS | 2 |
| ECON 2100 ECONOMIC ANALYSIS & POLICY PROBLEMS | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| BC 3600 CONSTRUCTION COST MANAGEMENT | 3 |
| BC 3640 CONSTRUCTION MECHANICS | 3 |
| LCC 2000 or 3000 LEVEL HUMANITIES (Communications) | 3 |
| MGT 3150 PRINCIPLES OF MANAGEMENT | 3 |
| PROFESSIONAL ELECTIVE | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **18** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| BC 3610 CONSTRUCTION LAW | 3 |
| BC 3620 REAL ESTATE & CONSTRUCTION FINANCE & ACCOUNTING | 3 |
| BC 4620 STRUCTURAL ANALYSIS | 3 |
| MGT 3062 FINANCIAL MANAGEMENT | 3 |
| FREE ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **18** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| BC 3630 PROJECT MANAGEMENT I | 3 |
| BC 4640 CONSTURCTION MARKETING | 3 |
| BC 4680 PROFESSIONAL INTERNSHIP | 3 |

| | |
|---|---|
| MGT 3102 MANAGING HUMAN RESOURCES ... OR<br>MGT 3660 INTERNATIONAL BUSINESS | 3 |
| BC 4670 CONSTRUCTION INDUSTRY ISSUES | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| BC 4600 PROJECT MANAGEMENT II | 3 |
| BC 4610 BUILDING ECONOMICS | 3 |
| BC 4630 SENIOR CAPSTONE PROJECT | 3 |
| BC 4660 ENTREPRENEURSHIP IN CONSTRUCTION | 3 |
| PROFESSIONAL ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

**TOTAL PROGRAM HOURS = 129 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

## ELECTIVES

### COMPUTING REQUIREMENT

Students must complete either CS 1315, CS 1301, or a computer programming course approved as satisfying the general education requirements in computer literacy.

### WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

### FREE ELECTIVES

Six semester hours of free electives are required. Military training is an option allowed by the Institute. If basic ROTC is elected, four credit hours of free electives may be used.

The College of Architecture will accept only the two required hours of physical education (HP 1040, 1062, 1063, or 1064) toward meeting degree requirements.

### PROFESSIONAL ELECTIVES

Six semester hours of professional electives are required, and these courses should be selected from the list of Recommended Professional Electives provided by the BC Program. The Building Construction professional electives provide students the opportunity to pursue specialized study and develop skills in construction management, construction development, and construction science. Construction management prepares students for managerial systems and practices utilized by constructors to manage the planning and delivery processes of buildings in the contemporary practice of construction.

Managerial areas of study range from internal management systems used by general contractors and builders in office operations and practice to management and systems controls employed by construction managers in the planning, design, and construction phases of complex building projects. Construction development introduces students to entrepreneurial theories and practices used in the development of construction projects ranging from single facilities to multiple building complexes. It focuses on urban economic theories, planning legislation and regulation, and urban development methods applicable in land and real estate investment. Emphasis is on the development and marketing theories of building projects in the context of contemporary planning and urban development issues. Construction science is an analytically and engineering-oriented study designed to encourage students to challenge current methods of building construction and delivery techniques and to seek innovative solutions through study, research, and technical inquiry. Emphasis is on the means and methods of constructing buildings, the intrinsic nature and use of construction materials, the anatomy of building systems and components, and prefabricated building systems and components development and production concepts.

### HUMANITIES ELECTIVES

Twelve credit hours are required by the Institute. The required English sequence, ENGL 1101-2, and 2000 or 3000 level LCC Communication Intensive courses will satisfy nine hours. The remaining three hours are selected by the student from the approved Catalog list of humanities courses.

### SOCIAL SCIENCES ELECTIVES

Twelve credit hours of social sciences are required by the Institute. The required three credit hour U.S./Georgia history and constitution legislative course (HIST 2111, 2112; POL 1101; INTA 1200; or PUBP 3000) and ECON 2100 will satisfy six hours. The remaining six hours are selected by the student from the approved Catalog list of social sciences courses.

## MASTER OF SCIENCE IN BUILDING CONSTRUCTION AND INTEGRATED FACILITY MANAGEMENT

The master's degree programs in Building Construction focus on management-based education for industry professionals seeking executive leadership positions in the industry. Our graduate training offers a holistic approach to business processes, integrating coursework, seminars, and hands-on learning to equip today's industry professionals with the resources they need to excel in their professional careers. The graduate program consists of three tracks:

1. Integrated Facility Management,
2. Integrated Project Delivery Systems, and
3. Residential Construction Development

which prepare students for innovative leadership positions within the industry. Students can complete either a thesis or non-thesis option for the degree.

Students in the program come from a variety of backgrounds, often with experience in facility management, construction, architecture, engineering, city planning, management, or business. The program is tailored to meet the needs of professionals by offering evening classes, giving students the flexibility of continuing to work while taking courses.

### THE MINIMUM REQUIREMENTS FOR A GRADUATE DEGREE IN BC ARE AS FOLLOWS:

#### Thesis Option:

The curriculum for graduate study with the Thesis Option consists of the following thirty-six semester hours:

| Courses | Hours |
|---|---|
| Core courses | 18 |
| Approved Professional Electives | 6 |
| Master's Thesis | 12 |
| Total | 36 |

#### Non-Thesis Option:

The curriculum for graduate study with the Non-Thesis Option substitutes twelve semester hours of coursework for the thesis and consists of the following thirty-six semester hours:

| Courses | Hours |
|---|---|
| Core courses | 18 |
| Approved Professional Electives | 18 |
| Total | 36 |

The Graduate Record Exam (GRE) or Graduate Management Admission Test (GMAT) is required for all students. A minimum TOEFL score of 550 (paper-based) or 213 (computer-based) is required of all international applicants. The application can be completed online at www.grad. gatech.edu/admissions.

### THE BUILDING CONSTRUCTION INTEGRATED FACILITY MANAGEMENT TRACK:

The focus of this graduate study is integrated facility and property management. The program offers a holistic understanding of this complex field and its theoretical concepts, and it focuses on developing and fine-tuning the management skills necessary for success in the facility and property management industry. Courses explore the many facets of integrated facility management including asset management, project management, facility operations and maintenance, energy management, workplace design and consulting, facility technology integration, design and construction, and real estate development.

### THE BUILDING CONSTRUCTION INTEGRATED PROJECT DELIVERY SYSTEMS TRACK

The graduate study, focused on integrated project delivery systems, educates students to understand, analyze, select, and manage the most appropriate and effective project delivery systems for constructing a facility. The curriculum emphasizes integrated problem solving through state-of-the-art technical and management techniques. A variety of project delivery systems that can be used independently or integrated are examined. The delivery methods explored include the design-build system, the construction management/agent method, the hybrid bridging and partnering system, the negotiated select team method, as well as the traditional delivery method.

### THE BUILDING CONSTRUCTION RESIDENTIAL CONSTRUCTION DEVELOPMENT TRACK:

The Building Construction Program now offers a comprehensive graduate degree that integrates mixed-use communities, new urbanism, quality development, sustainable construction, and other practices and trends that define the future of the residential construction industry. The residential graduate track focuses on the largest and fastest growing area of the construction industry. Students are exposed to the complexities and challenges associated with Residential Construction and Development. All segments of the housing industry are studied, including single family, multi-family, mixed-use, affordable, senior, and renovation. Students are provided with a comprehensive view of relevant public policy, development, design, and construction issues, and gain a realistic understanding of the current business environment and prospects for the future.

## PROFESSIONAL ELECTIVES

Managerial areas of study range from internal management systems used by general contractors and builders in office operations and practice to management and systems controls employed by construction managers in the planning, design, and construction phases of complex building projects. Construction development introduces students to entrepreneurial theories and practices used in the development of construction projects ranging from single facilities to multiple building complexes. It focuses on urban economic theories, planning legislation and regulation, and urban development methods applicable in land and real estate investment. Emphasis is on the development and marketing theories of building projects in the context of contemporary planning and urban development issues. Construction science is an analytically and engineering-oriented study designed to encourage students to challenge current methods of building construction and delivery techniques and to seek innovative solutions through study, research, and technical inquiry. Emphasis is on the means and methods of constructing buildings, the intrinsic nature and use of construction materials, the anatomy of building systems and components, and prefabricated building systems and components development and production concepts.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN ARCHITECTURE

The program leading to the Doctor of Philosophy degree in the College of Architecture has been developed to enable students of exceptional ability to undertake advanced study and original research in the fields of study within the College of Architecture. Currently the program includes several fields of study:

1. Architectural History, Theory, and Criticism
2. Architecture, Culture, and Behavior
3. Building Construction
4. Building Technology
5. City and Regional Planning
6. Design Cognition
7. Design Computing
8. Industrial Design
9. Spatial and Architectural Morphology

Several areas of study within city and regional planning are available for dissertation research: environmental planning, economic development, transportation planning, land and housing economics, urban and regional development, information systems, and land use planning.

The field of Architecture, Culture, and Behavior explores how individual, organizational, and cultural behavior, performance, and experience relate to the design of buildings and urban space. Current studies explore the following topics, among others: healthcare facilities that support higher quality care; workplaces that support new models of work; building and urban designs that promote health and active living; public buildings that promote functional and symbolic needs; wayfinding and environmental cognition and perception, and others.

The Architectural History, Theory, and Criticism (HTC) field is oriented toward historical and critical inquiry of architectural practice, thought, and criticism. Studies on topics related to interpretive methodology such as representation, meaning, and style are a distinctive focus of the HTC program at Georgia Tech.

Studies in Building Technology are concerned with the lifecycle performance of technical building systems, including the development and application of advanced knowledge in design processes, evaluation methods, intelligent and adaptive technologies, and indoor environmental factors.

Building Construction has several areas of research including: construction management; risk management and decision support systems; integrated construction project delivery systems (design-build, construction management, negotiated team, cost-plus with gmp, bridging, and others); integrated facility management; indoor environment; international construction; construction robotics and automation; e-business in construction; and life cycle cost analysis.

Design Computing focuses on the development of information technologies in support of design and construction. Current areas of research include building repositories, electronic design environments, human computer interfaces, building product models, formal approaches to composition, smart buildings and objects, direct fabrication of designs (building CAD/CAM), and parametric modeling.

Design Cognition is concerned with the reasoning, processes, models, and methods about how design skills, information, behaviors, and expertise are learned, applied, and represented. Research areas include sketch understanding, visual and spatial reasoning, mental imaging, cognitive process of problem solving, design moves, and creativity.

Spatial and Architectural Morphology is concerned with the principles that govern layouts and their meaning, functions, and social implications at urban and building scales. It includes analytical studies of spatial form.

Industrial Design is concerned with the understanding of design as a process of identifying, analyzing, and solving design problems of human interface with the physical environment.

For further details on the program, contact:

Ph.D. Program Director
College of Architecture
Georgia Institute of Technology
Atlanta, Georgia 30332-0155
Phone: 404.894.3476
Web site: www.coa.gatech.edu/phd/

## GENERAL INFORMATION

Founded in 1952, Georgia Tech's planning program is one of the oldest professional planning programs in the United States, with more than 1,000 alumni. Graduates are employed in both the public and private sectors, at all levels of government, by banks, real estate development companies, public utilities, and private corporations. The program is fully accredited by the Planning Accreditation Board; it is the only accredited planning program in Georgia.

The City and Regional Planning Program offers coursework in seven major areas of urban and regional planning: land and community development, environmental planning, transportation, economic development, geographic information systems, urban design, and land use policy. Several types of degree programs are available: the professional Master of City and Regional Planning; dualdegrees with civil and environmental engineering, architecture, and public policy; and a five-year B.S./ M.C.R.P. degree; and the Master of City and Regional Planning concurrent with the Juris Doctor (Law) degree at Georgia State University. Descriptions of each follow.

Telephone: 404.894.2352
Web site: www.coa.gatech.edu/crp/

## ACCREDITATION

The Master of City and Regional Planning (MCRP) program is fully accredited by the Planning Accreditation Board, a joint accrediting body of the American Institute of Certified Planners, the American Planning Association, and the Association of Collegiate Schools of Planning.

The M.CRP degree is the recognized basis for a career as a professional planner.

## CERTIFICATE IN LAND DEVELOPMENT

The City and Regional Planning Program offers a certificate in land development for undergraduate and graduate students in good standing at Georgia Tech. It is designed to give you specialized education in land development. Students tell us that the certificates make them more competitive in securing employment and in advancing to graduate education.

## CERTIFICATE PROGRAM IN REMOTE SENSING

Students completing the master's or doctoral degree requirements of the School may earn a Remote Sensing Certificate. Additional details can be found in this catalog under http://www.catalog.gatech.edu/colleges/cos/eas/grad/certificates.php

## MASTER OF CITY AND REGIONAL PLANNING

This program educates the student whose career goal is to be a professional planner. The program requires fifty-five total credit units for graduation. Approximately half of the program consists of required courses, called the core. The core is composed of three substantive streams: planning theory and process, including planning law, institutional analysis, plan implementation, and history and theory of planning; planning methods, including data analysis, computer applications, descriptive and inferential statistics, microeconomic analytic techniques, and planning information systems; and urban and regional theory, which explores the structure and function of urban systems. The core is largely contained within the student's first two semesters. Students must choose one of the seven areas of concentration described above. Each specialization consists of at least four courses.

The two-year curriculum requires, for most students, four semesters of coursework, including a four-credit hour applied research paper. Some students choose to write a ten-credit hour thesis. An approved internship is required for those students with no previous planning work experience.

The Graduate Record Examination is required for all applicants to the Master of City and Regional Planning Program. A minimum TOEFL score of 600 is required for all international applicants. Since the course material is sequential in nature, fall matriculation is strongly recommended. Applications must be completed before March 1 to ensure consideration for financial aid.

For more information about the M.C.R.P. program, contact:

Academic Advisor
City and Regional Planning Program
College of Architecture
Georgia Institute of Technology
Atlanta, Georgia 30332-0155.

## B.S. / M.CRP : DEGREE

Upper-division undergraduates may work simultaneously on their bachelor of science degree and a master of City and Regional Planning (M.CRP) in planning. By enrolling in all required planning classes as electives for the baccalaureate degree, students may obtain both an undergraduate degree as well as complete coursework toward a graduate degree. Students should request and receive permission from the director of the City and Regional Planning Program to begin their program of study in planning no later than fall of their junior year. Students with cumulative GPAs above 3.0 will be considered. In some cases, students can complete the two-year master's program in one year beyond the usual bachelor's degree. The key is to carefully schedule the last year of the undergraduate program. This program may be particularly appropriate for architecture, management, economics, civil and environmental engineering, and earth and atmospheric sciences majors.

## THE DUAL DEGREE

The City and Regional Planning Program maintains dual-degree programs with several other academic units: urban design in the College of Architecture; transportation, environmental engineering, and water resources in the School of Civil and Environmental Engineering; public policy with the School of Public Policy; and law with the Georgia State College of Law. The concept behind these dual-degree programs is that a student can structure his or her program so that required courses taken in one program can serve as elective credit in the other, thus allowing the student to receive two degrees in less time than the two would take to complete if pursued separately.

Candidates seeking the dual-degree should state their intentions and be officially admitted into City and Regional Planning and simultaneously accepted internally by the second program. In addition to the dual-degree programs, the business administration program in real estate at Georgia State University offers a certificate in real estate that some planning students elect to pursue; likewise, the history program at Georgia State University offers a heritage preservation certificate.

## DUAL DEGREE M.S.ENV.E./M.C.R.P. (ENVIRONMENTAL ENGINEERING)

This dual-degree program with Environmental Engineering (M.S.Env.E. / M.C.R.P.) provides students the scientific bases, the analytic techniques, and the planning principles to be effective environmental professionals. Candidates for this program should have a background in engineering or the physical sciences.

## DUAL DEGREE M.CRP AND GSU JURIS DOCTOR DEGREE

This dual Georgia Tech Master of City and Regional Planning and Georgia State University Juris Doctor degree program will 1) broaden the intellectual horizons of both Georgia State University College of Law and the Georgia Institute of Technology College of Architecture by facilitating interdisciplinary study, 2) support the interests of students who wish to pursue study in the fields of both law and urban planning, 3) provide an educational opportunity that reflects the fact that land management law and city and regional planning have become increasingly integrated and interdisciplinary in nature and that training for today's land use law or planning profession requires expertise in both disciplines.

## DUAL DEGREE M.CRP / MASTER OF SCIENCE (PUBLIC POLICY)

The objective of the dual-degree program in City and Regional Planning and Public Policy is to provide an education and research experience to those students wishing to work in urban policy analysis at the national, state and local level. Graduates will be more likely to work in political rather than planning settings and be focused more on policy research and analysis rather than on land planning and design. The dual-degree is an efficient step towards Ph.D. programs in either City and Regional Planning or Public Policy with an emphasis on Urban Policy. The dual-degree student receives both degrees in less time than it would take to receive the two degrees sequentially.

## DUAL DEGREE M.CRP/CEE (TRANSPORTATION ENGINEERING)

This dual-degree program is designed to meet the need of planning agencies and transportation departments for people who combine competence in city and regional planning and transportation engineering. Candidates for this program are limited to students who hold a bachelor's degree in engineering, mathematics, or a physical science. The program consists of coursework in city and regional planning, transportation engineering, mathematical and experimental statistics, principles of digital computers and operations research. It is administered jointly by the Graduate City and Regional Planning Program and the School of Civil and Environmental Engineering.

## DUAL DEGREE M.ARCH/M.CRP (URBAN DESIGN)

The joint Master of Architecture and Master of City and Regional Planning degree seeks to educate those who wish to engage directly in the process of city building. The program is intended to meet the needs of planning agencies, consultants, institutions, and architectural firms for graduates who can deal competently with the design complexities of urban areas. The curriculum is comprised of the core requirements for each of the two professional programs and, in addition, a set of joint requirements that focus upon urban design as a common ground linking the theory and practice of the two disciplines. The joint curriculum builds upon four major bodies of material:

- Urban history and design theory as a way of understanding the formal and architectural order of the city
- Economics and development methods as a basis for formulating development projects
- Process and methods as a means of understanding professional practice and of designing policies and strategies that can be implemented in a private market regulated by public bodies
- Design studios as a basis for exploring architectural, urban design, and development issues utilizing theory, method, and professional practice paradigms

## DUAL DEGREE M.S.C.E./M.C.R.P. (WATER RESOURCES)

This dual-degree program with civil engineering (M.S.C.E./M.C.R.P.) addresses a growing need for water resources professionals with both technical and planning expertise. Candidates for this program should have a background in engineering or the physical sciences.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN ARCHITECTURE

The program leading to the Doctor of Philosophy degree in the College of Architecture has been developed to enable students of exceptional ability to undertake advanced study and original research in the fields of study within the College of Architecture. Currently the program includes several fields of study:

1. Architectural History, Theory, and Criticism
2. Architecture, Culture, and Behavior
3. Building Construction
4. Building Technology
5. City and Regional Planning
6. Design Cognition
7. Design Computing
8. Industrial Design
9. Spatial and Architectural Morphology

Several areas of study within city and regional planning are available for dissertation research: environmental planning, economic development, transportation planning, land and housing economics, urban and regional development, information systems, and land use planning.

The field of Architecture, Culture, and Behavior explores how individual, organizational, and cultural behavior, performance, and experience relate to the design of buildings and urban space. Current studies explore the following topics, among others: healthcare facilities that support higher quality care; workplaces that support new models of work; building and urban designs that promote health and active living; public buildings that promote functional and symbolic needs; wayfinding and environmental cognition and perception, and others.

The Architectural History, Theory, and Criticism (HTC) field is oriented toward historical and critical inquiry of architectural practice, thought, and criticism. Studies on topics related to interpretive methodology such as representation, meaning, and style are a distinctive focus of the HTC program at Georgia Tech.

Studies in Building Technology are concerned with the lifecycle performance of technical building systems, including the development and application of advanced knowledge in design processes, evaluation methods, intelligent and adaptive technologies, and indoor environmental factors.

Building Construction has several areas of research including: construction management; risk management and decision support systems; integrated construction project delivery systems (design-build, construction management, negotiated team, cost-plus with gmp, bridging, and others); integrated facility management; indoor environment; international construction; construction robotics and automation; e-business in construction; and life cycle cost analysis.

Design Computing focuses on the development of information technologies in support of design and construction. Current areas of research include building repositories, electronic design environments, human computer interfaces, building product models, formal approaches to composition, smart buildings and objects, direct fabrication of designs (building CAD/CAM), and parametric modeling.

Design Cognition is concerned with the reasoning, processes, models, and methods about how design skills, information, behaviors, and expertise are learned, applied, and represented. Research areas include sketch understanding, visual and spatial reasoning, mental imaging, cognitive process of problem solving, design moves, and creativity.

Spatial and Architectural Morphology is concerned with the principles that govern layouts and their meaning, functions, and social implications at urban and building scales. It includes analytical studies of spatial form.

Industrial Design is concerned with the understanding of design as a process of identifying, analyzing, and solving design problems of human interface with the physical environment.

For further details on the program, contact:

Ph.D. Program Director
College of Architecture
Georgia Institute of Technology
Atlanta, Georgia 30332-0155
Phone: 404.894.3476
Web site: www.coa.gatech.edu/phd/

## GENERAL INFORMATION

Industrial design is the professional service of creating and developing concepts and specifications that optimize the function, value, and appearance of products and systems for the mutual benefit of both user and manufacturer. An industrial designer's responsibilities include fitting the artifact, system, or service to the person. This includes developing appropriate aesthetics and ergonomics, a practical concern for technical processes, and requirements for manufacture; marketing opportunities and economic constraints; and distribution, sales, and servicing processes.

The industrial designer's work touches all of our lives in the form of home furnishings, transportation, appliances, recreational equipment, and a myriad of other consumer and industrial products and services. While giving form to the efforts of industry, the designer is at the same time a consumer advocate, providing the humanizing link between technology and the consumer.

The Georgia Tech program offers a well-rounded course of study with early emphasis on basic design and design skills. Design projects stress realistic design situations. The program encourages students to develop a diverse background in order to expand individual talents and respond to changing opportunities in the field. Most faculty members are practicing designers with extensive experience in the field.

All work executed in the College becomes the property of the College and will be retained or returned at the discretion of the faculty. The faculty also reserves the right to refuse credit for any project executed outside the precincts of the College or otherwise executed without proper coordination with the instructor.

Telephone: 404.894.4874
Web site: www.coa.gatech.edu/id/

## ACCREDITATION

The Bachelor of Science in Industrial Design and the Master of Industrial Design degree programs have been accredited by the National Association of Schools in Art and Design (NASAD) and is recognized by the Industrial Designers Society of America (IDSA).

## COMMON FIRST YEAR

All freshmen enter as undesignated majors within the College of Architecture. All students, including transfer students, must complete a three-course sequence consisting of:

- COA 1060 - Introduction to Design and the Built Environment
- COA 1011 - Fundamentals of Design and the Built Environment I, and
- COA 1012 - Fundamentals of Design and the Built Environment II

in addition to other courses scheduled for the freshman year, or appropriate courses for transfer students. During the spring semester of the first year, students enrolled in COA 1012 will prepare a portfolio and application to one of the three undergraduate programs within the College of Architecture: Architecture, Building Construction, or Industrial Design. Admission to one of the three programs will be determined by the student's performance at Georgia Tech, portfolio review, program application information, and other academic information that was used to admit the student to Georgia Tech. Admission to a specific program may be limited by available space and resources needed to accommodate a maximum number of majors in the second-year program courses. Students will be notified concerning their acceptance to a specific program before the end of the spring semester.

## BACHELOR OF SCIENCE INDUSTRIAL DESIGN

Undergraduate education in industrial design at Georgia Tech leads to the Bachelor of Science Degree in Industrial Design that is accredited by the National Association of Schools of Art and Design (NASAD). The undergraduate education prepares students for a career in design practice as well as for graduate education in industrial design and in related fields. The Industrial Design Program at Georgia Tech is the only industrial design program in a Georgia university system.

Industrial design is the professional practice of creating products that enhances the function, usability, value and appearance of products with the goal of benefiting the user, manufacturer, community and the environment. Also known as product design, the industrial design education prepares students to design systems and tangible artifacts including, consumer and recreational products, business and industrial products, medical and computer equipment, and transportation and environments. Both generalist and specialist, industrial designers tend to part artist, part entrepreneur and engineer.

Cross disciplinary education is the primary focus of the four year industrial design program. The university education provides: 1) an understanding of the arts (liberal and visual arts), technology (engineering and sciences), humanities (sociology and psychology) and management (marketing and branding), 2) a collaborative and shared education through an emphasis on the design studio, and 3) an opportunity to periodically participate in real life design projects through sponsored studio projects. The Program offers a well rounded course of study with an emphasis on critical thinking, basic design, design skills and design communication. There are six industrial design studios after the two Common Freshman Year studios. The industrial design studios focus on a sequential learning path which begins with form making to product design to post design that involves development and manufacturing. Design projects stress on developing a well rounded education through an exposure to academic and professional considerations. The Program encourages students to develop a diverse background in order to expand individual talents and respond to the emerging opportunities in the field. Faculty members are scholars and design practitioners, giving students the opportunity to learn about both.

All work executed in the College becomes the property of the College and will be retained or returned at the discretion of the faculty. The faculty also reserves the right to refuse credit for any project executed outside the precincts of the College or otherwise executed without proper coordination with the instructor.

# BACHELOR OF SCIENCE IN INDUSTRIAL DESIGN
## 2008 - 2009 DEGREE REQUIREMENTS
### INDUSTRIAL DESIGN
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| COA 1011 FUNDAMENTALS OF DESIGN I | 3 |
| COA 1060 INTRODUCTION TO DESIGN | 3 |
| COMPUTING REQUIREMENT | 3 |
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| COA 1012 FUNDAMENTALS OF DESIGN II | 4 |
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| WELLNESS | 2 |
| MATH 1502 CALCULUS II | 4 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| ID 2011 INTRODUCTORY DESIGN I | 4 |
| ID 3103 INDUSTRIAL DESIGN COMPUTING I | 3 |
| COA 2241 ART HISTORY I | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| ID 2012 INTRODUCTORY DESIGN II | 4 |
| ID 2202 HISTORY OF MODERN INDUSTRIAL DESIGN | 3 |
| COA 2242 ART HISTORY II | 3 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| LAB SCIENCE (BIOL, CHEM, EAS, PHYS) | 4 |
| ID 3104 INDUSTRIAL DESIGN COMPUTING II | 3 |
| **TOTAL SEMESTER HOURS =** | **19** |

| THIRD YEAR-FALL | HRS |
|---|---|
| ID 3011 INTERMEDIATE DESIGN I | 5 |
| ID 3301 MATERIALS I: RENEWABLES | 3 |
| ID 4201 DESIGN / RESEARCH METHODS | 3 |
| INDUSTRIAL DESIGN ELECTIVE | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| ID 3012 INTERMEDIATE DESIGN II | 5 |
| ID 3302 MATERIALS & PROCESSES II: NONRENEWABLES | 3 |
| ID 4202 PROFESSIONAL PRACTICE | 3 |
| INDUSTRIAL DESIGN ELECTIVE | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| ID 4011 ADVANCED DESIGN I | 5 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| COA HISTORY ELECTIVE | 3 |
| FREE ELECTIVES | 5 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FOURTH YEAR-SPRING | HRS |
|---|---|
| ID 4012 ADVANCED DESIGN II | 5 |
| IDUSTRIAL DESIGN ELECTIVE | 3 |
| FREE ELECTIVES | 5 |
| **TOTAL SEMESTER HOURS =** | **13** |

**TOTAL PROGRAM HOURS = 129 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

## GRADE REQUIREMENTS

All industrial design required studio courses must be completed with a grade of C or higher. A student may not enter a more advanced studio design course until this requirement is met; students with such academic deficiencies may be required to delay their studies for one year. Studio design courses must be taken in sequence beginning fall semester. Both transfer students and students already enrolled at Georgia Technology must have a cumulative minimum grade point average of 2.5. Students interested in transferring from another school should contact Georgia Tech Office of Undergraduate Admission. A maximum of nine credit hours may be taken on a pass/fail basis. Only courses taken as free electives in the undergraduate curriculum must be taken for pass/fail credit. See “Information for Undergraduate Students” for Institute regulations regarding pass/fail courses.

# ELECTIVES

## ELECTIVES

Twelve credit hours of humanities courses are required. The required ENGL 1101, 1102, and COA 2241 and 2242 satisfy this requirement. ID 2202 does not count toward this requirement for industrial design majors.

## COMPUTING REQUIREMENT

Students must complete either CS 1315, CS 1321, or a computer programming course approved as satisfying the general education requirements in computer literacy.

## WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

## HUMANITIES ELECTIVES

Twelve credit hours of humanities courses are required. The required ENGL 1101, 1102, and COA 2241 and 2242 satisfy this requirement. ID 2202 does not count toward this requirement for industrial design majors.

## SOCIAL SCIENCES ELECTIVES

Twelve credit hours of approved social sciences courses are required. To satisfy the state requirements regarding coursework in the history and constitutions of the United States and Georgia, students must complete one of the following courses: HIST 2111, HIST 2112, POL 1101, PUBP 3000, or INTA 1200. Any other nine credit hours of Institute-approved social science courses will satisfy the remainder of this requirement.

## GENERAL AND INDUSTRIAL DESIGN ELECTIVES

Fourteen general elective hours are required. The general elective hours may include six hours of credit for ROTC courses. Those enrolling in ROTC must schedule appropriate ROTC courses in the freshman and sophomore years.

Students are encouraged to use general electives to fulfill one of several track elective options. Contact the Industrial Design program office for approved tracks.

Only nine hours of electives taken on a pass/fail basis may be applied toward fulfilling requirements for the B.S.I.D. degree. Nine industrial design elective hours are required.

## MASTER OF INDUSTRIAL DESIGN (M.I.D.)

Graduate education in industrial design at Georgia Tech leads to the Masters in Industrial Design degree that is accredited by National Association of Schools of Art and Design (NASAD). The graduate education provides an advanced and rigorous education that prepares students to undertake leadership position in industrial design education and practice. An overarching objective of the MID is to promote an understanding of design as a process of identifying, analyzing, and solving design problems of human interface with the physical environment. The Industrial Design Program offers two types of graduate programs - a two year MID program for students with an undergraduate degree in industrial design, and a three year MID program for all other undergraduates. There are two main aspects of the MID program, first it is cross-disciplinary and involves many area of expertise, and second it has six tracks that are built on the strengths of the university - technology, ability, manufacturing, transportation, information and innovation. Graduate students perform under these new tracks and develop a specialized expertise in addition to becoming a designer. Through this comprehensive education, students are connected with other programs and research centers across campus such as Mechanical Engineering, CATEA, GVU and AWPL. The Program routinely collaborates with corporations to bring design projects into the classroom through sponsored studio initiatives. They provide students with opportunities to learn about research, design and practice first hand. The MID program is design studio based education and it requires taking a design studio every semester in addition to registering for industrial design and track related courses. Through design studios and courses, students are introduced to theoretical and professional aspects of industrial design as well as the forces that are shaping the future of industrial design profession.

All work executed in the College becomes the property of the College and will be retained or returned at the discretion of the faculty. The faculty also reserves the right to refuse credit for any project executed outside the precincts of the College or otherwise executed without proper coordination with the instructor.

### TRACK 1: DESIGN AND TECHNOLOGY

This graduate study is integrated education in technology and industrial design. Open to those with an undergraduate engineering degree, the track offers an opportunity to learn about technology and design, so product design and development that require greater engineering knowledge can be focused. Courses will offer an opportunity to learn about theoretical perspectives and build synthetic knowledge of technology and design, which will get applied in the design studios and in thesis projects.

### TRACK 2: DESIGN AND ABILITY

This graduate study will focus on accessible and universal design. The track offers an opportunity to learn about assistive technology and universal design, so product designs for a broad population including the elderly and people with disabilities can be focused. Courses will offer an opportunity to learn about theoretical perspectives and build synthetic knowledge of accessibility and design, which will get applied in the design studios and in thesis projects.

### TRACK 3: DESIGN AND MANUFACTURING

This graduate study will focus on digital design and manufacturing. The track offers an opportunity to learn about the interconnectedness between digital design and production, so computerized manufacturing can serve as a basis for design innovation. Courses will offer an opportunity to learn about theoretical perspectives and build synthetic knowledge of production and design, which will get applied in the design studios and in thesis projects.

### TRACK 4: DESIGN AND TRANSPORTATION

This graduate study will focus on product design and mass transportation. The track offers an opportunity to learn about transportation technology and public requirements, so new models of transit systems and facilities can be studied. Courses will offer an opportunity to learn about theoretical perspectives and build synthetic knowledge of transport and design, which will get applied in the design studios and in thesis projects.

### TRACK 5: DESIGN AND INNOVATION

This graduate study will focus on the management and diffusion of design innovation. The track offers an opportunity to learn about marketing and management alongside product design, so new products and innovations can be developed and marketed. Courses will offer an opportunity to learn about theoretical perspectives and build synthetic knowledge of innovation and design, which will get applied in the design studios and in thesis projects.

### TRACK 6: DESIGN AND INFORMATION

This graduate study will focus on information and interface design. The track offers an opportunity to learn about product design as information and human-computer interaction, so product interactivity for a broad population can be focused. Courses will offer an opportunity to learn about theoretical perspectives and build synthetic knowledge of information and design, which will get applied in the design studios and in thesis projects.

The minimum requirements for the 2 year MID degree for a student with a previous degree in industrial design are as follows:

| Course | Credit Hours |
|---|---|
| Industrial design studio | 15 |
| Professional core requirements | 16 |
| Track related requirements | 12 |
| Masters Thesis/Project option | 8 |
| Approved professional electives | 9 |
| Total (Minimum) | 60 |

Minimum requirements for the 3 year MID degree for a student with a previous degree in a discipline other than industrial design are as follows:

| Course | Credit Hours |
|---|---|
| Industrial design studio | 15 |
| Preparatory requirements | 28 |
| Professional core requirements | 16 |
| Track related requirements | 12 |
| Masters Thesis/Project option | 8 |
| Approved professional electives | 9 |
| Total (Minimum) | 88 |

The preparatory courses includes two design studios and 6 lecture courses; Materials and Processes, History of Modern Design, Computing 1, Computing 2, Advanced Sketching, and Professional Practice.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN ARCHITECTURE

The program leading to the Doctor of Philosophy degree in the College of Architecture has been developed to enable students of exceptional ability to undertake advanced study and original research in the fields of study within the College of Architecture. Currently the program includes several fields of study:

1. Architectural History, Theory, and Criticism
2. Architecture, Culture, and Behavior
3. Building Construction
4. Building Technology
5. City and Regional Planning
6. Design Cognition
7. Design Computing
8. Industrial Design
9. Spatial and Architectural Morphology

Several areas of study within city and regional planning are available for dissertation research: environmental planning, economic development, transportation planning, land and housing economics, urban and regional development, information systems, and land use planning.

The field of Architecture, Culture, and Behavior explores how individual, organizational, and cultural behavior, performance, and experience relate to the design of buildings and urban space. Current studies explore the following topics, among others: healthcare facilities that support higher quality care; workplaces that support new models of work; building and urban designs that promote health and active living; public buildings that promote functional and symbolic needs; wayfinding and environmental cognition and perception, and others.

The Architectural History, Theory, and Criticism (HTC) field is oriented toward historical and critical inquiry of architectural practice, thought, and criticism. Studies on topics related to interpretive methodology such as representation, meaning, and style are a distinctive focus of the HTC program at Georgia Tech.

Studies in Building Technology are concerned with the lifecycle performance of technical building systems, including the development and application of advanced knowledge in design processes, evaluation methods, intelligent and adaptive technologies, and indoor environmental factors.

Building Construction has several areas of research including: construction management; risk management and decision support systems; integrated construction project delivery systems (design-build, construction management, negotiated team, cost-plus with gmp, bridging, and others); integrated facility management; indoor environment; international construction; construction robotics and automation; e-business in construction; and life cycle cost analysis.

Design Computing focuses on the development of information technologies in support of design and construction. Current areas of research include building repositories, electronic design environments, human computer interfaces, building product models, formal approaches to composition, smart buildings and objects, direct fabrication of designs (building CAD/CAM), and parametric modeling.

Design Cognition is concerned with the reasoning, processes, models, and methods about how design skills, information, behaviors, and expertise are learned, applied, and represented. Research areas include sketch understanding, visual and spatial reasoning, mental imaging, cognitive process of problem solving, design moves, and creativity.

Spatial and Architectural Morphology is concerned with the principles that govern layouts and their meaning, functions, and social implications at urban and building scales. It includes analytical studies of spatial form.

Industrial Design is concerned with the understanding of design as a process of identifying, analyzing, and solving design problems of human interface with the physical environment.

For further details on the program, contact:

Ph.D. Program Director
College of Architecture
Georgia Institute of Technology
Atlanta, Georgia 30332-0155
Phone: 404.894.3476
Web site: www.coa.gatech.edu/phd/

## MASTER'S CERTIFICATE PROGRAM IN DESIGN COMPUTING

Graduate students in the College of Architecture and the College of Computing may sign up to participate in the Certificate Program in Design Computing. This option allows students to enroll in a program jointly administered by the College of Architecture and the College of Computing, providing studies in computing, computer graphics, Web technologies, and other digital technology areas.

Students eligible for this certificate program are master's students in the Colleges of Architecture or Computing. They are admitted through the regular admissions process, but are designated as being also signed up for this certificate option. Students admitted to the certificate program through the College of Architecture may do so through multiple degree programs:

a. Master of Architecture program: Students in the M.Arch. program may also enroll in this certificate program as part of their professional electives.
b. Master of Science with a major in architecture in the College of Architecture, Master of Building Construction, and Master of Industrial Design: Students in these programs may enroll in this certificate program if their interests and background correspond to those of the certificate.

The requirements for the certificate program for College of Architecture students are fifteen units of coursework in computing or design. Students taking the certificate program from the College of Architecture are expected to focus on courses in computer science and design computing within the College. The core courses in design computing are those identified as crucial for base knowledge in the field. Students interested in the certificate program should discuss it with their advisor. For further details on the program, contact:

Design Computing Certificate Advisor
Ph.D. Office, College of Architecture
Georgia Institute of Technology
Atlanta, Georgia 30332-0155

## DEPARTMENT OF MUSIC

Location: Couch Building
Telephone: 404.894.3193
Fax: 404.894.9952
Web site: www.music.gatech.edu

### GENERAL INFORMATION

Among the oldest traditions of the Institute, the Music Department provides a creative cultural outlet for Tech's many musically minded students. Whether a student's interest is casual or intense, the music faculty is dedicated to providing a quality experience in the theory, history, and practice of music. Students may elect to participate in various classroom courses, and in vocal or instrumental ensembles, enjoying a sense of community, pride, and accomplishment. Institute research also reveals that student retention is 4.5 times greater for students involved in music.

Music activities at Georgia Tech are centered around its major performing groups: Marching Band, Concert Band, Chamber Choir, Chorale, Jazz Ensemble, Symphonic Band, and Orchestra. The Music Department is cognizant of the desires of students who wish to enrich their lives through music, and excellence in the program is clearly demonstrated in the level of student performance and the vitality and rapid growth of the program. Students involved in the program represent every major of the Institute on both undergraduate and graduate levels.

Students earn free elective or humanities credit for all ensembles and classroom courses. Upon completion of thirteen credit hours of coursework within a prescribed curriculum, a Certificate in Music may be awarded. A Minor in Music is also offered, requiring nineteen credit hours, with at least six credit hours at the upper-division level (3000 4000). The minor can be completed in any one of the following areas: woodwinds, brass, strings, percussion, vocal, and jazz. Specific offerings may be checked each semester at https://oscar.gatech.edu. The Department plans events with an awareness of the demands placed upon Tech students so that a great amount of musical experience is concentrated into a limited time. Most ensemble classes schedule meetings and rehearsal times during the late afternoon and early evening hours. The Department enjoys a tradition of commitment to campus and community service that contributes greatly to the quality of life at Georgia Tech.

## FACULTY

**DONALD F. ALLEN**
Assistant Director of Bands

**PARAG CHORDIA, PH.D.**
Music Technology

**FRANK CLARK, PH.D.**
Director and Professor of Music

**JASON FREEMAN, D.M.A.**
Composition and Music Technology

**RON MENDOLA**
Director of Jazz Ensemble and Director of Orchestra

**CHRISTOPHER MOORE**
Associate Director of Bands and Director of Athletic Bands

**ANDREA STRAUSS, PH.D.**
Director of Bands and Director of Symphonic Band

**JERRY ULRICH, D.M.A.**
Director of Choral Activities

**GIL WEINBERG, PH.D.**
Director of Music Technology

## MASTER OF SCIENCE IN MUSIC TECHNOLOGY

The digital revolution led to a cultural and social transformation in the manner in which we make, perform, and listen to music. Recent technological developments in areas such as music recording, compression, distribution, and playback have fundamentally changed musical practices and created a need in the industry and academia for well-educated music and audio technologists able to design, develop, and creatively employ the next generation of musical performances, products, and services. The Georgia Tech Music Department's Master of Science in Music Technology program prepares students for careers in the arts and entertainment industries, professional audio software and hardware, as well as in the education/academic markets. This interdisciplinary degree program is executed in close collaboration with other leading programs at Georgia Tech including Human Computer Interaction, Electrical Engineering, Industrial Design, Interactive Digital Technology, and Mechanical Engineering.

The Master of Science in Music Technology is a four-semester program for a total of forty-eight credit hours. Applicants will be admitted to the program with an undergraduate degree in music, computing, engineering, or a related degree. Applicants will have to demonstrate their musical background in performance, composition and/or theory, as well as basic skills in programming and/or engineering in order to be admitted to the program. An interview process, which will include a portfolio examination, will be used to determine applicant's qualifications. Upon acceptance, each student will be assigned an academic advisor who will consult and approve student's course selections. After the first year of study and with the approval of their academic advisor, students will choose between two academic tracks:

- **Project Track**
  - Students will complete a set of requirements that will include twenty-one music technology course credit hours, fifteen elective course credit hours, and twelve research credit hours, leading to the development of a final master's project in Music Technology.
- **Thesis Track**
  - Students will complete a set of requirements that will include twenty-one music technology course credit hours, nine elective course credit hours, twelve research credit hours, and six Thesis Preparation credit hours, leading to the completion and submission of an master's thesis in Music Technology.

The program will offer two different concentrations: Computer Music Research and Engineering and Music Production and Multimedia. The first concentration, which began in Fall 2006, is technological and scientific in nature, focusing on the design and development of novel enabling music technologies. The second concentration, which will be offered in the near future, is productionoriented and will focus on creative utilization of current music and media technologies with an emphasis on recording, multimedia, and production. Both concentrations will require four core classes and twelve research lab credits, setting a common ground and providing a solid foundation in theory and practice. Each concentration will also require three concentration-specific classes, providing students with in-depth education in their chosen area. In addition to these seven required classes and twelve research credits, students will be able to choose from seven music technology elective courses and thirteen external elective courses from programs such as Industrial Design, Electrical Engineering, Mechanical Engineering, Computer Science, and Literature, Communication, and Culture.

## MUSIC MINOR REQUIREMENT

A Music Minor can be earned by Georgia Tech students upon completion of a minimum of eighteen hours of study (twelve hours must be at the 3000 level or higher) in music as approved by the Music Department program coordinator. Students following the guidelines of the Minor Program will be exposed to musical study at considerable depth in areas that include theory, history, and an introduction to the study of music technology. An additional requirement of the Minor Program involves sustained performance in one of Georgia Tech's instrumental or vocal ensembles chosen from the list below. All courses must be taken on a letter-grade basis with a *C* or better, and must be completed with an overall GPA of 2.0. All other requirements outlined in the Georgia Tech Policy for Undergraduate Minors must be met. Auditions for acceptance into the Music Minor are required and occur each spring.

### REQUIRED COURSES:

- Music History - (4 semester hours)
- Music Theory - (4 semester hours)
- Music Technology - (4 semester hours)
- Applied Instruction - (3 semester hours)
- Ensemble Performance - (6 semester hours)

A minimum of three semesters in ONE of the following ensemble tracks must be completed at the MUSI 3000 level or above. Therefore, a student must be enrolled in the ensemble for three semesters during their junior and senior years. The ensemble tracks include:

- Symphonic Band and/or Concert Band
- Jazz Ensemble
- Percussion Ensemble
- Orchestra
- Chorale and/or Chamber Choir and/or Men's Glee Club

# CERTIFICATE IN FINE ARTS - MUSIC

A Certificate in Fine Arts-Music can be earned by Georgia Tech students upon completion of thirteen hours of coursework in music as approved by the Music Department director. Students following certificate guidelines will be exposed to an introduction to fine arts, including the development of personal aesthetic and critical skills, and will go on to more in-depth study in music analysis and history. A core component of this program involves sustained performance in one of Georgia Tech's instrumental or vocal ensembles.

At least nine hours must be at the 3000 level or higher. All other Undergraduate Certificate Academic Requirements as they appear in the Undergraduate Certificate Program Guidelines must be met. Courses must be taken on a letter-grade basis, and a *C* or better must be received in order to obtain course credit toward the Certificate. This Certificate Program is designed mainly for students with an interest in gaining an in-depth knowledge of music within the context of a technical undergraduate education. Required and elective courses are as follows:

## REQUIRED COURSES (ELEVEN CREDIT HOURS):

- Three hours of Survey of Music Technology (MUSI 3450)
- Two hours of Composers and Their Music
- Two hours of Music Theory (MUSI 2600, 3600)
- Four hours core from one of the following areas:
    - Band (Concert Band-MUSI 1102-3, 2102-3, 3102-3, 4102-3) and/or Symphonic Band (1112-4, 2112-4, 3112-4, 4112-4)
    - Chamber Ensemble (MUSI 1401-3, 2401-3, 3401-3, 4401-3)
    - Chorale (MUSI 1201-3, 2201-3, 3201-3, 4201-3)
    - Jazz (MUSI 1301-3, 2301-3, 3301-3, 4301-3)
    - Orchestra (MUSI 1601-3, 2601-3, 3601-3, 4601-3)
    - Vocal Ensemble (MUSI 1211-3, 2211-3, 3211-3, 4211-3)

## ELECTIVE COURSES (TWO CREDIT HOURS):

Two hours of elective music courses with MUSI prefix.

## MUSIC DEPARTMENT HUMANITIES CREDIT INFORMATION

CORE AREA C**:**

Music: 2600, 3450, 3500, 3600, 3610, 3620, 4450

Students are permitted to earn four hours of humanities credit for participation in ensembles.

### HUMANITIES CREDIT FOR ENSEMBLE PARTICIPATION

Students are permitted to earn four hours of humanities credit for participating in ensembles in the Music Department, provided the selection and concentration criteria are satisfied. Specifically, the selection must satisfy Criterion 1, and the concentration must satisfy either Criterion 2 or Criterion 3.

- **Criterion 1**-The ensemble is chosen from the following list: Percussion Ensemble, Orchestra, Chorale, Concert Band, Jazz Ensemble, Symphonic Band, Vocal Ensemble, and Men's Glee Club.
- **Criterion 2**-The student earns at least four credits in one of the ensembles chosen from the list in Criterion 1.
- **Criterion 3**-The student earns at least four credits in a combination of Symphonic Band and Concert Band.

## ATHLETIC BANDS

The Yellow Jacket Marching Band and Basketball Pep Bands are elements of the Georgia Tech Band Program. The Marching Band and Pep Bands perform at all home games and travel to several out-of-state events, including the ACC Tournament, NCAA Tournament, football games, and bowl appearances. These trips are financed by the Georgia Tech Athletic Association. Tryouts for the auxiliary units are held each spring. There is a mandatory band camp the week before fall classes begin. All members must sign up for the class.

## CONCERT BAND

The Concert Band holds auditions at the beginning of each semester and is open to experienced wind and percussion players. This is a performing ensemble that covers both traditional and contemporary literature. Students may earn humanities credit by participating in a series of Concert Band and/or Symphonic Band courses.

## SYMPHONIC BAND

This auditioned instrumental ensemble for the more serious student has established a reputation of musical excellence through the performance of challenging band literature. Individual performance time, sectionals, and a high level of musical standards in rehearsals are expected. Repertoire has consisted of the compositions of Grainger, Persichetti, Copland, Bernstein, Hindemith, Giannini, and Holst. Guest clinicians and conductors are frequently invited to enhance performance preparation. Auditions are scheduled by contacting the director before the first day of class.

## ORCHESTRA

The Georgia Tech Orchestra was founded in 1993 and has grown to full orchestration including brass, woodwinds, and percussion. The group performs a balance of classical, romantic, contemporary, and popular literature. The Orchestra performs during Parent's Weekend, the Music of the Season concert, and many other community appearances. Auditions are scheduled by appointment during the first two days of class.

## THE CHORALE

With approximately 125 singers, the Chorale is Georgia Tech's largest vocal music organization. Students from nearly every school in the Institute are found among its membership. The Chorale specializes in music written for large groups and performs regularly on campus. The Chorale travels extensively during its biennial spring tour.

## JAZZ ENSEMBLE

The Jazz Ensemble's repertoire ranges from the concert jazz compositions of Leonard Bernstein, Duke Ellington, and Stan Kenton to the contemporary works of Bob Mintzer and Pat Metheny, and to works commissioned for the band. The group performs at area jazz festivals and has appeared in hundreds of concerts on campus and in the community. Members sharpen their improvisational skills and strive to grow as instrumentalists in various jazz styles. Students rightfully take pride in the group's accomplished level of performance. Professional clinicians, guest artists, and conductors bring additional musical perspective. Auditions are scheduled by appointment during the first two days of classes.

## CHAMBER ENSEMBLES

Small ensembles for experienced instrumentalists are organized prior to the first day of classes. Participation must be pre-approved by a faculty member in the Music Department. Members of these small ensembles must be participating in a large ensemble. Chamber Ensembles include string quartet, brass quintet, woodwind quintet, clarinet quartet, trumpet quartet, saxophone quartet, flute choir, etc. Students receiving class credit for these chamber groups must rehearse at least three hours a week and must be coached by a faculty member. Performances vary depending on the semester and may include appearances at school-related functions.

## PERCUSSION ENSEMBLE

The Percussion Ensemble focuses on traditional and contemporary ensemble literature as well as transcriptions of popular music. This ensemble is offered to students with prior percussion background. In the fall, it serves as the marching percussion section of the Yellow Jacket Marching Band.

## THE VOCAL ENSEMBLE

This ensemble of twenty to twenty-four singers is selected through audition each spring and performs as the Georgia Tech Chamber Choir in campus and community concerts. The choir rehearses and performs quality choral music literature written especially for smaller choirs.

## ELECTRONIC PERCUSSION ENSEMBLE

This ensemble performs a variety of student-designed and arranged music. All pieces are performed on student-designed and built instruments, as well as the latest in commercial controllers and interfaces. The use of multimedia is also encouraged in each arrangement.

## THE MEN'S GLEE CLUB

The Men's Glee Club was organized in 1906 and is the oldest student organization on campus. The Glee Club performs frequently on and off campus. Repertoire includes traditional men's chorus music, contemporary vocal percussion, and original compositions.

## MUSIC TECHNOLOGY

**Introduction to Synthesized Computer Music** explores the basic theories of music sequencing and engraving utilizing the computer and integrated synthesizers. "Survey of Music Technology" is a detailed survey of historic and contemporary electronic music systems, providing an overview of the technological, cultural, and aesthetic factors that have shaped developments in the creation and production of modern electronic music.

**Integrating Music into Multimedia** provides students insight and basic proficiency in current techniques that utilize music and digital audio technologies as part of multimedia productions.

Also covered are issues in software/hardware integration, data acquisition from various media, and intellectual property considerations. Other classes such as "Music Recording and Mixing," "Music Interface Design," "Multimedia Production and Post-production," and "Music and Sound Design" explore the intersection of music technology and digital media.

## ADDITIONAL INFORMATION

Other courses currently taught in the Music Department include "Composers and Their Music" and "Music Theory." Further information is available from the Music Department at 404.894.3193 or www.music.gatech.edu/.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN ARCHITECTURE

The program leading to the Doctor of Philosophy degree in the College of Architecture has been developed to enable students of exceptional ability to undertake advanced study and original research in the fields of study within the College of Architecture. Currently the program includes several fields of study:

1. Architectural History, Theory, and Criticism
2. Architecture, Culture, and Behavior
3. Building Construction
4. Building Technology
5. City and Regional Planning
6. Design Cognition
7. Design Computing
8. Industrial Design
9. Spatial and Architectural Morphology

Several areas of study within city and regional planning are available for dissertation research: environmental planning, economic development, transportation planning, land and housing economics, urban and regional development, information systems, and land use planning.

The field of Architecture, Culture, and Behavior explores how individual, organizational, and cultural behavior, performance, and experience relate to the design of buildings and urban space. Current studies explore the following topics, among others: healthcare facilities that support higher quality care; workplaces that support new models of work; building and urban designs that promote health and active living; public buildings that promote functional and symbolic needs; wayfinding and environmental cognition and perception, and others.

The Architectural History, Theory, and Criticism (HTC) field is oriented toward historical and critical inquiry of architectural practice, thought, and criticism. Studies on topics related to interpretive methodology such as representation, meaning, and style are a distinctive focus of the HTC program at Georgia Tech.

Studies in Building Technology are concerned with the lifecycle performance of technical building systems, including the development and application of advanced knowledge in design processes, evaluation methods, intelligent and adaptive technologies, and indoor environmental factors.

Building Construction has several areas of research including: construction management; risk management and decision support systems; integrated construction project delivery systems (design-build, construction management, negotiated team, cost-plus with gmp, bridging, and others); integrated facility management; indoor environment; international construction; construction robotics and automation; e-business in construction; and life cycle cost analysis.

Design Computing focuses on the development of information technologies in support of design and construction. Current areas of research include building repositories, electronic design environments, human computer interfaces, building product models, formal approaches to composition, smart buildings and objects, direct fabrication of designs (building CAD/CAM), and parametric modeling.

Design Cognition is concerned with the reasoning, processes, models, and methods about how design skills, information, behaviors, and expertise are learned, applied, and represented. Research areas include sketch understanding, visual and spatial reasoning, mental imaging, cognitive process of problem solving, design moves, and creativity.

Spatial and Architectural Morphology is concerned with the principles that govern layouts and their meaning, functions, and social implications at urban and building scales. It includes analytical studies of spatial form.

Industrial Design is concerned with the understanding of design as a process of identifying, analyzing, and solving design problems of human interface with the physical environment.

For further details on the program, contact:

Ph.D. Program Director
College of Architecture
Georgia Institute of Technology
Atlanta, Georgia 30332-0155
Phone: 404.894.3476
Web site: www.coa.gatech.edu/phd/

## COLLEGE OF COMPUTING

Established in 1990
Location: 801 Atlantic Drive
Telephone: 404.894.3152
Fax: 404.894.9846
Web site: www.cc.gatech.edu

### GENERAL INFORMATION

The founding of the College in 1990 as a focal point for the interdisciplinary advancement of computing caps a history that began in 1963 with the establishment of the School of Information Science. In 1972, this school was succeeded by the School of Information and Computer Science, the immediate predecessor of the current College of Computing. The College of Computing at Georgia Tech is one of the first College-level units devoted to the study of computing in the country.

Computer science is an important basis for many activities and is a natural and powerful partner with a variety of other disciplines. The College offers instructional and research programs in many areas, including algorithms and data structures, intelligent systems and robotics, computer architecture, cognitive science, databases, distributed and parallel systems, educational technology, graphics and visualization, human-computer interaction, information security, information systems, networking and telecommunications, operating systems, parallel architectures, programming languages, software engineering, and theories of automata and computation.

Beginning Fall 2006, the undergraduate program was organized around the Threads™ program developed by College of Computing faculty. A Thread™ is an intuitive, flexible, and mutually strengthening set of courses that allows students to craft a distinctive future in any computing-related field. Based on their particular interests, students will choose two Threads™ consisting of computing combined with Modeling & Simulation, devices, theory, information internetworks, intelligence, media, people, or platforms in order to weave a technical degree with a broad collection of skills and learning experiences they need to thrive in a globally competitive world. This approach allows the computing program to retain its strong computer science foundations, yet encourages partnerships with the multitude of disciplines affected by computing and technology.

The College conducts an increasing number of interdisciplinary research and instructional programs jointly with other campus units and operates three centers of interdisciplinary research for the campus: the Center for Experimental Research in Computer Systems (CERCS); the Graphics, Visualization, and Usability (GVU) Center; and the Georgia Tech Information Security Center (GTISC). The College's operations are housed in parts of five separate buildings on campus, including the College of Computing building.

The College awards bachelor's degrees in computer science (CS), and bachelor's degrees in computational media jointly with the School of Literature, Communication, and Culture, master's degrees in computer science and in information security, and doctoral degrees in computer science and human-centered computing. The College offers an undergraduate CS minor. The College also offers the M.S. degree in human-computer interaction in collaboration with the School of Literature, Communication, and Culture and the School of Psychology. The College is a sponsor of a multidisciplinary program in Algorithms, Combinatorics, and Optimization (ACO), an approved doctoral degree program at Georgia Tech. Master's and doctoral degrees in bioengineering can be pursued through the College as one of the units participating in the Institute-wide interdisciplinary Bioengineering Program. A doctoral degree in bioinformatics can also be pursued through the College in conjunction with the School of Biology.

## COLLEGE OF COMPUTING ACCREDITATION STATEMENT

The Bachelor of Science in Computer Science is accredited by the Computing Accreditation Commission (CAC) of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, Telephone: (410) 347-7700.

## GEORGIA TECH INFORMATION SECURITY CENTER (GTISC)

The Georgia Tech Information Security Center, a National Center of Academic Excellence in Information Assurance Education, is an interdisciplinary center involving faculty from the College of Computing, School of Electrical and Computer Engineering, Georgia Tech Research Institute (GTRI), the Sam Nunn School of International Affairs, and the School of Public Policy.
www.gtisc.gatech.edu

## ROBOTICS AND INTELLIGENT MACHINES AT GEORGIA TECH (RIM@GT)

The Center for Robotics and Intelligent Machines (RIM@Georgia Tech) leverages the strengths and resources of Georgia Tech in robotics education, research, and leadership by reaching across traditional boundaries to embrace a multidisciplinary approach. The College of Computing, College of Engineering and the Georgia Tech Research Institute play key, complementary roles through Tech's traditional expertise in interactive and intelligent computing, control, and mechanical engineering. Emphasizing personal and everyday robotics as well as the future of automation, faculty involved with RIM@Georgia Tech help students understand and define the future role of robotics in society.
www.robotics.gatech.edu

## ALGORITHMS AND RANDOMNESS CENTER AND THINKTANK (ARC THINKTANK)

The ARC ThinkTank brings together faculty from the College of Computing, the School of Mathematics and the School of Industrial Systems Engineering at Georgia Tech to find algorithms and algorithmic models for real-world problems across the sciences and, in the process, seeking new directions and techniques for the emerging theory of algorithms. www.arc.gatech.edu/

## GVU CENTER AT GEORGIA TECH

The GVU Center at Georgia Tech is an interdisciplinary research center encompassing a number of individual colleges at Georgia Tech as well as external collaborators. GVU focuses on unlocking and amplifying human potential through technical innovation in computing technologies. The faculty and students associated with GVU bring expertise ranging from computer science and engineering to the humanities and design. It is through deep collaboration between these diverse domains that the GVU Center is able to engage in research that would otherwise be difficult to tackle in traditional academic and industrial settings. www.gvu.gatech.edu

## CENTER FOR EXPERIMENTAL RESEARCH IN COMPUTER SYSTEMS (CERCS)

CERCS is one of the largest experimental systems programs in the U.S. focusing on complex hardware, communications and system-level software, and applications that lead the innovation of new information and computing technologies. http://www.cercs.gatech.edu/

## FACULTY

### John P. Imlay Jr. Dean of Computing and Distinguished Professor

Richard A. DeMillo

### Associate Dean and Distinguished Professor

Merrick Furst

### Associate Dean and Fredrick G. Storey Chair in Computing and Professor

Richard J. Lipton

### Interim Associate Dean and Associate Professor

Charles L. Isbell Jr.

### Chair of the School of Computer Science, Professor and Director of Graduate, Professional and International Programs

Ellen Witte Zegura

### Chair of the School of Interactive Computing and Professor

Aaron Bobick

### Chair of the Computational Science and Engineering Division and Regents' Professor

Richard Fujimoto

### Assistant Dean and Principal Research Scientist

W. Michael McCracken

### Assistant Dean for Students

Thomas D. Pilsch

### Stephen Fleming Chair in Telecommunications and Professor

James D. Foley

### John P. Imlay Jr. Chair in Software and Professor

Calton Pu

### Director, Georgia Tech Information Security Center and Professor

Mustaque Ahamad

### Director, Robotics and Intelligent Machines Center, KUKA Chair of Robotics, and Distinguished Professor

Henrik Christensen

### Director, Algorithms and Randomness Center and ThinkTank and Distinguished Professor

Santosh Vempala

### Director, Graphics, Visualization and Usability Center and Associate Professor

Elizabeth Mynatt

### Director, Center for Experimental Research in Computer Systems and Professor

Karsten Schwan

### Professors of the Practice

Howard Schmidt, Clint Kelly

### Regents' Professors

Mostafa H. Ammar, Ronald C. Arkin, Janet L. Kolodner, Nancy Nersessian

### Professors

Gregory Abowd (distinguished), Alberto Apostolico, David Bader, Albert N. Badre (emeritus), Mark Borodovsky (joint), Lucio Chiaraviglio (emeritus), Charles M. Eastman (joint), Philip H. Enslow Jr. (emeritus), Irfan A. Essa, Norberto Ezquerra (part-time), Peter A. Freeman (dean emeritus), John Goda (emeritus), Seymour E. Goodman (joint), Concettina Guerra (part-time), Mark Guzdial, Mary Jean Harrold, Richard LeBlanc (emeritus), Shamkant B. Navathe, Haesun Park, Umakishore Ramachandran, Jaroslaw R. Rossignac, William Rouse (joint), John T. Stasko, Prasad Tetali (joint), Vijay V. Vazirani, Thomas Zacharia (part-time), Hongyuan Zha.

### Associate Professors

Tucker Balch, Saugata Basu (joint), Amy S. Bruckman, Frank Dellaert, Constantinos Dovrolis, Ellen Do (joint), Keith Edwards, Ashok K. Goel, Rebecca Grinter, Wenke Lee, Ling Liu, Blair MacIntyre, Leo Mark, Milena Mihail, Melody Moore (visiting), Edward R. Omiecinski, Alessandro Orso, Santosh Pande, Colin Potts, Ashwin Ram, Dana Randall, James M. Rehg, David Sherrill (joint), Thad Starner, Gregory Turk, H. Venkateswaran, Eric Vigoda, Bruce N. Walker (joint), Jun Xu.

### Assistant Professors

Alexandra Boldyreva, Ken Brown (joint), Nathan Clark, Nick Feamster, Jonathon Giffin, Alexander Gray, Adam Kalai, Yael Kalai, Hyesoon Kim, Subhash Khot, Karen Liu, Gabriel Loh, Milos Prvulovic, Mark Riedl, Michael Stilman, Andrea Thomaz, Richard Vuduc.

### Academic Professionals

Randy Carpenter, David White

### Principal Research Scientists

Amihood Amir

### Senior Research Scientists

Rosa Arriaga, Maureen Biggers, Angus McLean, J. Spencer Rugaber

### Research Scientists

Cedric Stallworth

### Lecturers

Rosa Arriaga, William D. Leahy Jr., David M. Smith, Monica Sweat

### Instructors

Juwon Ahn, Barbara Ericson, Walter Sapronov, Robert L. Waters Jr.

### Adjunct Faculty

Christopher Atkeson, Michael Best, Douglas M. Blough, Jay D. Bolter, Richard Catrambone, Tal Cohen, Stephen Cross, Imme Ebert-Uphoff, Magnus Egerstedt, Ronald Ferguson, Ayana Howard, Xiangmin Jiao, Sing-Bing Kang, Howard Karloff, Charlie Kemp, Hsien-Hsin S. Lee, Sukhan Lee, Sung-Kyu Lim, Alexandra Mazalek, Vincent J. Mooney, Wendy C. Newstetter, Jeff Nichols, Henry Owen, Kalyan Perumalla, David Prince, George Riley, Raghupathy Sivakumar, Sandra Slaughter, Mani M. Subramanian, Andrjez Szymczak, Allen Tannenbaum, Craig A. Tovey, Jeffrey Vetter, Eberhard Voit, Gil Weinberg, Linda M. Wills, Sudhakar Yalamanchili, Wayne Wolf, Brian Worley, PK Yeung.

## BACHELOR OF SCIENCE IN COMPUTER SCIENCE WITH THREADS

The undergraduate degree in computer science (CS) offered by the College of Computing provides a solid foundation of knowledge and skills for applying digital processes effectively to issues of broad interest in a global society. Our program is based on a unique concept, Threads™ , a significant College of Computing innovation in undergraduate CS education. The curriculum builds on a base of fundamentals in programming and computational theory to allow each student the opportunity to explore a variety of computing paths in depth. There are eight Threads, each providing a focused journey through a broad spectrum of course offerings at Georgia Tech in preparation for a distinctive future in a changing and interconnected world. Each student selects two Threads to fulfill the requirements for an accredited Bachelor of Science degree in computer science. It is at the intersection of the two paths that the unique synergistic value of this educational experience is realized. Graduates will leave the College of Computing fully aware of the limitless potential of their dynamic discipline and be able to adapt and continuously add value to society throughout their careers.

The Threads™ represent partial paths through the curriculum. Thus, a student weaves a degree from these Threads. Students are not forced to make Thread decisions very early in their academic careers; however, they may if they want. We define the Threads so they are flexible enough to allow for a variety of technical and creative experiences. Threads are coherent enough that students develop computing skills even if their focus shifts as they go along.

The CS curriculum also offers opportunities in undergraduate research and international study. In addition to the standard four-year plan, a five-year cooperative plan is offered for students who wish to combine their academic education with industry experience.

The undergraduate program requires a total of 124 credit hours for graduation, plus a two-hour Wellness course. With the exception of free electives, all Bachelor of Science degree coursework must be taken on a letter-grade basis. Up to six hours of free electives may be taken on a pass/fail basis.

All required CS courses, whether Thread or non-Thread, must be completed with a *C* or better to be counted toward degree requirements. All courses listed as required for a Thread, whether CS or non-CS, must be completed with a *C* or better to be counted toward degree requirements.

### THE COLLEGE OF COMPUTING DEFINES EIGHT THREADS

A Thread provides an intuitive, flexible, and mutually strengthening set of courses that allows a student to craft a distinctive future in an area that is certain to have societal value in the emerging world. A Thread provides a skill and credential basis that allows graduates to create value in ways beyond what would be possible with only a narrowly focused tool set.

Choose any two threads to create your own path and special variation on an area of study.

- Computing and Devices: creating devices embedded in physical objects that interact in the physical world
- Computing and Information Internetworks: representing, transforming, transmitting, and presenting information
- Computing and Intelligence: building top-to-bottom models of human-level intelligence
- Computing and Media: building systems in order to exploit computing's abilities to provide creative outlets
- Computing and Modeling & Simulation: representing natural and physical processes
- Computing and People: designing, building, and evaluating systems that treat the human as a central component
- Computing and Platforms: creating computer architectures, systems, and languages
- Computing and Theory: theoretical foundations underlying a wide range of computing disciplines

Threads™ are defined as partial paths through the course offerings of the Institute.Students constructs their own personalized computer science degree by weaving through two Threads™. Each Thread™ is about 2/3 of a degree, but with Thread™ arithmetic, since there's so much overlap, 2/3 + 2/3 = 1. Each pair of Threads™ fulfills the requirements for an accredited Bachelor of Science degree in computer science.

### THE POWER OF ONE THREAD

Are you a computationalist who is interested in the expressive arts (telling stories, making games, creating emotional experiences)? Join the Computing and Media Thread. Here you'll see courses on topics ranging from computational graphics to Hamlet, from human perception to interactive fiction engines.

Are you a computationalist who is interested in placing intelligence in physical objects like robots, airplanes, or cell phones? Join the Computing and Devices Thread. Here you'll see courses on everything from computational sensors to dealing with noisy data, from real-time operating systems to mobile power issues and computational autonomy.

## WEAVING TWO THREADS TOGETHER - A LEAP

Are you interested in computer security? Then perhaps choose Computing and Information to learn how data is stored, retrieved, encoded, transmitted, etc. And perhaps also choose Computing and People to learn how people use technology, how to run experiments with human subjects, etc. The kind of person you will become is the kind of person who will be able to invent and build secure systems that are usable by people.

For more information about the B.S.C.S. undergraduate program or the College of Computing, please visit www.cc.gatech.edu

or

## THE COMPUTING AND DEVICES THREAD

The Devices thread is concerned with embedded computational artifacts that interact with people or the physical world. In this thread, one learns how to create and evaluate devices that operate under physical constraints such as size, power, and bandwidth. Examples include PDAs, cell phones, robots, jet engines, and intelligent appliances.

## READ ABOUT OTHER THREADS TO CREATE A B.S. IN CS

- Computing and Modeling & Simulation
- Computing and Theory
- Computing and Information Internetworks
- Computing and Intelligence
- Computing and Media
- Computing and People
- Computing and Platforms

## THE COMPUTING AND INFORMATION INTERNETWORKS THREAD

The Information Internetworks thread is where computing meets the data enterprise and all that this implies. The thread prepares students for all levels of information management by helping them to capture, represent, organize, transform, communicate, and present data so that it becomes information.

### READ ABOUT OTHER THREADS TO CREATE A B.S. IN CS

- Computing and Modeling & Simulation
- Computing and Devices
- Computing and Theory
- Computing and Intelligence
- Computing and Media
- Computing and People
- Computing and Platforms

## THE COMPUTING AND INTELLIGENCE THREAD

The Intelligence thread is where computing models intelligence. This thread is concerned with computational models of intelligence from top to bottom. To this end, we emphasize designing and implementing artifacts that exhibit various levels of intelligence as well as understanding and modeling natural cognitive agents such as humans, ants, or bees. Students acquire the technical knowledge and skills necessary for expressing, specifying, understanding, creating, and exploiting computational models that represent cognitive processes. It prepares students for fields as diverse as artificial intelligence, machine learning, perception, and cognitive science, as well as for fields that benefit from applications of techniques from those fields.

### READ ABOUT OTHER THREADS TO CREATE A B.S. IN CS

- Computing and Modeling & Simulation
- Computing and Devices
- Computing and Theory
- Computing and Information Internetworks
- Computing and Media
- Computing and People
- Computing and Platforms

## THE COMPUTING AND MEDIA THREAD

The Media thread is where computing meets design. This thread prepares students by helping them to understand the technical and computational capabilities of systems in order to exploit their abilities to provide creative outlets.

### READ ABOUT OTHER THREADS TO CREATE A B.S. IN CS

- Computing and Modeling & Simulation
- Computing and Devices
- Computing and Theory
- Computing and Information Internetworks
- Computing and Intelligence
- Computing and People
- Computing and Platforms

## THE COMPUTING AND MODELING AND SIMULATION THREAD

The Modeling & Simulation thread is intended for students interested in developing a deep understanding and appreciation of how natural and human-generated systems such as weather, biological processes, supply chains, or computers can be represented by mathematical models and computer software. Such models are widely used today to better understand and predict the behavior of such systems. Because these models are often described and represented by mathematical expressions, and the models themselves often deal with physical phenomena, a background in mathematics and the sciences is required. Combining this background with a deep knowledge in computer science will yield the basic tools necessary to transform abstract conceptual models to computer programs that execute efficiently on digital machines. The required coursework in this thread includes topics in continuous and discrete mathematics, the sciences, and computing. Elective courses enable students to further develop and apply their knowledge and skills to a specific discipline where Modeling & Simulation plays an important role.

### READ ABOUT OTHER THREADS TO CREATE A B.S. IN CS

- Computing and Devices
- Computing and Theory
- Computing and Information Internetworks
- Computing and Intelligence
- Computing and Media
- Computing and People
- Computing and Platforms

## THE COMPUTING AND PEOPLE THREAD

The People thread is where computing meets users. This thread prepares students by helping them to understand the theoretical and computational foundations for designing, building, and evaluating systems that treat the human as a central component.

### READ ABOUT OTHER THREADS TO CREATE A B.S. IN CS

- Computing and Modeling & Simulation
- Computing and Devices
- Computing and Theory
- Computing and Information Internetworks
- Computing and Intelligence
- Computing and Media
- Computing and Platforms

## THE COMPUTING AND PLATFORMS THREAD

The Platforms thread is where many of the practical skills of computing are learned. Like Theory, Platforms lies at the center of computing. It prepares students to create and evaluate computer architectures, systems, and languages across a variety of paradigms and approaches.

### READ ABOUT OTHER THREADS TO CREATE A B.S. IN CS

- Computing and Modeling & Simulation
- Computing and Devices
- Computing and Theory
- Computing and Information Internetworks
- Computing and Intelligence
- Computing and Media
- Computing and People

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE
## THREAD: DEVICES & INFORMATION INTERNETWORKS
## 2008 - 2009 DEGREE REQUIREMENTS
## COLLEGE OF COMPUTING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| SOCIAL SCIENCE ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| ECE 2031 DIGITAL DESIGN LAB* | 2 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| BUILDING DEVICES - PICK ONE * | 4 |
| INTRODUCTION TO INFORMATION MANAGEMENT - PICK ONE * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| CS 3251 COMPUTER NETWORKING I * | 3 |
| DEVICES IN THE REAL WORLD - PICK ONE * | 3 |
| ADVANCED INFORMATION MANAGEMENT - PICK ONE * | 3 |

| | |
|---|---|
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * | 3 |
| THREAD ELECTIVE (From List) * | 3 |
| FREE ELECTIVE | 3 |
| FREE ELECTIVE | 2 |
| **TOTAL SEMESTER HOURS =** | **14** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

## THREAD PICKS AND ELECTIVE COURSES
(Devices and Information Internetworks)

### Building Devices *
_____ CS3651 The Art of Building Intelligent Appliances
_____ ECE4175 Embedded Micro-controller Design

### Devices in the Real World *
_____ CS3630 Robotics and Perception
_____ CS4605 Mobile and Ubiquitous Computing
_____ CS4261 Mobile Appl & Services for Converged Netwks

### Algorithm Fundamentals
_____ CS3240 Languages and Computation

### Device Platforms
_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS4210 Advanced Operating Systems
_____ CS4220 Programming Embedded Systems
_____ CS4261 Mobile Appl & Services for Converged Netwks

### Intelligent Systems
_____ CS3600 Introduction to Artificial Intelligence
_____ CS3630 Robotics and Perception
_____ CS4495 Computer Vision
_____ CS4616 Pattern Recognition
_____ CS4632 Advanced Intelligent Robotics
_____ CS4641 Machine Learning

### Devices for People
_____ CS4685 Pervasive Systems and Networking
_____ CS4470 Introduction to User Interface Software
_____ CS4605 Mobile and Ubiquitous Computing

### Introduction to Information Management *
_____ CS4400 Introduction to Database Systems
_____ CS4365 Introduction to Enterprise Computing
_____ CS4235 Introduction to Information Security

### Advanced Information Management *
_____ (Pick 1 of) Database Systems
_____ (Pick 1 of) Enterprise Computing
_____ (Pick 1 of) Information Security
_____ (Pick 1 of) Network Systems

### Database Systems
_____ CS4420 Database System Implementation
_____ CS4440 Emerging Database Technologies & Appl
_____ CS4460 Information Visualization

### Enterprise Computing
_____ CS4560 Verification of Systems
_____ CS4342 Software Generation, Testing, & Maint
_____ MGT4056 Electronic Commerce
_____ MGT4057 Business Process Analysis and Design

### Information Security
_____ CS4237 Computer and Network Security

### Network Systems
_____ CS4251 Computer Networking II
_____ CS4261 Mobile Appl & Services for Converged Netwks
_____ CS4255 Introduction to Network Management
_____ CS4270 Data Communications Laboratory

* Required Thread Pick - If the same course is used to meet two Required Thread Picks, another Thread Elective course from this page must be taken to replace the hours.

## BACHELOR OF SCIENCE IN COMPUTER SCIENCE
### THREAD: DEVICES & INTELLIGENCE
### 2008 - 2009 DEGREE REQUIREMENTS
### COLLEGE OF COMPUTING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| PSYC 1101 GENERAL PSYCHOLOGY | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| CS 3600 INTRODUCTION TO ARTIFICIAL INTELLIGENCE * | 3 |
| ECE 2031 DIGITAL DESIGN LAB * | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| BUILDING DEVICES - PICK ONE * | 4 |
| EMBODIED INTELLIGENCE - PICK ONE * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * | 3 |
| DEVICES IN THE REAL WORLD - PICK ONE * | 3 |
| APPROACHES TO INTELLIGENCE - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |

| TOTAL SEMESTER HOURS = | 15 |
|---|---|

| FOURTH YEAR-SPRING | HRS |
|---|---|
| CS 4002 ROBOT & SOCIETY * | 3 |
| CS 3251 COMPUTER NETWORKING I * | 3 |
| COMPUTATIONAL COMPLEXITY - PICK ONE * | 3 |
| APPROACHES TO INTELLIGENCE - PICK ONE * | 3 |
| FREE ELECTIVE | 2 |
| **TOTAL SEMESTER HOURS =** | **14** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

**THREAD PICKS AND ELECTIVE COURSES**
(Devices and Intelligence)

### Building Devices *
_____ CS3651 The Art of Building Intelligent Appliances
_____ ECE4175 Embedded Micro-controller Design

### Devices in the Real World *
_____ CS3630 Robotics and Perception
_____ CS4605 Mobile and Ubiquitous Computing
_____ CS4261 Mobile Appl & Services for Converged Netwks

### Algorithm Fundamentals
_____ CS3240 Languages and Computation

### Device Platforms
_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS4210 Advanced Operating Systems
_____ CS4220 Programming Embedded Systems
_____ CS4261 Mobile Appl & Services for Converged Netwks

### Intelligent Systems
_____ CS3600 Introduction to Artificial Intelligence
_____ CS3630 Robotics and Perception
_____ CS4495 Computer Vision
_____ CS4616 Pattern Recognition
_____ CS4632 Advanced Intelligent Robotics
_____ CS4641 Machine Learning

### Devices for People
_____ CS4685 Pervasive Systems and Networking
_____ CS4470 Introduction to User Interface Software
_____ CS4605 Mobile and Ubiquitous Computing

### Computational Complexity *
_____ CS3240 Languages and Computation
_____ CS4510 Automata and Complexity Theory

### Embodied Intelligence *
_____ CS3630 Robotics and Perception
_____ CS3790 Introduction to Cognitive Science
_____ PSY3040 Sensation and Perception

### Approaches to Intelligence *
_____ CS4635 Knowledge-based AI
_____ CS4641 Machine Learning
_____ CS4495 Computer Vision

### Knowledge-Based Intelligence
_____ CS3790 Introduction to Cognitive Science
_____ CS4615 Knowledge-based Modeling & Design
_____ CS4635 Knowledge-based AI
_____ CS4650 Natural Language Understanding

### Data-Driven Intelligence
_____ CS4641 Machine Learning
_____ CS4616 Pattern Recognition
_____ MATH 4280 Introduction to Information Theory

### Intelligent Systems
_____ CS4495 Computer Vision
_____ CS4632 Advanced Intelligent Robotics
_____ CS3651 The Art of Building Intelligent Appliances
_____ CS4625 Intelligent and Interactive Systems
_____ CS4731 Game AI

### Philosophical Issues in Intelligence
_____ CS4793 Perspectives in Cognitive Science
_____ CS4752 Philosophical Issues in Computation

* Required Thread Pick - If the same course is used to meet two Required Thread Picks, another Thread Elective course from this page must be taken to replace the hours.

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE
## THREAD: DEVICES & MEDIA
## 2008 - 2009 DEGREE REQUIREMENTS
## COLLEGE OF COMPUTING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * or CS 1315 INTRODUCTION TO MEDIA COMPUTATION * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| SOCIAL SCIENCE ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| ECE 2031 DIGITAL DESIGN LAB * | 2 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| CS 3451 COMPUTER GRAPHICS * | 3 |
| BUILDING DEVICES - PICK ONE * | 4 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| CS 3251 COMPUTER NETWORKING I * | 3 |
| DEVICES IN THE REAL WORLD - PICK ONE * | 3 |
| MEDIA TECHNOLOGIES - PICK ONE * | 3 |

| | |
|---|---|
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| ALGORITHM FUNDIMENTALS - PICK ONE * | 3 |
| MEDIA TECHNOLOGIES - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| FREE ELECTIVE | 2 |
| **TOTAL SEMESTER HOURS =** | **14** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

**THREAD PICKS AND ELECTIVE COURSES**
(Devices and Media)

### Building Devices *
_____ CS3651 The Art of Building Intelligent Appliances
_____ ECE4175 Embedded Micro-controller Design

### Devices in the Real World *
_____ CS3630 Robotics and Perception
_____ CS4605 Mobile and Ubiquitous Computing
_____ CS4261 Mobile Appl & Services for Converged Netwks

### Algorithm Fundamentals *
_____ CS3510 Design and Analysis of Algorithms
_____ CS3240 Languages and Computation

### Device Platforms
_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS4210 Advanced Operating Systems
_____ CS4220 Programming Embedded Systems
_____ CS4261 Mobile Appl & Services for Converged Netwks

### Intelligent Systems
_____ CS3600 Introduction to Artificial Intelligence
_____ CS3630 Robotics and Perception
_____ CS4495 Computer Vision
_____ CS4616 Pattern Recognition
_____ CS4632 Advanced Intelligent Robotics
_____ CS4641 Machine Learning

### Devices for People
_____ CS4685 Pervasive Systems and Networking
_____ CS4470 Introduction to User Interface Software
_____ CS4605 Mobile and Ubiquitous Computing

### Media Technologies *
_____ CS4455 Video Game Design and Programming
_____ CS4480 Digital Video Special Effects
_____ CS4496 Computer Animation
_____ CS4590 Computer Audio

### Computing Fundamentals
_____ CS1316 Rep Struct & Behavior (Must take before 1331)
_____ CS3240 Languages and Computation
_____ CS3510 Design and Analysis of Algorithms

### Multimedia Applications and Design
_____ CS4475 Computational Photography
_____ CS4803 Computational Journalism
_____ CS4770 Mixed Reality Experience Design

### Multimedia Connections
_____ CS4230 Distributed Simulation Systems
_____ CS4460 Information Visualization
_____ CS4470 Introduction to User Interface Software
_____ CS4550 Scientific Data Processing and Visualization

* Required Thread Pick

## BACHELOR OF SCIENCE IN COMPUTER SCIENCE
### THREAD: DEVICES & PEOPLE
### 2008 - 2009 DEGREE REQUIREMENTS
### COLLEGE OF COMPUTING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| PSYC 1101 GENERAL PSYCHOLOGY | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| ECE 2031 DIGITAL DESIGN LAB * | 2 |
| FREE ELECTIVE | 1 |
| **TOTAL SEMESTER HOURS =** | **14** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| BUILDING DEVICES - PICK ONE * | 4 |
| HUMAN CENTERED TECHNOLOGY - PICK ONE * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| CS 3251 COMPUTER NETWORKING I * | 3 |
| PSYC 2015 RESEARCH METHODS * | 4 |
| DEVICES IN THE REAL WORLD - PICK ONE * | 3 |
| HUMAN CENTERED TECHNOLOGY - PICK ONE * | 3 |

| TOTAL SEMESTER HOURS = | 16 |
|---|---|

| FOURTH YEAR-SPRING | HRS |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| ALGORITHM FUNDIMENTALS - PICK ONE * | 3 |
| SOCIAL/BEHAVIORAL SCIENCE FOR COMPUTING - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| THREAD ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

THREAD PICKS AND ELECTIVE COURSES
(Devices and People)

### Building Devices *

_____ CS3651 The Art of Building Intelligent Appliances
_____ ECE4175 Embedded Micro-controller Design

### Devices in the Real World *

_____ CS3630 Robotics and Perception
_____ CS4605 Mobile and Ubiquitous Computing
_____ CS4261 Mobile Appl & Services for Converged Netwks

### Algorithm Fundamentals *

_____ CS 3510 Design and Analysis of Algorithms
_____ CS3240 Languages and Computation

### Device Platforms

_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS4210 Advanced Operating Systems
_____ CS4220 Programming Embedded Systems
_____ CS4261 Mobile Appl & Services for Converged Netwks

### Intelligent Systems

_____ CS3600 Introduction to Artificial Intelligence
_____ CS3630 Robotics and Perception
_____ CS4495 Computer Vision
_____ CS4616 Pattern Recognition
_____ CS4632 Advanced Intelligent Robotics
_____ CS4641 Machine Learning

### Devices for People

_____ CS4685 Pervasive Systems and Networking
_____ CS4470 Introduction to User Interface Software
_____ CS4605 Mobile and Ubiquitous Computing

### Social/Behavioral Science for Computing *

_____ PSYC2210 Social Psychology
_____ PSYC2760 Psychology of Human Language
_____ PSYC3040 Sensation and Perception

### Human-Centered Technology *

_____ CS3790 Introduction to Cognitive Science
_____ CS3750 Human-Computer Interface Design and Eval
_____ CS4660 Introduction to Educational Technology

### User Support Technology

_____ CS4460 Information Visualization
_____ CS4470 Introduction to User Interface Software
_____ CS4605 Mobile and Ubiquitous Computing
_____ CS4625 Intelligent and Interactive Systems

### Educational Technology

_____ CS4660 Introduction to Educational Technology
_____ CS4665 Educational Technology: Design & Evaluation
_____ CS4670 Computer-Supported Collaborative Learning

### Design and Evaluation

_____ CS4690 Empirical Methods in HCI
_____ CS3750 Human-Computer Interface Design and Eval
_____ PSYC2020 Psychological Statistics
_____ CS4770 Mixed Reality Experience Design

### Human Cognition and Interaction

_____ CS3790 Introduction to Cognitive Science
_____ CS4793 Perspectives Cognitive Science
_____ PSYC2210 Social Psychology
_____ PSYC2760 Psychology of Human Language
_____ PSYC3011 Cognitive Psychology
_____ PSYC3040 Sensation and Perception
_____ PSYC4090 Cognitive Neuropsychology
_____ PSYC4260 Aging

* Required Thread Pick

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE
## THREAD: DEVICES & PLATFORMS
## 2008 - 2009 DEGREE REQUIREMENTS
## COLLEGE OF COMPUTING

Suggested Schedule

| **FIRST YEAR-FALL** | **HRS** |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| **FIRST YEAR-SPRING** | **HRS** |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| **SECOND YEAR-FALL** | **HRS** |
|---|---|
| SOCIAL SCIENCE ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| **SECOND YEAR-SPRING** | **HRS** |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| **THIRD YEAR-FALL** | **HRS** |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| ECE 2031 DIGITAL DESIGN LAB * | 2 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| **THIRD YEAR-SPRING** | **HRS** |
|---|---|
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| BUILDING DEVICES - PICK ONE * | 4 |
| CS 3210 DESIGN OF OPERATING SYSTEMS * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| **FOURTH YEAR-FALL** | **HRS** |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * | 3 |
| DEVICES IN THE REAL WORLD - PICK ONE * | 3 |
| COMPUTER ARCHITECTURES - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |

| TOTAL SEMESTER HOURS = | 15 |
|---|---|

| FOURTH YEAR-SPRING | HRS |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| CS 3240 LANGUAGES & COMPUTATION * | 3 |
| CS 3251 COMPUTER NETWORKING I * | 3 |
| FREE ELECTIVE | 3 |
| FREE ELECTIVE | 2 |
| **TOTAL SEMESTER HOURS =** | **14** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

**THREAD PICKS AND ELECTIVE COURSES**
(Devices and Platforms)

### Building Devices *
_____ CS3651 The Art of Building Intelligent Appliances
_____ ECE4175 Embedded Micro-controller Design

### Devices in the Real World *
_____ CS3630 Robotics and Perception
_____ CS4605 Mobile and Ubiquitous Computing
_____ CS4261 Mobile Appl & Services for Converged Netwks

### Device Platforms
_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS4210 Advanced Operating Systems
_____ CS4220 Programming Embedded Systems
_____ CS4261 Mobile Appl & Services for Converged Netwks

### Intelligent Systems
_____ CS3600 Introduction to Artificial Intelligence
_____ CS3630 Robotics and Perception
_____ CS4495 Computer Vision
_____ CS4616 Pattern Recognition
_____ CS4632 Advanced Intelligent Robotics
_____ CS4641 Machine Learning

### Devices for People
_____ CS4685 Pervasive Systems and Networking
_____ CS4470 Introduction to User Interface Software
_____ CS4605 Mobile and Ubiquitous Computing

### Computer Architectures *
_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS4290 Advanced Computer Organization

### Platform Interfaces
_____ CS3300 Introduction to Software Engineering

### Parallel Platforms
_____ CS4210 Advanced Operating Systems
_____ CS4290 Advanced Computer Organization
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4233 Parallel Computer Architecture
_____ CS4803 Design of Gaming Consoles

### Distributed Platforms
_____ CS4210 Advanced Operating Systems
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4675 Internet Computing Systems
_____ CS4685 Pervasive Systems and Networking

### Embedded and Ubiquitous Platforms
_____ CS4220 Programming Embedded Systems
_____ CS4685 Pervasive Systems and Networking
_____ CS4803 Design of Gaming Consoles

### Domain Specific Platforms
_____ CS4803 Design of Gaming Consoles
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4220 Programming Embedded Systems

### Platform Technologies
_____ CS4235 Introduction to Information Security
_____ CS4237 Computer and Network Security
_____ CS4560 Verification of Systems
_____ CS4220 Programming Embedded Systems
_____ CS4210 Advanced Operating Systems

### Software Interfaces, Tools & Technologies
_____ CS4220 Programming Embedded Systems
_____ CS4392 Programming Language Design
_____ CS4240 Compilers, Interpreters, & Program Analyzers
_____ CS6246 Object-oriented Systems and Languages
_____ CS6241 Design and Implementation of Compilers

* Required Thread Pick

**BACHELOR OF SCIENCE IN COMPUTER SCIENCE**
**THREAD: DEVICES & THEORY**
**2008 - 2009 DEGREE REQUIREMENTS**
**COLLEGE OF COMPUTING**
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| SOCIAL SCIENCE ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| CS 1171 INTRODUCTORY COMPUTING IN MATLAB | 1 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| ECE 2031 DIGITAL DESIGN LAB * | 2 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| BUILDING DEVICES - PICK ONE * | 4 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| CS 3251 COMPUTER NETWORKING I * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * or<br>CS 3511 Design and Analysis of Algorithms, Honors * | 3 |

| | |
|---|---|
| DEVICES IN THE REAL WORLD - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-SPRING | HRS |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| COMPUTATIONAL COMPLEXITY - PICK ONE * | 3 |
| MATHEMATICS RELATED TO COMPUTER SCIENCE - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| FREE ELECTIVE | 1 |
| **TOTAL SEMESTER HOURS =** | **13** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

*Must earn a *C* or better in each of these courses.

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

## THREAD PICKS AND ELECTIVE COURSES
(Devices and Theory)

### Building Devices *
_____ CS3651 The Art of Building Intelligent Appliances
_____ ECE4175 Embedded Micro-controller Design

### Devices in the Real World *
_____ CS3630 Robotics and Perception
_____ CS4605 Mobile and Ubiquitous Computing
_____ CS4261 Mobile Appl & Services for Converged Netwks

### Algorithm Fundamentals
_____ CS3240 Languages and Computation

### Device Platforms
_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS4210 Advanced Operating Systems
_____ CS4220 Programming Embedded Systems
_____ CS4261 Mobile Appl & Services for Converged Netwks

### Intelligent Systems
_____ CS3600 Introduction to Artificial Intelligence
_____ CS3630 Robotics and Perception
_____ CS4495 Computer Vision
_____ CS4616 Pattern Recognition
_____ CS4632 Advanced Intelligent Robotics
_____ CS4641 Machine Learning

### Devices for People
_____ CS4685 Pervasive Systems and Networking
_____ CS4470 Introduction to User Interface Software
_____ CS4605 Mobile and Ubiquitous Computing

### Computational Complexity *
_____ CS3240 Languages and Computation
_____ CS4510 Automata and Complexity Theory

### Mathematics Related to Computer Science *
_____ MATH2406 Abstract Vector Spaces
_____ MATH4032 Combinatorial Analysis

### CS Appl Involving Algorithms & Complexity
_____ CS4400 Introduction to Database Systems
_____ CS4235 Introduction to Information Security
_____ CS3210 Design of Operating Systems
_____ CS3451 Computer Graphics
_____ CS4496 Computer Animation
_____ CS3600 Introduction to Artificial Intelligence
_____ CS4641 Machine Learning
_____ CS4140 Computational Modeling Algorithms
_____ CS4335 Computer Simulation

### Advanced Algorithms and Complexity
_____ CS3240 Languages and Computation
_____ CS4510 Automata and Complexity Theory
_____ CS4540 Advanced Algorithms
_____ CS6520 Computational Complexity
_____ CS4520 Approximation Algorithms
_____ CS4530 Randomized Algorithms

### Mathematics with CS Applications
_____ MATH2406 Abstract Vector Spaces
_____ MATH4150 Intro to Number Theory & Cryptography
_____ MATH4107 Abstract Algebra I
_____ MATH4255 Monte Carlo Methods
_____ MATH4280 Introduction to Information Theory
_____ MATH4305 Topics in Linear Algebra
_____ MATH4580 Linear Programming
_____ MATH4640 Numerical Analysis I
_____ MATH4782 Quantum Info & Quantum Computation
_____ MATH3770 Statistics and Applications
_____ MATH4012 Algebraic Structures for Coding Theory

### Computational Methods in the Sciences
_____ BIOL2400 Mathematical Models in Biology
_____ BIOL4755 Mathematical Biology
_____ PHYS3151 Mathematical Physics
_____ PHYS3266 Computational Physics
_____ ISYE3133 Optimization
_____ MGT3076 Investments
_____ MGT3078 Finance and Investments
_____ MGT3084 Derivative Securities
_____ ECON3110 Advanced Microeconomic Analysis
_____ ECON3120 Advanced Macroeconomic Analysis

* Required Thread Pick

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE
## THREAD: MODELING & SIMULATION & DEVICES
## 2008 - 2009 DEGREE REQUIREMENTS
## COLLEGE OF COMPUTING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
| --- | --- |
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING* | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| HPS 1040 WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
| --- | --- |
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
| --- | --- |
| SOCIAL SCIENCE ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
| --- | --- |
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
| --- | --- |
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1171 INTRODUCTORY COMPUTING IN MATLAB | 1 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| ECE 2031 DIGITAL DESIGN LAB* | 2 |
| **TOTAL SEMESTER HOURS =** | **14** |

| THIRD YEAR-SPRING | HRS |
| --- | --- |
| MATH/CE/ISYE 3770 STATISTICS AND APPLICATIONS or<br>MATH 3215 PROBABILITY & STATISTICS | 3 |
| FREE ELECTIVE | 3 |
| MATH 2403 DIFFERENTIAL EQUATIONS * | 4 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| BUILDING DEVICES - PICK ONE * | 4 |
| **TOTAL SEMESTER HOURS =** | **17** |

| FOURTH YEAR-FALL | HRS |
| --- | --- |
| CS SR PROJECT (4980 or 4911) * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * | 3 |
| DEVICES IN THE REAL WORLD - PICK ONE * | 3 |
| COMPUTATIONAL SCIENCE & ENGINEERING - PICK ONE * | 3 |

| | |
|---|---|
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| CS 3251 COMPUTER NETWORKING I * | 3 |
| COMPUTATIONAL SCIENCE & ENGINEERING - PICK ONE * | 3 |
| FREE ELECTIVE | 6 |
| **TOTAL SEMESTER HOURS =** | **15** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

*Must earn a *C* or better in each of these courses.

**THREAD PICKS AND ELECTIVE COURSES**
(Devices and Modeling-Simulation)

### Building Devices *
_____ CS3651 The Art of Building Intelligent Appliances
_____ ECE4175 Embedded Micro-controller Design

### Devices in the Real World *
_____ CS3630 Robotics and Perception
_____ CS4605 Mobile and Ubiquitous Computing
_____ CS4261 Mobile Appl & Services for Converged Netwks

### Algorithm Fundamentals
_____ CS3240 Languages and Computation

### Device Platforms
_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS4210 Advanced Operating Systems
_____ CS4220 Programming Embedded Systems
_____ CS4261 Mobile Appl & Services for Converged Netwks

### Intelligent Systems
_____ CS3600 Introduction to Artificial Intelligence
_____ CS3630 Robotics and Perception
_____ CS4495 Computer Vision
_____ CS4616 Pattern Recognition
_____ CS4632 Advanced Intelligent Robotics
_____ CS4641 Machine Learning

### Devices for People
_____ CS4685 Pervasive Systems and Networking
_____ CS4470 Introduction to User Interface Software
_____ CS4605 Mobile and Ubiquitous Computing

### Aerospace Engineering
_____ AE1350 Introduction to Aerospace Engineering
_____ AE4375 Fundamentals of Computer-Aided Eng & Design
_____ PHYS3266 Computational Physics

### Digital Signal Processing
_____ ECE4271 Applications of Digital Signal Processing
_____ ECE4270 Fundamentals of Digital Signal Processing
_____ ECE3075 Random Signals
_____ ECE3025 Electromagnetics

### Computational Science and Engineering *
_____ CS4140 Computational Modeling Algorithms
_____ CS4225 Introduction to High Performance Computing
_____ CS4245 Introduction to Data Mining and Analysis
_____ CS4335 Computer Simulation
_____ MATH4640/CS 4642 Numerical Analysis I

### Advanced Computational Methods & Software
_____ MATH4641/CS 4643 Numerical Analysis II
_____ CS4230 Distributed Simulation
_____ CS4343 Simulation and Military Gaming
_____ MATH4255 Monte Carlo Methods
_____ CS2335 Software Practicuum
_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS3451 Computer Graphics
_____ CS3600 Introduction to Artificial Intelligence
_____ CS4210 Advanced Operating Systems
_____ CS4230 Distributed Simulation Systems
_____ CS4495 Computer Vision
_____ CS4496 Computer Animation
_____ CS4550 Scientific Data Processing and Visualization
_____ CS4641 Machine Learning
_____ CS4777 Vector and Parallel Scientific Computing
_____ ISYE4331 Honors Optimization
_____ ISYE2028 Basic Statistics Methods
_____ ME2016 Computing Techniques
_____ CHBE2120 Numerical Methods

### Modeling & Simulation in Industrial Engineering
_____ ISYE2030 Modeling in Industrial Engineering
_____ ISYE3133 Engineering Optimization
_____ ISYE3044 Simulation Analysis and Design
_____ ISYE3232 Stochastic Manufacturing & Service Systems

### Biology/Chemistry
_____ BIOL2400 Mathematical Models in Biology
_____ BIOL4401 Exp Design & Statistical Methods in Biology
_____ CHBE2100 Chemical Process Principles

### Geoscience
_____ EAS4610 Earth System Modeling
_____ EAS3620 Geochemistry
_____ EAS4630 Physics of the Earth
_____ EAS4655 Atmospheric Dynamics
_____ EAS4602 Biochemical Cycles
_____ EAS4803 Water Chemistry Modeling
_____ PHYS3266 Computational Physics

* Required Thread Pick

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE
## THREAD: DEVICES & INFORMATION INTERNETWORKS
## 2008 - 2009 DEGREE REQUIREMENTS
## COLLEGE OF COMPUTING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| SOCIAL SCIENCE ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| ECE 2031 DIGITAL DESIGN LAB* | 2 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| BUILDING DEVICES - PICK ONE * | 4 |
| INTRODUCTION TO INFORMATION MANAGEMENT - PICK ONE * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| CS 3251 COMPUTER NETWORKING I * | 3 |
| DEVICES IN THE REAL WORLD - PICK ONE * | 3 |
| ADVANCED INFORMATION MANAGEMENT - PICK ONE * | 3 |

| | |
|---|---|
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * | 3 |
| THREAD ELECTIVE (From List) * | 3 |
| FREE ELECTIVE | 3 |
| FREE ELECTIVE | 2 |
| **TOTAL SEMESTER HOURS =** | **14** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

## THREAD PICKS AND ELECTIVE COURSES
(Devices and Information Internetworks)

### Building Devices *
_____ CS3651 The Art of Building Intelligent Appliances
_____ ECE4175 Embedded Micro-controller Design

### Devices in the Real World *
_____ CS3630 Robotics and Perception
_____ CS4605 Mobile and Ubiquitous Computing
_____ CS4261 Mobile Appl & Services for Converged Netwks

### Algorithm Fundamentals
_____ CS3240 Languages and Computation

### Device Platforms
_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS4210 Advanced Operating Systems
_____ CS4220 Programming Embedded Systems
_____ CS4261 Mobile Appl & Services for Converged Netwks

### Intelligent Systems
_____ CS3600 Introduction to Artificial Intelligence
_____ CS3630 Robotics and Perception
_____ CS4495 Computer Vision
_____ CS4616 Pattern Recognition
_____ CS4632 Advanced Intelligent Robotics
_____ CS4641 Machine Learning

### Devices for People
_____ CS4685 Pervasive Systems and Networking
_____ CS4470 Introduction to User Interface Software
_____ CS4605 Mobile and Ubiquitous Computing

### Introduction to Information Management *
_____ CS4400 Introduction to Database Systems
_____ CS4365 Introduction to Enterprise Computing
_____ CS4235 Introduction to Information Security

### Advanced Information Management *
_____ (Pick 1 of) Database Systems
_____ (Pick 1 of) Enterprise Computing
_____ (Pick 1 of) Information Security
_____ (Pick 1 of) Network Systems

### Database Systems
_____ CS4420 Database System Implementation
_____ CS4440 Emerging Database Technologies & Appl
_____ CS4460 Information Visualization

### Enterprise Computing
_____ CS4560 Verification of Systems
_____ CS4342 Software Generation, Testing, & Maint
_____ MGT4056 Electronic Commerce
_____ MGT4057 Business Process Analysis and Design

### Information Security
_____ CS4237 Computer and Network Security

### Network Systems
_____ CS4251 Computer Networking II
_____ CS4261 Mobile Appl & Services for Converged Netwks
_____ CS4255 Introduction to Network Management
_____ CS4270 Data Communications Laboratory

* Required Thread Pick - If the same course is used to meet two Required Thread Picks, another Thread Elective course from this page must be taken to replace the hours.

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE
## THREAD: INFORMATION INTERNETWORKS & INTELLIGENCE
## 2008 - 2009 DEGREE REQUIREMENTS
## COLLEGE OF COMPUTING

Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| PSYC 1101 GENERAL PSYCHOLOGY | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 3600 INTRODUCTION TO ARTIFICIAL INTELLIGENCE * | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| INTRODUCTION TO INFORMATION MANAGEMENT - PICK ONE * | 3 |
| EMBODIED INTELLIGENCE - PICK ONE * | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * | 3 |
| INTRODUCTION TO INFORMATION MANAGEMENT - PICK ONE * | 3 |
| ADVANCED INFORMATION MANAGEMENT - PICK ONE * | 3 |
| APPROACHES TO INTELLIGENCE - PICK ONE * | 3 |

| | |
|---|---|
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| COMPUTATIONAL COMPLEXITY - PICK ONE * | 3 |
| APPROACHES TO INTELLIGENCE - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| FREE ELECTIVE | 2 |
| **TOTAL SEMESTER HOURS =** | **14** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

## THREAD PICKS AND ELECTIVE COURSES
(Information Internetworks and Intelligence)

### Introduction to Information Management *
_____ CS4400 Introduction to Database Systems
_____ CS4365 Introduction to Enterprise Computing
_____ CS4235 Introduction to Information Security
_____ CS3251 Computer Networking I

### Advanced Information Management *
_____ (Pick 1 of) Database Systems
_____ (Pick 1 of) Enterprise Computing
_____ (Pick 1 of) Information Security
_____ (Pick 1 of) Network Systems

### Database Systems
_____ CS4420 Database System Implementation
_____ CS4440 Emerging Database Technologies & Appl
_____ CS4460 Information Visualization

### Enterprise Computing
_____ CS4560 Verification of Systems
_____ CS4342 Software Generation, Testing, & Maint
_____ MGT4056 Electronic Commerce
_____ MGT4057 Business Process Analysis and Design

### Information Security
_____ CS4237 Computer and Network Security

### Network Systems
_____ CS4251 Computer Networking II
_____ CS4261 Mobile Appl & Services for Converged Netwks
_____ CS4255 Introduction to Network Management
_____ CS4270 Data Communications Laboratory

### Computational Complexity *
_____ CS3240 Languages and Computation
_____ CS4510 Automata and Complexity Theory

### Embodied Intelligence *
_____ CS3630 Robotics and Perception
_____ CS3790 Introduction to Cognitive Science
_____ PSY3040 Sensation and Perception

### Approaches to Intelligence *
_____ CS4635 Knowledge-based AI
_____ CS4641 Machine Learning
_____ CS4495 Computer Vision

### Knowledge-Based Intelligence
_____ CS3790 Introduction to Cognitive Science
_____ CS4615 Knowledge-based Modeling & Design
_____ CS4635 Knowledge-based AI
_____ CS4650 Natural Language Understanding

### Data-Driven Intelligence
_____ CS4641 Machine Learning
_____ CS4616 Pattern Recognition
_____ MATH 4280 Introduction to Information Theory

### Intelligent Systems
_____ CS4495 Computer Vision
_____ CS4632 Advanced Intelligent Robotics
_____ CS3651 The Art of Building Intelligent Appliances
_____ CS4625 Intelligent and Interactive Systems
_____ CS4731 Game AI

### Philosophical Issues in Intelligence
_____ CS4793 Perspectives in Cognitive Science
_____ CS4752 Philosophical Issues in Computation

* Required Thread Pick

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE
## THREAD: INFORMATION INTERNETWORKS & MEDIA
## 2008 - 2009 DEGREE REQUIREMENTS
## COLLEGE OF COMPUTING

Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * or CS 1315 INTRODUCTION TO MEDIA COMPUTATION * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| SOCIAL SCIENCE ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| CS 3451 COMPUTER GRAPHICS * | 3 |
| MEDIA TECHNOLOGIES - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| INTRODUCTION TO INFORMATION MANAGEMENT - PICK ONE * | 3 |
| ADVANCED INFORMATION MANAGEMENT - PICK ONE * | 3 |
| MEDIA TECHNOLOGIES - PICK ONE * | 3 |

| | |
|---|---|
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * | 3 |
| MEDIA TECHNOLOGIES - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| FREE ELECTIVE | 2 |
| **TOTAL SEMESTER HOURS =** | **14** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

**THREAD PICKS AND ELECTIVE COURSES**
(Information Internetworks and Media)

### Introduction to Information Management *
_____ CS4400 Introduction to Database Systems
_____ CS4365 Introduction to Enterprise Computing
_____ CS4235 Introduction to Information Security
_____ CS3251 Computer Networking I

### Advanced Information Management *
_____ (Pick 1 of) Database Systems
_____ (Pick 1 of) Enterprise Computing
_____ (Pick 1 of) Information Security
_____ (Pick 1 of) Network Systems

### Database Systems
_____ CS4420 Database System Implementation
_____ CS4440 Emerging Database Technologies & Appl
_____ CS4460 Information Visualization

### Enterprise Computing
_____ CS4560 Verification of Systems
_____ CS4342 Software Generation, Testing, & Maint
_____ MGT4056 Electronic Commerce
_____ MGT4057 Business Process Analysis and Design

### Information Security
_____ CS4237 Computer and Network Security

### Network Systems
_____ CS4251 Computer Networking II
_____ CS4261 Mobile Appl & Services for Converged Netwks
_____ CS4255 Introduction to Network Management
_____ CS4270 Data Communications Laboratory

### Media Technologies *
_____ CS4455 Video Game Design and Programming
_____ CS4480 Digital Video Special Effects
_____ CS4496 Computer Animation
_____ CS4590 Computer Audio

### Computing Fundamentals
_____ CS1316 Rep Struct & Behavior (Must take before 1331)
_____ CS3240 Languages and Computation

### Multimedia Applications and Design
_____ CS4475 Computational Photography
_____ CS4803 Computational Journalism
_____ CS4770 Mixed Reality Experience Design

### Multimedia Connections
_____ CS4230 Distributed Simulation Systems
_____ CS4460 Information Visualization
_____ CS4470 Introduction to User Interface Software
_____ CS4550 Scientific Data Processing and Visualization

* Required Thread Pick

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE
## THREAD: INFORMATION INTERNETWORKS & PEOPLE
## 2008 - 2009 DEGREE REQUIREMENTS
## COLLEGE OF COMPUTING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| PSYC 1101 GENERAL PSYCHOLOGY | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| PSYC 2015 RESEARCH METHODS * | 4 |
| FREE ELECTIVE | 1 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * | 3 |
| INTRODUCTION TO INFORMATION MANAGEMENT - PICK ONE * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| INTRODUCTION TO INFORMATION MANAGEMENT - PICK ONE * | 3 |
| ADVANCED INFORMATION MANAGEMENT - PICK ONE * | 3 |
| HUMAN CENTERED TECHNOLOGY - PICK ONE * | 3 |
| FREE ELECTIVES | 3 |

| TOTAL SEMESTER HOURS = | 15 |
|---|---|

| FOURTH YEAR-SPRING | HRS |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| HUMAN CENTERED TECHNOLOGY - PICK ONE * | 3 |
| SOCIAL/BEHAVIORAL SCIENCE FOR COMPUTING - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

**THREAD PICKS AND ELECTIVE COURSES**
(Information Internetworks and People)

### Introduction to Information Management *

- _____ CS4400 Introduction to Database Systems
- _____ CS4365 Introduction to Enterprise Computing
- _____ CS4235 Introduction to Information Security
- _____ CS3251 Computer Networking I

### Advanced Information Management *

- _____ (Pick 1 of) Database Systems
- _____ (Pick 1 of) Enterprise Computing
- _____ (Pick 1 of) Information Security
- _____ (Pick 1 of) Network Systems

### Database Systems

- _____ CS4420 Database System Implementation
- _____ CS4440 Emerging Database Technologies & Appl
- _____ CS4460 Information Visualization

### Enterprise Computing

- _____ CS4560 Verification of Systems
- _____ CS4342 Software Generation, Testing, & Maint
- _____ MGT4056 Electronic Commerce
- _____ MGT4057 Business Process Analysis and Design

### Information Security

- _____ CS4237 Computer and Network Security

### Network Systems

- _____ CS4251 Computer Networking II
- _____ CS4261 Mobile Appl & Services for Converged Netwks
- _____ CS4255 Introduction to Network Management
- _____ CS4270 Data Communications Laboratory

### Social/Behavioral Science for Computing *

- _____ PSYC2210 Social Psychology
- _____ PSYC2760 Psychology of Human Language
- _____ PSYC3040 Sensation and Perception

### Human-Centered Technology *

- _____ CS3790 Introduction to Cognitive Science
- _____ CS3750 Human-Computer Interface Design and Eval
- _____ CS4660 Introduction to Educational Technology

### User Support Technology

- _____ CS4460 Information Visualization
- _____ CS4470 Introduction to User Interface Software
- _____ CS4605 Mobile and Ubiquitous Computing
- _____ CS4625 Intelligent and Interactive Systems

### Educational Technology

- _____ CS4660 Introduction to Educational Technology
- _____ CS4665 Educational Technology: Design & Evaluation
- _____ CS4670 Computer-Supported Collaborative Learning

### Design and Evaluation

- _____ CS4690 Empirical Methods in HCI
- _____ CS3750 Human-Computer Interface Design and Eval
- _____ PSYC2020 Psychological Statistics
- _____ CS4770 Mixed Reality Experience Design

### Human Cognition and Interaction

- _____ CS3790 Introduction to Cognitive Science
- _____ CS4793 Perspectives Cognitive Science
- _____ PSYC2210 Social Psychology
- _____ PSYC2760 Psychology of Human Language
- _____ PSYC3011 Cognitive Psychology
- _____ PSYC3040 Sensation and Perception
- _____ PSYC4090 Cognitive Neuropsychology
- _____ PSYC4260 Aging

* Required Thread Pick

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE
## THREAD: INFORMATION INTERNETWORKS & PLATFORMS
## 2008 - 2009 DEGREE REQUIREMENTS
## COLLEGE OF COMPUTING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| SOCIAL SCIENCE ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| CS 3210 DESIGN OF OPERATING SYSTEMS * | 3 |
| CS 3240 LANGUAGES & COMPUTATION * | 3 |
| INTRODUCTION TO INFORMATION MANAGEMENT - PICK ONE * | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| INTRODUCTION TO INFORMATION MANAGEMENT - PICK ONE * | 3 |
| ADVANCED INFORMATION MANAGEMENT - PICK ONE * | 3 |
| COMPUTER ARCHITECTURES - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |

| | |
|---|---|
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * | 3 |
| PLATFORM INTERFACES - PICK ONE * | 3 |
| THREAD ELECTIVE | 3 |
| THREAD ELECTIVE | 2 |
| **TOTAL SEMESTER HOURS =** | **14** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

**THREAD PICKS AND ELECTIVE COURSES**
(Information Internetworks and Platforms)

### Introduction to Information Management *
_____ CS4400 Introduction to Database Systems
_____ CS4365 Introduction to Enterprise Computing
_____ CS4235 Introduction to Information Security
_____ CS3251 Computer Networking I

### Advanced Information Management *
_____ (Pick 1 of) Database Systems
_____ (Pick 1 of) Enterprise Computing
_____ (Pick 1 of) Information Security
_____ (Pick 1 of) Network Systems

### Database Systems
_____ CS4420 Database System Implementation
_____ CS4440 Emerging Database Technologies & Appl
_____ CS4460 Information Visualization

### Enterprise Computing
_____ CS4560 Verification of Systems
_____ CS4342 Software Generation, Testing, & Maint
_____ MGT4056 Electronic Commerce
_____ MGT4057 Business Process Analysis and Design

### Information Security
_____ CS4237 Computer and Network Security

### Network Systems
_____ CS4251 Computer Networking II
_____ CS4261 Mobile Appl & Services for Converged Netwks
_____ CS4255 Introduction to Network Management
_____ CS4270 Data Communications Laboratory

### Computer Architectures *
_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS4290 Advanced Computer Organization

### Platform Interfaces *
_____ CS3251 Computer Networking I
_____ CS3300 Introduction to Software Engineering

### Parallel Platforms
_____ CS4210 Advanced Operating Systems
_____ CS4290 Advanced Computer Organization
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4233 Parallel Computer Architecture
_____ CS4803 Design of Gaming Consoles

### Distributed Platforms
_____ CS4210 Advanced Operating Systems
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4675 Internet Computing Systems
_____ CS4685 Pervasive Systems and Networking

### Embedded and Ubiquitous Platforms
_____ CS4220 Programming Embedded Systems
_____ CS4685 Pervasive Systems and Networking
_____ CS4803 Design of Gaming Consoles

### Domain Specific Platforms
_____ CS4803 Design of Gaming Consoles
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4220 Programming Embedded Systems

### Platform Technologies
_____ CS4235 Introduction to Information Security
_____ CS4237 Computer and Network Security
_____ CS4560 Verification of Systems
_____ CS4220 Programming Embedded Systems
_____ CS4210 Advanced Operating Systems

### Software Interfaces, Tools & Technologies
_____ CS4220 Programming Embedded Systems
_____ CS4392 Programming Language Design
_____ CS4240 Compilers, Interpreters, & Program Analyzers
_____ CS6246 Object-oriented Systems and Languages
_____ CS6241 Design and Implementation of Compilers

* Required Thread Pick - If the same course is used to meet two Required Thread Picks, another Thread Elective course from this page must be taken to replace the hours.

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE
## THREAD: MODELING & SIMULATION & INFORMATION INTERNETWORKS
## 2008 - 2009 DEGREE REQUIREMENTS
## COLLEGE OF COMPUTING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING* | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| SOCIAL SCIENCE ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| CS 1171 INTRODUCTORY COMPUTING IN MATLAB | 1 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| INTRODUCTION TO INFORMATION MANAGEMENT - PICK ONE * | 3 |
| **TOTAL SEMESTER HOURS =** | **14** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| MATH/CE/ISYE 3770 STATISTICS AND APPLICATIONS or MATH 3215 PROBABILITY & STATISTICS | 3 |
| MATH 2403 DIFFERENTIAL EQUATIONS * | 4 |
| FREE ELECTIVE | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| INTRODUCTION TO INFORMATION MANAGEMENT- PICK ONE * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| COMPUTATIONAL SCIENCE & ENGINEERING - PICK ONE * | 3 |
| ADVANCED INFORMATION MANAGEMENT - PICK ONE * | 3 |
| FREE ELECTIVE | 6 |

| | |
|---|---|
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * | 3 |
| COMPUTATIONAL SCIENCE & ENGINEERING - PICK ONE * | 3 |
| FREE ELECTIVE | 6 |
| **TOTAL SEMESTER HOURS =** | **15** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

*Must earn a *C* or better in each of these courses.

## THREAD PICKS AND ELECTIVE COURSES

(Information Internetworks and Modeling-Simulation)

### Introduction to Information Management *

_____ CS4400 Introduction to Database Systems
_____ CS4365 Introduction to Enterprise Computing
_____ CS4235 Introduction to Information Security
_____ CS3251 Computer Networking I

### Advanced Information Management *

_____ (Pick 1 of) Database Systems
_____ (Pick 1 of) Enterprise Computing
_____ (Pick 1 of) Information Security
_____ (Pick 1 of) Network Systems

### Database Systems

_____ CS4420 Database System Implementation
_____ CS4440 Emerging Database Technologies & Appl
_____ CS4460 Information Visualization

### Enterprise Computing

_____ CS4560 Verification of Systems
_____ CS4342 Software Generation, Testing, & Maint
_____ MGT4056 Electronic Commerce
_____ MGT4057 Business Process Analysis and Design

### Information Security

_____ CS4237 Computer and Network Security

### Network Systems

_____ CS4251 Computer Networking II
_____ CS4261 Mobile Appl & Services for Converged Netwks
_____ CS4255 Introduction to Network Management
_____ CS4270 Data Communications Laboratory

### Aerospace Engineering

_____ AE1350 Introduction to Aerospace Engineering
_____ AE4375 Fundamentals of Computer-Aided Eng & Design
_____ PHYS3266 Computational Physics

### Digital Signal Processing

_____ ECE4271 Applications of Digital Signal Processing
_____ ECE4270 Fundamentals of Digital Signal Processing
_____ ECE3075 Random Signals
_____ ECE3025 Electromagnetics

### Computational Science and Engineering *

_____ CS4140 Computational Modeling Algorithms
_____ CS4225 Introduction to High Performance Computing
_____ CS4245 Introduction to Data Mining and Analysis
_____ CS4335 Computer Simulation
_____ MATH4640/CS 4642 Numerical Analysis I

### Advanced Computational Methods & Software

_____ MATH4641/CS 4643 Numerical Analysis II
_____ CS4230 Distributed Simulation
_____ CS4343 Simulation and Military Gaming
_____ MATH4255 Monte Carlo Methods
_____ CS2335 Software Practicuum
_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS3451 Computer Graphics
_____ CS3600 Introduction to Artificial Intelligence
_____ CS4210 Advanced Operating Systems
_____ CS4230 Distributed Simulation Systems
_____ CS4495 Computer Vision
_____ CS4496 Computer Animation
_____ CS4550 Scientific Data Processing and Visualization
_____ CS4641 Machine Learning
_____ CS4777 Vector and Parallel Scientific Computing
_____ ISYE4331 Honors Optimization
_____ ISYE2028 Basic Statistics Methods
_____ ME2016 Computing Techniques
_____ CHBE2120 Numerical Methods

### Modeling & Simulation in Industrial Engineering

_____ ISYE2030 Modeling in Industrial Engineering
_____ ISYE3133 Engineering Optimization
_____ ISYE3044 Simulation Analysis and Design
_____ ISYE3232 Stochastic Manufacturing & Service Systems

### Biology/Chemistry

_____ BIOL2400 Mathematical Models in Biology
_____ BIOL4401 Exp Design & Statistical Methods in Biology
_____ CHBE2100 Chemical Process Principles

### Geoscience

_____ EAS4610 Earth System Modeling
_____ EAS3620 Geochemistry
_____ EAS4630 Physics of the Earth
_____ EAS4655 Atmospheric Dynamics
_____ EAS4602 Biochemical Cycles
_____ EAS4803 Water Chemistry Modeling
_____ PHYS3266 Computational Physics

* Required Thread Pick

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE
## THREAD: THEORY & INFORMATION INTERNETWORKS
## 2008 - 2009 DEGREE REQUIREMENTS
## COLLEGE OF COMPUTING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| SOCIAL SCIENCE ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| CS 1171 INTRODUCTORY COMPUTING IN MATLAB | 1 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * or<br>CS 3511 Design and Analysis of Algorithms, Honors * | 3 |
| FREE ELECTIVE | 1 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| INTRODUCTION TO INFORMATION MANAGEMENT - PICK ONE * | 3 |
| THREAD ELECTIVE (From List) * | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| INTRODUCTION TO INFORMATION MANAGEMENT - PICK ONE * | 3 |
| ADVANCED INFORMATION MANAGEMENT - PICK ONE * | 3 |

| | |
|---|---|
| FREE ELECTIVE | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| MATHEMATICS RELATED TO COMPUTER SCIENCE - PICK ONE * | 3 |
| COMPUTATIONAL COMPLEXITY - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

**THREAD PICKS AND ELECTIVE COURSES**
(Information Internetworks and Theory)

### Introduction to Information Management *
_____ CS4400 Introduction to Database Systems
_____ CS4365 Introduction to Enterprise Computing
_____ CS4235 Introduction to Information Security
_____ CS3251 Computer Networking I

### Advanced Information Management *
_____ (Pick 1 of) Database Systems
_____ (Pick 1 of) Enterprise Computing
_____ (Pick 1 of) Information Security
_____ (Pick 1 of) Network Systems

### Database Systems
_____ CS4420 Database System Implementation
_____ CS4440 Emerging Database Technologies & Appl
_____ CS4460 Information Visualization

### Enterprise Computing
_____ CS4560 Verification of Systems
_____ CS4342 Software Generation, Testing, & Maint
_____ MGT4056 Electronic Commerce
_____ MGT4057 Business Process Analysis and Design

### Information Security
_____ CS4237 Computer and Network Security

### Network Systems
_____ CS4251 Computer Networking II
_____ CS4261 Mobile Appl & Services for Converged Netwks
_____ CS4255 Introduction to Network Management
_____ CS4270 Data Communications Laboratory

### Computational Complexity *
_____ CS3240 Languages and Computation
_____ CS4510 Automata and Complexity Theory

### Mathematics Related to Computer Science *
_____ MATH2406 Abstract Vector Spaces
_____ MATH4032 Combinatorial Analysis

### CS Appl Involving Algorithms & Complexity
_____ CS3251 Computer Networking I
_____ CS4400 Introduction to Database Systems
_____ CS4235 Introduction to Information Security
_____ CS3210 Design of Operating Systems
_____ CS3451 Computer Graphics
_____ CS4496 Computer Animation
_____ CS3600 Introduction to Artificial Intelligence
_____ CS4641 Machine Learning
_____ CS4140 Computational Modeling Algorithms
_____ CS4335 Computer Simulation

### Advanced Algorithms and Complexity
_____ CS3240 Languages and Computation
_____ CS4510 Automata and Complexity Theory
_____ CS4540 Advanced Algorithms
_____ CS6520 Computational Complexity
_____ CS4520 Approximation Algorithms
_____ CS4530 Randomized Algorithms

### Mathematics with CS Applications
_____ MATH2406 Abstract Vector Spaces
_____ MATH4150 Intro to Number Theory & Cryptography
_____ MATH4107 Abstract Algebra I
_____ MATH4255 Monte Carlo Methods
_____ MATH4280 Introduction to Information Theory
_____ MATH4305 Topics in Linear Algebra
_____ MATH4580 Linear Programming
_____ MATH4640 Numerical Analysis I
_____ MATH4782 Quantum Info & Quantum Computation
_____ MATH3770 Statistics and Applications
_____ MATH4012 Algebraic Structures for Coding Theory

### Computational Methods in the Sciences
_____ BIOL2400 Mathematical Models in Biology
_____ BIOL4755 Mathematical Biology
_____ PHYS3151 Mathematical Physics
_____ PHYS3266 Computational Physics
_____ ISYE3133 Optimization
_____ MGT3076 Investments
_____ MGT3078 Finance and Investments
_____ MGT3084 Derivative Securities
_____ ECON3110 Advanced Microeconomic Analysis
_____ ECON3120 Advanced Macroeconomic Analysis

* Required Thread Pick

## BACHELOR OF SCIENCE IN COMPUTER SCIENCE
### THREAD: DEVICES & INTELLIGENCE
### 2008 - 2009 DEGREE REQUIREMENTS
### COLLEGE OF COMPUTING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| PSYC 1101 GENERAL PSYCHOLOGY | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| CS 3600 INTRODUCTION TO ARTIFICIAL INTELLIGENCE * | 3 |
| ECE 2031 DIGITAL DESIGN LAB * | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| BUILDING DEVICES - PICK ONE * | 4 |
| EMBODIED INTELLIGENCE - PICK ONE * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * | 3 |
| DEVICES IN THE REAL WORLD - PICK ONE * | 3 |
| APPROACHES TO INTELLIGENCE - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |

| TOTAL SEMESTER HOURS = | 15 |
| --- | --- |

| FOURTH YEAR-SPRING | HRS |
| --- | --- |
| CS 4002 ROBOT & SOCIETY * | 3 |
| CS 3251 COMPUTER NETWORKING I * | 3 |
| COMPUTATIONAL COMPLEXITY - PICK ONE * | 3 |
| APPROACHES TO INTELLIGENCE - PICK ONE * | 3 |
| FREE ELECTIVE | 2 |
| **TOTAL SEMESTER HOURS =** | **14** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

## THREAD PICKS AND ELECTIVE COURSES

(Devices and Intelligence)

### Building Devices *

_____ CS3651 The Art of Building Intelligent Appliances
_____ ECE4175 Embedded Micro-controller Design

### Devices in the Real World *

_____ CS3630 Robotics and Perception
_____ CS4605 Mobile and Ubiquitous Computing
_____ CS4261 Mobile Appl & Services for Converged Netwks

### Algorithm Fundamentals

_____ CS3240 Languages and Computation

### Device Platforms

_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS4210 Advanced Operating Systems
_____ CS4220 Programming Embedded Systems
_____ CS4261 Mobile Appl & Services for Converged Netwks

### Intelligent Systems

_____ CS3600 Introduction to Artificial Intelligence
_____ CS3630 Robotics and Perception
_____ CS4495 Computer Vision
_____ CS4616 Pattern Recognition
_____ CS4632 Advanced Intelligent Robotics
_____ CS4641 Machine Learning

### Devices for People

_____ CS4685 Pervasive Systems and Networking
_____ CS4470 Introduction to User Interface Software
_____ CS4605 Mobile and Ubiquitous Computing

### Computational Complexity *

_____ CS3240 Languages and Computation
_____ CS4510 Automata and Complexity Theory

### Embodied Intelligence *

_____ CS3630 Robotics and Perception
_____ CS3790 Introduction to Cognitive Science
_____ PSY3040 Sensation and Perception

### Approaches to Intelligence *

_____ CS4635 Knowledge-based AI
_____ CS4641 Machine Learning
_____ CS4495 Computer Vision

### Knowledge-Based Intelligence

_____ CS3790 Introduction to Cognitive Science
_____ CS4615 Knowledge-based Modeling & Design
_____ CS4635 Knowledge-based AI
_____ CS4650 Natural Language Understanding

### Data-Driven Intelligence

_____ CS4641 Machine Learning
_____ CS4616 Pattern Recognition
_____ MATH 4280 Introduction to Information Theory

### Intelligent Systems

_____ CS4495 Computer Vision
_____ CS4632 Advanced Intelligent Robotics
_____ CS3651 The Art of Building Intelligent Appliances
_____ CS4625 Intelligent and Interactive Systems
_____ CS4731 Game AI

### Philosophical Issues in Intelligence

_____ CS4793 Perspectives in Cognitive Science
_____ CS4752 Philosophical Issues in Computation

* Required Thread Pick - If the same course is used to meet two Required Thread Picks, another Thread Elective course from this page must be taken to replace the hours.

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE
## THREAD: INFORMATION INTERNETWORKS & INTELLIGENCE
## 2008 - 2009 DEGREE REQUIREMENTS
## COLLEGE OF COMPUTING

Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| PSYC 1101 GENERAL PSYCHOLOGY | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 3600 INTRODUCTION TO ARTIFICIAL INTELLIGENCE * | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| INTRODUCTION TO INFORMATION MANAGEMENT - PICK ONE * | 3 |
| EMBODIED INTELLIGENCE - PICK ONE * | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * | 3 |
| INTRODUCTION TO INFORMATION MANAGEMENT - PICK ONE * | 3 |
| ADVANCED INFORMATION MANAGEMENT - PICK ONE * | 3 |
| APPROACHES TO INTELLIGENCE - PICK ONE * | 3 |

| | |
|---|---|
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| COMPUTATIONAL COMPLEXITY - PICK ONE * | 3 |
| APPROACHES TO INTELLIGENCE - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| FREE ELECTIVE | 2 |
| **TOTAL SEMESTER HOURS =** | **14** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

**THREAD PICKS AND ELECTIVE COURSES**
(Information Internetworks and Intelligence)

### Introduction to Information Management *
_____ CS4400 Introduction to Database Systems
_____ CS4365 Introduction to Enterprise Computing
_____ CS4235 Introduction to Information Security
_____ CS3251 Computer Networking I

### Advanced Information Management *
_____ (Pick 1 of) Database Systems
_____ (Pick 1 of) Enterprise Computing
_____ (Pick 1 of) Information Security
_____ (Pick 1 of) Network Systems

### Database Systems
_____ CS4420 Database System Implementation
_____ CS4440 Emerging Database Technologies & Appl
_____ CS4460 Information Visualization

### Enterprise Computing
_____ CS4560 Verification of Systems
_____ CS4342 Software Generation, Testing, & Maint
_____ MGT4056 Electronic Commerce
_____ MGT4057 Business Process Analysis and Design

### Information Security
_____ CS4237 Computer and Network Security

### Network Systems
_____ CS4251 Computer Networking II
_____ CS4261 Mobile Appl & Services for Converged Netwks
_____ CS4255 Introduction to Network Management
_____ CS4270 Data Communications Laboratory

### Computational Complexity *
_____ CS3240 Languages and Computation
_____ CS4510 Automata and Complexity Theory

### Embodied Intelligence *
_____ CS3630 Robotics and Perception
_____ CS3790 Introduction to Cognitive Science
_____ PSY3040 Sensation and Perception

### Approaches to Intelligence *
_____ CS4635 Knowledge-based AI
_____ CS4641 Machine Learning
_____ CS4495 Computer Vision

### Knowledge-Based Intelligence
_____ CS3790 Introduction to Cognitive Science
_____ CS4615 Knowledge-based Modeling & Design
_____ CS4635 Knowledge-based AI
_____ CS4650 Natural Language Understanding

### Data-Driven Intelligence
_____ CS4641 Machine Learning
_____ CS4616 Pattern Recognition
_____ MATH 4280 Introduction to Information Theory

### Intelligent Systems
_____ CS4495 Computer Vision
_____ CS4632 Advanced Intelligent Robotics
_____ CS3651 The Art of Building Intelligent Appliances
_____ CS4625 Intelligent and Interactive Systems
_____ CS4731 Game AI

### Philosophical Issues in Intelligence
_____ CS4793 Perspectives in Cognitive Science
_____ CS4752 Philosophical Issues in Computation

* Required Thread Pick

**BACHELOR OF SCIENCE IN COMPUTER SCIENCE**
**THREAD: INTELLIGENCE & MEDIA**
**2008 - 2009 DEGREE REQUIREMENTS**
**COLLEGE OF COMPUTING**
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * or CS 1315 INTRODUCTION TO MEDIA COMPUTATION * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| PSYC 1101 GENERAL PSYCHOLOGY | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 * or CS 2261 * (Media Thread) | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| CS 3451 COMPUTER GRAPHICS * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * | 3 |
| CS 3600 INTRODUCTION TO ARTIFICIAL INTELLIGENCE * | 3 |
| EMBODIED INTELLIGENCE - PICK ONE * | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| APPROACHES TO INTELLIGENCE - PICK ONE * | 3 |
| MEDIA TECHNOLOGIES - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |

| | |
|---|---|
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| APPROACHES TO INTELLIGENCE - PICK ONE * | 3 |
| MEDIA TECHNOLOGIES - PICK ONE * | 3 |
| COMPUTATIONAL COMPLEXITY - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

## THREAD PICKS AND ELECTIVE COURSES
(Intelligence and Media)

### Computational Complexity *
_____ CS3240 Languages and Computation
_____ CS4510 Automata and Complexity Theory

### Embodied Intelligence *
_____ CS3630 Robotics and Perception
_____ CS3790 Introduction to Cognitive Science
_____ PSY3040 Sensation and Perception

### Approaches to Intelligence *
_____ CS4635 Knowledge-based AI
_____ CS4641 Machine Learning
_____ CS4495 Computer Vision

### Knowledge-Based Intelligence
_____ CS3790 Introduction to Cognitive Science
_____ CS4615 Knowledge-based Modeling & Design
_____ CS4635 Knowledge-based AI
_____ CS4650 Natural Language Understanding

### Data-Driven Intelligence
_____ CS4641 Machine Learning
_____ CS4616 Pattern Recognition
_____ MATH 4280 Introduction to Information Theory

### Intelligent Systems
_____ CS4495 Computer Vision
_____ CS4632 Advanced Intelligent Robotics
_____ CS3651 The Art of Building Intelligent Appliances
_____ CS4625 Intelligent and Interactive Systems
_____ CS4731 Game AI

### Philosophical Issues in Intelligence
_____ CS4793 Perspectives in Cognitive Science
_____ CS4752 Philosophical Issues in Computation

### Media Technologies *
_____ CS4455 Video Game Design and Programming
_____ CS4480 Digital Video Special Effects
_____ CS4496 Computer Animation
_____ CS4590 Computer Audio

### Computing Fundamentals
_____ CS1316 Rep Struct & Behavior (Must take before 1331)
_____ CS3240 Languages and Computation

### Multimedia Applications and Design
_____ CS4475 Computational Photography
_____ CS4803 Computational Journalism
_____ CS4770 Mixed Reality Experience Design

### Multimedia Connections
_____ CS4230 Distributed Simulation Systems
_____ CS4460 Information Visualization
_____ CS4470 Introduction to User Interface Software
_____ CS4550 Scientific Data Processing and Visualization

* Required Thread Pick

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE
## THREAD: INTELLIGENCE & PEOPLE
## 2008 - 2009 DEGREE REQUIREMENTS
## COLLEGE OF COMPUTING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| PSYC 1101 GENERAL PSYCHOLOGY | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * | 3 |
| HUMAN CENTERED TECHNOLOGY - PICK ONE * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| CS 3600 INTRODUCTION TO ARTIFICIAL INTELLIGENCE * | 3 |
| EMBODIED INTELLIGENCE - PICK ONE * | 3 |
| SOCIAL/BEHAVIORAL SCIENCE FOR COMPUTING - PICK ONE * | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| PSYC 2015 RESEARCH METHODS * | 4 |
| APPROACHES TO INTELLIGENCE - PICK ONE * | 3 |
| COMPUTATIONAL COMPLEXITY - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |

| TOTAL SEMESTER HOURS = | 16 |
| --- | --- |

| FOURTH YEAR-SPRING | HRS |
| --- | --- |
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| APPROACHES TO INTELLIGENCE - PICK ONE * | 3 |
| HUMAN CENTERED TECHNOLOGY - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| FREE ELECTIVE | 2 |
| **TOTAL SEMESTER HOURS =** | **14** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

**THREAD PICKS AND ELECTIVE COURSES**
(Intelligence and People)

### Computational Complexity *
_____ CS3240 Languages and Computation
_____ CS4510 Automata and Complexity Theory

### Embodied Intelligence *
_____ CS3630 Robotics and Perception
_____ CS3790 Introduction to Cognitive Science
_____ PSY3040 Sensation and Perception

### Approaches to Intelligence *
_____ CS4635 Knowledge-based AI
_____ CS4641 Machine Learning
_____ CS4495 Computer Vision

### Knowledge-Based Intelligence
_____ CS3790 Introduction to Cognitive Science
_____ CS4615 Knowledge-based Modeling & Design
_____ CS4635 Knowledge-based AI
_____ CS4650 Natural Language Understanding

### Data-Driven Intelligence
_____ CS4641 Machine Learning
_____ CS4616 Pattern Recognition
_____ MATH 4280 Introduction to Information Theory

### Intelligent Systems
_____ CS4495 Computer Vision
_____ CS4632 Advanced Intelligent Robotics
_____ CS3651 The Art of Building Intelligent Appliances
_____ CS4625 Intelligent and Interactive Systems
_____ CS4731 Game AI

### Philosophical Issues in Intelligence
_____ CS4793 Perspectives in Cognitive Science
_____ CS4752 Philosophical Issues in Computation

### Social/Behavioral Science for Computing *
_____ PSYC2210 Social Psychology
_____ PSYC2760 Psychology of Human Language
_____ PSYC3040 Sensation and Perception

### Human-Centered Technology *
_____ CS3790 Introduction to Cognitive Science
_____ CS3750 Human-Computer Interface Design and Eval
_____ CS4660 Introduction to Educational Technology

### User Support Technology
_____ CS4460 Information Visualization
_____ CS4470 Introduction to User Interface Software
_____ CS4605 Mobile and Ubiquitous Computing
_____ CS4625 Intelligent and Interactive Systems

### Educational Technology
_____ CS4660 Introduction to Educational Technology
_____ CS4665 Educational Technology: Design & Evaluation
_____ CS4670 Computer-Supported Collaborative Learning

### Design and Evaluation
_____ CS4690 Empirical Methods in HCI
_____ CS3750 Human-Computer Interface Design and Eval
_____ PSYC2020 Psychological Statistics
_____ CS4770 Mixed Reality Experience Design

### Human Cognition and Interaction
_____ CS3790 Introduction to Cognitive Science
_____ CS4793 Perspectives Cognitive Science
_____ PSYC2210 Social Psychology
_____ PSYC2760 Psychology of Human Language
_____ PSYC3011 Cognitive Psychology
_____ PSYC3040 Sensation and Perception
_____ PSYC4090 Cognitive Neuropsychology
_____ PSYC4260 Aging

* Required Thread Pick - If the same course is used to meet two Required Thread Picks, another Thread Elective course from this page must be taken to replace the hours.

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE
## THREAD: INTELLIGENCE & PLATFORMS
## 2008 - 2009 DEGREE REQUIREMENTS
## COLLEGE OF COMPUTING

Suggested Schedule

| FIRST YEAR-FALL | HRS |
| --- | --- |
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
| --- | --- |
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
| --- | --- |
| PSYC 1101 GENERAL PSYCHOLOGY | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
| --- | --- |
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
| --- | --- |
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-SPRING | HRS |
| --- | --- |
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| CS 3240 LANGUAGES & COMPUTATION * | 3 |
| CS 3600 INTRODUCTION TO ARTIFICIAL INTELLIGENCE * | 3 |
| EMBODIED INTELLIGENCE - PICK ONE * | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
| --- | --- |
| CS SR PROJECT (4980 or 4911) * | 3 |
| APPROACHES TO INTELLIGENCE - PICK ONE * | 3 |
| COMPUTER ARCHITECTURES - PICK ONE * | 3 |
| PLATFORM INTERFACES - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |

| | |
|---|---|
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * | 3 |
| CS 3240 LANGUAGES & COMPUTATION * | 3 |
| APPROACHES TO INTELLIGENCE - PICK ONE * | 3 |
| THREAD ELECTIVE | 2 |
| **TOTAL SEMESTER HOURS =** | **14** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

**THREAD PICKS AND ELECTIVE COURSES**
(Intelligence and Platforms)

### Embodied Intelligence *

_____ CS3630 Robotics and Perception
_____ CS3790 Introduction to Cognitive Science
_____ PSY3040 Sensation and Perception

### Approaches to Intelligence *

_____ CS4635 Knowledge-based AI
_____ CS4641 Machine Learning
_____ CS4495 Computer Vision

### Computational Complexity

_____ CS4510 Automata and Complexity Theory

### Knowledge-Based Intelligence

_____ CS3790 Introduction to Cognitive Science
_____ CS4615 Knowledge-based Modeling & Design
_____ CS4635 Knowledge-based AI
_____ CS4650 Natural Language Understanding

### Data-Driven Intelligence

_____ CS4641 Machine Learning
_____ CS4616 Pattern Recognition
_____ MATH 4280 Introduction to Information Theory

### Intelligent Systems

_____ CS4495 Computer Vision
_____ CS4632 Advanced Intelligent Robotics
_____ CS3651 The Art of Building Intelligent Appliances
_____ CS4625 Intelligent and Interactive Systems
_____ CS4731 Game AI

### Philosophical Issues in Intelligence

_____ CS4793 Perspectives in Cognitive Science
_____ CS4752 Philosophical Issues in Computation

### Computer Architectures *

_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS4290 Advanced Computer Organization

### Platform Interfaces *

_____ CS3251 Computer Networking I
_____ CS3300 Introduction to Software Engineering

### Parallel Platforms

_____ CS4210 Advanced Operating Systems
_____ CS4290 Advanced Computer Organization
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4233 Parallel Computer Architecture
_____ CS4803 Design of Gaming Consoles

### Distributed Platforms

_____ CS4210 Advanced Operating Systems
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4675 Internet Computing Systems
_____ CS4685 Pervasive Systems and Networking

### Embedded and Ubiquitous Platforms

_____ CS4220 Programming Embedded Systems
_____ CS4685 Pervasive Systems and Networking
_____ CS4803 Design of Gaming Consoles

### Domain Specific Platforms

_____ CS4803 Design of Gaming Consoles
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4220 Programming Embedded Systems

### Platform Technologies

_____ CS4235 Introduction to Information Security
_____ CS4237 Computer and Network Security
_____ CS4560 Verification of Systems
_____ CS4220 Programming Embedded Systems
_____ CS4210 Advanced Operating Systems

### Software Interfaces, Tools & Technologies

_____ CS4220 Programming Embedded Systems
_____ CS4392 Programming Language Design
_____ CS4240 Compilers, Interpreters, & Program Analyzers
_____ CS6246 Object-oriented Systems and Languages
_____ CS6241 Design and Implementation of Compilers

* Required Thread Pick

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE
## THREAD: MODELING & SIMULATION & INTELLIGENCE
## 2008 - 2009 DEGREE REQUIREMENTS
## COLLEGE OF COMPUTING

Suggested Schedule

| FIRST YEAR-FALL | HRS |
| --- | --- |
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING* | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
| --- | --- |
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
| --- | --- |
| PSYC 1101 GENERAL PSYCHOLOGY | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
| --- | --- |
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| CS 1171 INTRODUCTORY COMPUTING IN MATLAB | 1 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-FALL | HRS |
| --- | --- |
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| MATH 2403 DIFFERENTIAL EQUATIONS * | 4 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-SPRING | HRS |
| --- | --- |
| MATH/CE/ISYE 3770 STATISTICS AND APPLICATIONS or<br>MATH 3215 PROBABILITY & STATISTICS | 3 |
| FREE ELECTIVE | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| CS 3600 INTRODUCTION TO ARTIFICIAL INTELLIGENCE * | 3 |
| EMBODIED INTELLIGENCE - PICK ONE * | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
| --- | --- |
| CS SR PROJECT (4980 or 4911) * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * | 3 |
| COMPUTATIONAL SCIENCE & ENGINEERING - PICK ONE * | 3 |
| APPROACHES TO INTELLIGENCE - PICK ONE * | 3 |

| | |
|---|---|
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| COMPUTATIONAL COMPLEXITY - PICK ONE * | 3 |
| COMPUTATIONAL SCIENCE & ENGINEERING - PICK ONE * | 3 |
| APPROACHES TO INTELLIGENCE - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

*Must earn a *C* or better in each of these courses.

**THREAD PICKS AND ELECTIVE COURSES**
(Intelligence and Modeling-Simulation)

## Computational Complexity *
_____ CS3240 Languages and Computation
_____ CS4510 Automata and Complexity Theory

## Embodied Intelligence *
_____ CS3630 Robotics and Perception
_____ CS3790 Introduction to Cognitive Science
_____ PSY3040 Sensation and Perception

## Approaches to Intelligence *
_____ CS4635 Knowledge-based AI
_____ CS4641 Machine Learning
_____ CS4495 Computer Vision

## Knowledge-Based Intelligence
_____ CS3790 Introduction to Cognitive Science
_____ CS4615 Knowledge-based Modeling & Design
_____ CS4635 Knowledge-based AI
_____ CS4650 Natural Language Understanding

## Data-Driven Intelligence
_____ CS4641 Machine Learning
_____ CS4616 Pattern Recognition
_____ MATH 4280 Introduction to Information Theory

## Intelligent Systems
_____ CS4495 Computer Vision
_____ CS4632 Advanced Intelligent Robotics
_____ CS3651 The Art of Building Intelligent Appliances
_____ CS4625 Intelligent and Interactive Systems
_____ CS4731 Game AI

## Philosophical Issues in Intelligence
_____ CS4793 Perspectives in Cognitive Science
_____ CS4752 Philosophical Issues in Computation

## Aerospace Engineering
_____ AE1350 Introduction to Aerospace Engineering
_____ AE4375 Fundamentals of Computer-Aided Eng & Design
_____ PHYS3266 Computational Physics

## Digital Signal Processing
_____ ECE4271 Applications of Digital Signal Processing
_____ ECE4270 Fundamentals of Digital Signal Processing
_____ ECE3075 Random Signals
_____ ECE3025 Electromagnetics

## Computational Science and Engineering *
_____ CS4140 Computational Modeling Algorithms
_____ CS4225 Introduction to High Performance Computing
_____ CS4245 Introduction to Data Mining and Analysis
_____ CS4335 Computer Simulation
_____ MATH4640/CS 4642 Numerical Analysis I

## Advanced Computational Methods & Software
_____ MATH4641/CS 4643 Numerical Analysis II
_____ CS4230 Distributed Simulation
_____ CS4343 Simulation and Military Gaming
_____ MATH4255 Monte Carlo Methods
_____ CS2335 Software Practicuum
_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS3451 Computer Graphics
_____ CS3600 Introduction to Artificial Intelligence
_____ CS4210 Advanced Operating Systems
_____ CS4230 Distributed Simulation Systems
_____ CS4495 Computer Vision
_____ CS4496 Computer Animation
_____ CS4550 Scientific Data Processing and Visualization
_____ CS4641 Machine Learning
_____ CS4777 Vector and Parallel Scientific Computing
_____ ISYE4331 Honors Optimization
_____ ISYE2028 Basic Statistics Methods
_____ ME2016 Computing Techniques
_____ CHBE2120 Numerical Methods

## Modeling & Simulation in Industrial Engineering
_____ ISYE2030 Modeling in Industrial Engineering
_____ ISYE3133 Engineering Optimization
_____ ISYE3044 Simulation Analysis and Design
_____ ISYE3232 Stochastic Manufacturing & Service Systems

## Biology/Chemistry
_____ BIOL2400 Mathematical Models in Biology
_____ BIOL4401 Exp Design & Statistical Methods in Biology
_____ CHBE2100 Chemical Process Principles

## Geoscience
_____ EAS4610 Earth System Modeling
_____ EAS3620 Geochemistry
_____ EAS4630 Physics of the Earth
_____ EAS4655 Atmospheric Dynamics
_____ EAS4602 Biochemical Cycles
_____ EAS4803 Water Chemistry Modeling
_____ PHYS3266 Computational Physics

* Required Thread Pick

## BACHELOR OF SCIENCE IN COMPUTER SCIENCE
### THREAD: THEORY & INTELLIGENCE
### 2008 - 2009 DEGREE REQUIREMENTS
### COLLEGE OF COMPUTING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
| --- | --- |
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
| --- | --- |
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
| --- | --- |
| PSYC 1101 GENERAL PSYCHOLOGY | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
| --- | --- |
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| CS 1171 INTRODUCTORY COMPUTING IN MATLAB | 1 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-FALL | HRS |
| --- | --- |
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * or<br>CS 3511 Design and Analysis of Algorithms, Honors * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-SPRING | HRS |
| --- | --- |
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| CS 3600 INTRODUCTION TO ARTIFICIAL INTELLIGENCE * | 3 |
| EMBODIED INTELLIGENCE - PICK ONE * | 3 |
| COMPUTATIONAL COMPLEXITY - PICK ONE * | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
| --- | --- |
| CS SR PROJECT (4980 or 4911) * | 3 |
| APPROACHES TO INTELLIGENCE - PICK ONE * | 3 |
| MATHEMATICS RELATED TO COMPUTER SCIENCE - PICK ONE * | 3 |

| | |
|---|---|
| FREE ELECTIVE | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| APPROACHES TO INTELLIGENCE - PICK ONE * | 3 |
| THREAD ELECTIVE (From List) * | 3 |
| FREE ELECTIVE | 3 |
| FREE ELECTIVE | 2 |
| **TOTAL SEMESTER HOURS =** | **14** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

**THREAD PICKS AND ELECTIVE COURSES**
(Intelligence and Theory)

### Computational Complexity *
_____ CS3240 Languages and Computation
_____ CS4510 Automata and Complexity Theory

### Embodied Intelligence *
_____ CS3630 Robotics and Perception
_____ CS3790 Introduction to Cognitive Science
_____ PSY3040 Sensation and Perception

### Approaches to Intelligence *
_____ CS4635 Knowledge-based AI
_____ CS4641 Machine Learning
_____ CS4495 Computer Vision

### Knowledge-Based Intelligence
_____ CS3790 Introduction to Cognitive Science
_____ CS4615 Knowledge-based Modeling & Design
_____ CS4635 Knowledge-based AI
_____ CS4650 Natural Language Understanding

### Data-Driven Intelligence
_____ CS4641 Machine Learning
_____ CS4616 Pattern Recognition
_____ MATH 4280 Introduction to Information Theory

### Intelligent Systems
_____ CS4495 Computer Vision
_____ CS4632 Advanced Intelligent Robotics
_____ CS3651 The Art of Building Intelligent Appliances
_____ CS4625 Intelligent and Interactive Systems
_____ CS4731 Game AI

### Philosophical Issues in Intelligence
_____ CS4793 Perspectives in Cognitive Science
_____ CS4752 Philosophical Issues in Computation

### Mathematics Related to Computer Science *
_____ MATH2406 Abstract Vector Spaces
_____ MATH4032 Combinatorial Analysis

### CS Appl Involving Algorithms & Complexity
_____ CS3251 Computer Networking I
_____ CS4400 Introduction to Database Systems
_____ CS4235 Introduction to Information Security
_____ CS3210 Design of Operating Systems
_____ CS3451 Computer Graphics
_____ CS4496 Computer Animation
_____ CS4641 Machine Learning
_____ CS4140 Computational Modeling Algorithms
_____ CS4335 Computer Simulation

### Advanced Algorithms and Complexity
_____ CS3240 Languages and Computation
_____ CS4510 Automata and Complexity Theory
_____ CS4540 Advanced Algorithms
_____ CS6520 Computational Complexity
_____ CS4520 Approximation Algorithms
_____ CS4530 Randomized Algorithms

### Mathematics with CS Applications
_____ MATH2406 Abstract Vector Spaces
_____ MATH4150 Intro to Number Theory & Cryptography
_____ MATH4107 Abstract Algebra I
_____ MATH4255 Monte Carlo Methods
_____ MATH4280 Introduction to Information Theory
_____ MATH4305 Topics in Linear Algebra
_____ MATH4580 Linear Programming
_____ MATH4640 Numerical Analysis I
_____ MATH4782 Quantum Info & Quantum Computation
_____ MATH3770 Statistics and Applications
_____ MATH4012 Algebraic Structures for Coding Theory

### Computational Methods in the Sciences
_____ BIOL2400 Mathematical Models in Biology
_____ BIOL4755 Mathematical Biology
_____ PHYS3151 Mathematical Physics
_____ PHYS3266 Computational Physics
_____ ISYE3133 Optimization
_____ MGT3076 Investments
_____ MGT3078 Finance and Investments
_____ MGT3084 Derivative Securities
_____ ECON3110 Advanced Microeconomic Analysis
_____ ECON3120 Advanced Macroeconomic Analysis

* Required Thread Pick

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE
## THREAD: DEVICES & MEDIA
## 2008 - 2009 DEGREE REQUIREMENTS
## COLLEGE OF COMPUTING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * or CS 1315 INTRODUCTION TO MEDIA COMPUTATION * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| SOCIAL SCIENCE ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| ECE 2031 DIGITAL DESIGN LAB * | 2 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| CS 3451 COMPUTER GRAPHICS * | 3 |
| BUILDING DEVICES - PICK ONE * | 4 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| CS 3251 COMPUTER NETWORKING I * | 3 |
| DEVICES IN THE REAL WORLD - PICK ONE * | 3 |
| MEDIA TECHNOLOGIES - PICK ONE * | 3 |

| | |
|---|---|
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| ALGORITHM FUNDIMENTALS - PICK ONE * | 3 |
| MEDIA TECHNOLOGIES - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| FREE ELECTIVE | 2 |
| **TOTAL SEMESTER HOURS =** | **14** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

**THREAD PICKS AND ELECTIVE COURSES**
(Devices and Media)

### Building Devices *
_____ CS3651 The Art of Building Intelligent Appliances
_____ ECE4175 Embedded Micro-controller Design

### Devices in the Real World *
_____ CS3630 Robotics and Perception
_____ CS4605 Mobile and Ubiquitous Computing
_____ CS4261 Mobile Appl & Services for Converged Netwks

### Algorithm Fundamentals *
_____ CS3510 Design and Analysis of Algorithms
_____ CS3240 Languages and Computation

### Device Platforms
_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS4210 Advanced Operating Systems
_____ CS4220 Programming Embedded Systems
_____ CS4261 Mobile Appl & Services for Converged Netwks

### Intelligent Systems
_____ CS3600 Introduction to Artificial Intelligence
_____ CS3630 Robotics and Perception
_____ CS4495 Computer Vision
_____ CS4616 Pattern Recognition
_____ CS4632 Advanced Intelligent Robotics
_____ CS4641 Machine Learning

### Devices for People
_____ CS4685 Pervasive Systems and Networking
_____ CS4470 Introduction to User Interface Software
_____ CS4605 Mobile and Ubiquitous Computing

### Media Technologies *
_____ CS4455 Video Game Design and Programming
_____ CS4480 Digital Video Special Effects
_____ CS4496 Computer Animation
_____ CS4590 Computer Audio

### Computing Fundamentals
_____ CS1316 Rep Struct & Behavior (Must take before 1331)
_____ CS3240 Languages and Computation
_____ CS3510 Design and Analysis of Algorithms

### Multimedia Applications and Design
_____ CS4475 Computational Photography
_____ CS4803 Computational Journalism
_____ CS4770 Mixed Reality Experience Design

### Multimedia Connections
_____ CS4230 Distributed Simulation Systems
_____ CS4460 Information Visualization
_____ CS4470 Introduction to User Interface Software
_____ CS4550 Scientific Data Processing and Visualization

* Required Thread Pick

## BACHELOR OF SCIENCE IN COMPUTER SCIENCE
### THREAD: INFORMATION INTERNETWORKS & MEDIA
### 2008 - 2009 DEGREE REQUIREMENTS
### COLLEGE OF COMPUTING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * or CS 1315 INTRODUCTION TO MEDIA COMPUTATION * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| SOCIAL SCIENCE ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| CS 3451 COMPUTER GRAPHICS * | 3 |
| MEDIA TECHNOLOGIES - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| INTRODUCTION TO INFORMATION MANAGEMENT - PICK ONE * | 3 |
| ADVANCED INFORMATION MANAGEMENT - PICK ONE * | 3 |
| MEDIA TECHNOLOGIES - PICK ONE * | 3 |

| | |
|---|---|
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * | 3 |
| MEDIA TECHNOLOGIES - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| FREE ELECTIVE | 2 |
| **TOTAL SEMESTER HOURS =** | **14** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

**THREAD PICKS AND ELECTIVE COURSES**
(Information Internetworks and Media)

### Introduction to Information Management *
_____ CS4400 Introduction to Database Systems
_____ CS4365 Introduction to Enterprise Computing
_____ CS4235 Introduction to Information Security
_____ CS3251 Computer Networking I

### Advanced Information Management *
_____ (Pick 1 of) Database Systems
_____ (Pick 1 of) Enterprise Computing
_____ (Pick 1 of) Information Security
_____ (Pick 1 of) Network Systems

### Database Systems
_____ CS4420 Database System Implementation
_____ CS4440 Emerging Database Technologies & Appl
_____ CS4460 Information Visualization

### Enterprise Computing
_____ CS4560 Verification of Systems
_____ CS4342 Software Generation, Testing, & Maint
_____ MGT4056 Electronic Commerce
_____ MGT4057 Business Process Analysis and Design

### Information Security
_____ CS4237 Computer and Network Security

### Network Systems
_____ CS4251 Computer Networking II
_____ CS4261 Mobile Appl & Services for Converged Netwks
_____ CS4255 Introduction to Network Management
_____ CS4270 Data Communications Laboratory

### Media Technologies *
_____ CS4455 Video Game Design and Programming
_____ CS4480 Digital Video Special Effects
_____ CS4496 Computer Animation
_____ CS4590 Computer Audio

### Computing Fundamentals
_____ CS1316 Rep Struct & Behavior (Must take before 1331)
_____ CS3240 Languages and Computation

### Multimedia Applications and Design
_____ CS4475 Computational Photography
_____ CS4803 Computational Journalism
_____ CS4770 Mixed Reality Experience Design

### Multimedia Connections
_____ CS4230 Distributed Simulation Systems
_____ CS4460 Information Visualization
_____ CS4470 Introduction to User Interface Software
_____ CS4550 Scientific Data Processing and Visualization

* Required Thread Pick

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE
## THREAD: INTELLIGENCE & MEDIA
## 2008 - 2009 DEGREE REQUIREMENTS
## COLLEGE OF COMPUTING

Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * or CS 1315 INTRODUCTION TO MEDIA COMPUTATION * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| PSYC 1101 GENERAL PSYCHOLOGY | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 * or CS 2261 * (Media Thread) | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| CS 3451 COMPUTER GRAPHICS * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * | 3 |
| CS 3600 INTRODUCTION TO ARTIFICIAL INTELLIGENCE * | 3 |
| EMBODIED INTELLIGENCE - PICK ONE * | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| APPROACHES TO INTELLIGENCE - PICK ONE * | 3 |
| MEDIA TECHNOLOGIES - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |

| | |
|---|---|
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| APPROACHES TO INTELLIGENCE - PICK ONE * | 3 |
| MEDIA TECHNOLOGIES - PICK ONE * | 3 |
| COMPUTATIONAL COMPLEXITY - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

**THREAD PICKS AND ELECTIVE COURSES**
(Intelligence and Media)

### Computational Complexity *
_____ CS3240 Languages and Computation
_____ CS4510 Automata and Complexity Theory

### Embodied Intelligence *
_____ CS3630 Robotics and Perception
_____ CS3790 Introduction to Cognitive Science
_____ PSY3040 Sensation and Perception

### Approaches to Intelligence *
_____ CS4635 Knowledge-based AI
_____ CS4641 Machine Learning
_____ CS4495 Computer Vision

### Knowledge-Based Intelligence
_____ CS3790 Introduction to Cognitive Science
_____ CS4615 Knowledge-based Modeling & Design
_____ CS4635 Knowledge-based AI
_____ CS4650 Natural Language Understanding

### Data-Driven Intelligence
_____ CS4641 Machine Learning
_____ CS4616 Pattern Recognition
_____ MATH 4280 Introduction to Information Theory

### Intelligent Systems
_____ CS4495 Computer Vision
_____ CS4632 Advanced Intelligent Robotics
_____ CS3651 The Art of Building Intelligent Appliances
_____ CS4625 Intelligent and Interactive Systems
_____ CS4731 Game AI

### Philosophical Issues in Intelligence
_____ CS4793 Perspectives in Cognitive Science
_____ CS4752 Philosophical Issues in Computation

### Media Technologies *
_____ CS4455 Video Game Design and Programming
_____ CS4480 Digital Video Special Effects
_____ CS4496 Computer Animation
_____ CS4590 Computer Audio

### Computing Fundamentals
_____ CS1316 Rep Struct & Behavior (Must take before 1331)
_____ CS3240 Languages and Computation

### Multimedia Applications and Design
_____ CS4475 Computational Photography
_____ CS4803 Computational Journalism
_____ CS4770 Mixed Reality Experience Design

### Multimedia Connections
_____ CS4230 Distributed Simulation Systems
_____ CS4460 Information Visualization
_____ CS4470 Introduction to User Interface Software
_____ CS4550 Scientific Data Processing and Visualization

* Required Thread Pick

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE
## THREAD: MEDIA & PEOPLE
## 2008 - 2009 DEGREE REQUIREMENTS
## COLLEGE OF COMPUTING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * or CS 1315 INTRODUCTION TO MEDIA COMPUTATION * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| PSYC 1101 GENERAL PSYCHOLOGY | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2261 (Media Thread) | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| CS 3451 COMPUTER GRAPHICS * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| HUMAN CENTERED TECHNOLOGY - PICK ONE * | 3 |
| SOCIAL/BEHAVIORAL SCIENCE FOR COMPUTING - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| PSYC 2015 RESEARCH METHODS * | 4 |
| HUMAN CENTERED TECHNOLOGY - PICK ONE * | 3 |
| MEDIA TECHNOLOGIES - PICK ONE * | 3 |

| | |
|---|---|
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| MEDIA TECHNOLOGIES - PICK ONE * | 3 |
| THREAD ELECTIVE (From List) * | 3 |
| FREE ELECTIVE | 3 |
| FREE ELECTIVE | 2 |
| **TOTAL SEMESTER HOURS =** | **14** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

## THREAD PICKS AND ELECTIVE COURSES
(Media and People)

### Media Technologies *
_____ CS4455 Video Game Design and Programming
_____ CS4480 Digital Video Special Effects
_____ CS4496 Computer Animation
_____ CS4590 Computer Audio

### Computing Fundamentals
_____ CS1316 Rep Struct & Behavior (Must take before 1331)
_____ CS3240 Languages and Computation
_____ CS3510 Design and Analysis of Algorithms

### Multimedia Applications and Design
_____ CS4475 Computational Photography
_____ CS4803 Computational Journalism
_____ CS4770 Mixed Reality Experience Design

### Multimedia Connections
_____ CS4230 Distributed Simulation Systems
_____ CS4460 Information Visualization
_____ CS4470 Introduction to User Interface Software
_____ CS4550 Scientific Data Processing and Visualization

### Social/Behavioral Science for Computing *
_____ PSYC2210 Social Psychology
_____ PSYC2760 Psychology of Human Language
_____ PSYC3040 Sensation and Perception

### Human-Centered Technology *
_____ CS3790 Introduction to Cognitive Science
_____ CS3750 Human-Computer Interface Design and Eval
_____ CS4660 Introduction to Educational Technology

### User Support Technology
_____ CS4460 Information Visualization
_____ CS4470 Introduction to User Interface Software
_____ CS4605 Mobile and Ubiquitous Computing
_____ CS4625 Intelligent and Interactive Systems

### Educational Technology
_____ CS4660 Introduction to Educational Technology
_____ CS4665 Educational Technology: Design & Evaluation
_____ CS4670 Computer-Supported Collaborative Learning

### Design and Evaluation
_____ CS4690 Empirical Methods in HCI
_____ CS3750 Human-Computer Interface Design and Eval
_____ PSYC2020 Psychological Statistics
_____ CS4770 Mixed Reality Experience Design

### Human Cognition and Interaction
_____ CS3790 Introduction to Cognitive Science
_____ CS4793 Perspectives Cognitive Science
_____ PSYC2210 Social Psychology
_____ PSYC2760 Psychology of Human Language
_____ PSYC3011 Cognitive Psychology
_____ PSYC3040 Sensation and Perception
_____ PSYC4090 Cognitive Neuropsychology
_____ PSYC4260 Aging

* Required Thread Pick

**BACHELOR OF SCIENCE IN COMPUTER SCIENCE**
**THREAD: MEDIA & PLATFORMS**
**2008 - 2009 DEGREE REQUIREMENTS**
**COLLEGE OF COMPUTING**
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * or CS 1315 INTRODUCTION TO MEDIA COMPUTATION * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| SOCIAL SCIENCE ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| CS 3210 DESIGN OF OPERATING SYSTEMS * | 3 |
| CS 3451 COMPUTER GRAPHICS * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| MEDIA TECHNOLOGIES - PICK ONE * | 3 |
| COMPUTER ARCHITECTURES - PICK ONE * | 3 |
| PLATFORM INTERFACES - PICK ONE * | 3 |

| | |
|---|---|
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| CS 3240 LANGUAGES & COMPUTATION * | 3 |
| MEDIA TECHNOLOGIES - PICK ONE * | 3 |
| THREAD ELECTIVE | 3 |
| THREAD ELECTIVE | 2 |
| **TOTAL SEMESTER HOURS =** | **14** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

**THREAD PICKS AND ELECTIVE COURSES**
(Media and Platforms)

### Media Technologies *
_____ CS4455 Video Game Design and Programming
_____ CS4480 Digital Video Special Effects
_____ CS4496 Computer Animation
_____ CS4590 Computer Audio

### Computing Fundamentals
_____ CS1316 Rep Struct & Behavior (Must take before 1331)
_____ CS3240 Languages and Computation

### Multimedia Applications and Design
_____ CS4475 Computational Photography
_____ CS4803 Computational Journalism
_____ CS4770 Mixed Reality Experience Design

### Multimedia Connections
_____ CS4230 Distributed Simulation Systems
_____ CS4460 Information Visualization
_____ CS4470 Introduction to User Interface Software
_____ CS4550 Scientific Data Processing and Visualization

### Computer Architectures *
_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS4290 Advanced Computer Organization

### Platform Interfaces *
_____ CS3251 Computer Networking I
_____ CS3300 Introduction to Software Engineering

### Parallel Platforms
_____ CS4210 Advanced Operating Systems
_____ CS4290 Advanced Computer Organization
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4233 Parallel Computer Architecture
_____ CS4803 Design of Gaming Consoles

### Distributed Platforms
_____ CS4210 Advanced Operating Systems
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4675 Internet Computing Systems
_____ CS4685 Pervasive Systems and Networking

### Embedded and Ubiquitous Platforms
_____ CS4220 Programming Embedded Systems
_____ CS4685 Pervasive Systems and Networking
_____ CS4803 Design of Gaming Consoles

### Domain Specific Platforms
_____ CS4803 Design of Gaming Consoles
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4220 Programming Embedded Systems

### Platform Technologies
_____ CS4235 Introduction to Information Security
_____ CS4237 Computer and Network Security
_____ CS4560 Verification of Systems
_____ CS4220 Programming Embedded Systems
_____ CS4210 Advanced Operating Systems

### Software Interfaces, Tools & Technologies
_____ CS4220 Programming Embedded Systems
_____ CS4392 Programming Language Design
_____ CS4240 Compilers, Interpreters, & Program Analyzers
_____ CS6246 Object-oriented Systems and Languages
_____ CS6241 Design and Implementation of Compilers

* Required Thread Pick

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE
## THREAD: MODELING & SIMULATION & MEDIA
## 2008 - 2009 DEGREE REQUIREMENTS
## COLLEGE OF COMPUTING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * or CS 1315 INTRODUCTION TO MEDIA COMPUTATION * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| SOCIAL SCIENCE ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| CS 1171 INTRODUCTORY COMPUTING IN MATLAB | 1 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| MATH 2403 DIFFERENTIAL EQUATIONS * | 4 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| MATH/CE/ISYE 3770 STATISTICS AND APPLICATIONS or MATH 3215 PROBABILITY & STATISTICS | 3 |
| FREE ELECTIVE | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| CS 3451 COMPUTER GRAPHICS * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| COMPUTATIONAL SCIENCE & ENGINEERING - PICK ONE * | 3 |
| MEDIA TECHNOLOGIES - PICK ONE * | 3 |

| | |
|---|---|
| FREE ELECTIVES | 6 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * | 3 |
| COMPUTATIONAL SCIENCE & ENGINEERING - PICK ONE * | 3 |
| MEDIA TECHNOLOGIES - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

*Must earn a *C* or better in each of these courses.

**THREAD PICKS AND ELECTIVE COURSES**
(Media and Modeling-Simulation)

### Media Technologies *

_____ CS4455 Video Game Design and Programming
_____ CS4480 Digital Video Special Effects
_____ CS4496 Computer Animation
_____ CS4590 Computer Audio

### Computing Fundamentals

_____ CS1316 Rep Struct & Behavior (Must take before 1331)
_____ CS3240 Languages and Computation

### Multimedia Applications and Design

_____ CS4475 Computational Photography
_____ CS4803 Computational Journalism
_____ CS4770 Mixed Reality Experience Design

### Multimedia Connections

_____ CS4230 Distributed Simulation Systems
_____ CS4460 Information Visualization
_____ CS4470 Introduction to User Interface Software
_____ CS4550 Scientific Data Processing and Visualization

### Aerospace Engineering

_____ AE1350 Introduction to Aerospace Engineering
_____ AE4375 Fundamentals of Computer-Aided Eng & Design
_____ PHYS3266 Computational Physics

### Digital Signal Processing

_____ ECE4271 Applications of Digital Signal Processing
_____ ECE4270 Fundamentals of Digital Signal Processing
_____ ECE3075 Random Signals
_____ ECE3025 Electromagnetics

### Computational Science and Engineering *

_____ CS4140 Computational Modeling Algorithms
_____ CS4225 Introduction to High Performance Computing
_____ CS4245 Introduction to Data Mining and Analysis
_____ CS4335 Computer Simulation
_____ MATH4640/CS 4642 Numerical Analysis I

### Advanced Computational Methods & Software

_____ MATH4641/CS 4643 Numerical Analysis II
_____ CS4230 Distributed Simulation
_____ CS4343 Simulation and Military Gaming
_____ MATH4255 Monte Carlo Methods
_____ CS2335 Software Practicuum
_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS3451 Computer Graphics
_____ CS3600 Introduction to Artificial Intelligence
_____ CS4210 Advanced Operating Systems
_____ CS4230 Distributed Simulation Systems
_____ CS4495 Computer Vision
_____ CS4496 Computer Animation
_____ CS4550 Scientific Data Processing and Visualization
_____ CS4641 Machine Learning
_____ CS4777 Vector and Parallel Scientific Computing
_____ ISYE4331 Honors Optimization
_____ ISYE2028 Basic Statistics Methods
_____ ME2016 Computing Techniques
_____ CHBE2120 Numerical Methods

### Modeling & Simulation in Industrial Engineering

_____ ISYE2030 Modeling in Industrial Engineering
_____ ISYE3133 Engineering Optimization
_____ ISYE3044 Simulation Analysis and Design
_____ ISYE3232 Stochastic Manufacturing & Service Systems

### Biology/Chemistry

_____ BIOL2400 Mathematical Models in Biology
_____ BIOL4401 Exp Design & Statistical Methods in Biology
_____ CHBE2100 Chemical Process Principles

### Geoscience

_____ EAS4610 Earth System Modeling
_____ EAS3620 Geochemistry
_____ EAS4630 Physics of the Earth
_____ EAS4655 Atmospheric Dynamics
_____ EAS4602 Biochemical Cycles
_____ EAS4803 Water Chemistry Modeling
_____ PHYS3266 Computational Physics

* Required Thread Pick

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE
## THREAD: THEORY & MEDIA
## 2008 - 2009 DEGREE REQUIREMENTS
## COLLEGE OF COMPUTING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * or CS 1315 INTRODUCTION TO MEDIA COMPUTATION * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| SOCIAL SCIENCE ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 * or CS 2261 * | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| CS 1171 INTRODUCTORY COMPUTING IN MATLAB | 1 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * or CS 3511 Design and Analysis of Algorithms, Honors | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| CS 3451 COMPUTER GRAPHICS * | 3 |
| COMPUTATIONAL COMPLEXITY - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| MEDIA TECHNOLOGIES - PICK ONE * | 3 |

| | |
|---|---|
| THREAD ELECTIVE (From List) * | 3 |
| FREE ELECTIVE | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| MEDIA TECHNOLOGIES - PICK ONE * | 3 |
| MATHEMATICS RELATED TO COMPUTER SCIENCE - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| FREE ELECTIVE | 2 |
| **TOTAL SEMESTER HOURS =** | **14** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

**THREAD PICKS AND ELECTIVE COURSES**
(Media and Theory)

### Media Technologies *
_____ CS4455 Video Game Design and Programming
_____ CS4480 Digital Video Special Effects
_____ CS4496 Computer Animation
_____ CS4590 Computer Audio

### Computing Fundamentals
_____ CS1316 Rep Struct & Behavior (Must take before 1331)
_____ CS3240 Languages and Computation

### Multimedia Applications and Design
_____ CS4475 Computational Photography
_____ CS4803 Computational Journalism
_____ CS4770 Mixed Reality Experience Design

### Multimedia Connections
_____ CS4230 Distributed Simulation Systems
_____ CS4460 Information Visualization
_____ CS4470 Introduction to User Interface Software
_____ CS4550 Scientific Data Processing and Visualization

### Computational Complexity *
_____ CS3240 Languages and Computation
_____ CS4510 Automata and Complexity Theory

### Mathematics Related to Computer Science *
_____ MATH2406 Abstract Vector Spaces
_____ MATH4032 Combinatorial Analysis

### CS Appl Involving Algorithms & Complexity
_____ CS4400 Introduction to Database Systems
_____ CS4235 Introduction to Information Security
_____ CS3210 Design of Operating Systems
_____ CS4496 Computer Animation
_____ CS3600 Introduction to Artificial Intelligence
_____ CS4641 Machine Learning
_____ CS4140 Computational Modeling Algorithms
_____ CS4335 Computer Simulation

### Advanced Algorithms and Complexity
_____ CS3240 Languages and Computation
_____ CS4510 Automata and Complexity Theory
_____ CS4540 Advanced Algorithms
_____ CS6520 Computational Complexity
_____ CS4520 Approximation Algorithms
_____ CS4530 Randomized Algorithms

### Mathematics with CS Applications
_____ MATH2406 Abstract Vector Spaces
_____ MATH4150 Intro to Number Theory & Cryptography
_____ MATH4107 Abstract Algebra I
_____ MATH4255 Monte Carlo Methods
_____ MATH4280 Introduction to Information Theory
_____ MATH4305 Topics in Linear Algebra
_____ MATH4580 Linear Programming
_____ MATH4640 Numerical Analysis I
_____ MATH4782 Quantum Info & Quantum Computation
_____ MATH3770 Statistics and Applications
_____ MATH4012 Algebraic Structures for Coding Theory

### Computational Methods in the Sciences
_____ BIOL2400 Mathematical Models in Biology
_____ BIOL4755 Mathematical Biology
_____ PHYS3151 Mathematical Physics
_____ PHYS3266 Computational Physics
_____ ISYE3133 Optimization
_____ MGT3076 Investments
_____ MGT3078 Finance and Investments
_____ MGT3084 Derivative Securities
_____ ECON3110 Advanced Microeconomic Analysis
_____ ECON3120 Advanced Macroeconomic Analysis

* Required Thread Pick

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE
## THREAD: MODELING & SIMULATION & DEVICES
## 2008 - 2009 DEGREE REQUIREMENTS
## COLLEGE OF COMPUTING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING* | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| HPS 1040 WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| SOCIAL SCIENCE ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1171 INTRODUCTORY COMPUTING IN MATLAB | 1 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| ECE 2031 DIGITAL DESIGN LAB* | 2 |
| **TOTAL SEMESTER HOURS =** | **14** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| MATH/CE/ISYE 3770 STATISTICS AND APPLICATIONS or<br>MATH 3215 PROBABILITY & STATISTICS | 3 |
| FREE ELECTIVE | 3 |
| MATH 2403 DIFFERENTIAL EQUATIONS * | 4 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| BUILDING DEVICES - PICK ONE * | 4 |
| **TOTAL SEMESTER HOURS =** | **17** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * | 3 |
| DEVICES IN THE REAL WORLD - PICK ONE * | 3 |
| COMPUTATIONAL SCIENCE & ENGINEERING - PICK ONE * | 3 |

| | |
|---|---|
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| CS 3251 COMPUTER NETWORKING I * | 3 |
| COMPUTATIONAL SCIENCE & ENGINEERING - PICK ONE * | 3 |
| FREE ELECTIVE | 6 |
| **TOTAL SEMESTER HOURS =** | **15** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

*Must earn a *C* or better in each of these courses.

**THREAD PICKS AND ELECTIVE COURSES**
(Devices and Modeling-Simulation)

### Building Devices *
_____ CS3651 The Art of Building Intelligent Appliances
_____ ECE4175 Embedded Micro-controller Design

### Devices in the Real World *
_____ CS3630 Robotics and Perception
_____ CS4605 Mobile and Ubiquitous Computing
_____ CS4261 Mobile Appl & Services for Converged Netwks

### Algorithm Fundamentals
_____ CS3240 Languages and Computation

### Device Platforms
_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS4210 Advanced Operating Systems
_____ CS4220 Programming Embedded Systems
_____ CS4261 Mobile Appl & Services for Converged Netwks

### Intelligent Systems
_____ CS3600 Introduction to Artificial Intelligence
_____ CS3630 Robotics and Perception
_____ CS4495 Computer Vision
_____ CS4616 Pattern Recognition
_____ CS4632 Advanced Intelligent Robotics
_____ CS4641 Machine Learning

### Devices for People
_____ CS4685 Pervasive Systems and Networking
_____ CS4470 Introduction to User Interface Software
_____ CS4605 Mobile and Ubiquitous Computing

### Aerospace Engineering
_____ AE1350 Introduction to Aerospace Engineering
_____ AE4375 Fundamentals of Computer-Aided Eng & Design
_____ PHYS3266 Computational Physics

### Digital Signal Processing
_____ ECE4271 Applications of Digital Signal Processing
_____ ECE4270 Fundamentals of Digital Signal Processing
_____ ECE3075 Random Signals
_____ ECE3025 Electromagnetics

### Computational Science and Engineering *
_____ CS4140 Computational Modeling Algorithms
_____ CS4225 Introduction to High Performance Computing
_____ CS4245 Introduction to Data Mining and Analysis
_____ CS4335 Computer Simulation
_____ MATH4640/CS 4642 Numerical Analysis I

### Advanced Computational Methods & Software
_____ MATH4641/CS 4643 Numerical Analysis II
_____ CS4230 Distributed Simulation
_____ CS4343 Simulation and Military Gaming
_____ MATH4255 Monte Carlo Methods
_____ CS2335 Software Practicuum
_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS3451 Computer Graphics
_____ CS3600 Introduction to Artificial Intelligence
_____ CS4210 Advanced Operating Systems
_____ CS4230 Distributed Simulation Systems
_____ CS4495 Computer Vision
_____ CS4496 Computer Animation
_____ CS4550 Scientific Data Processing and Visualization
_____ CS4641 Machine Learning
_____ CS4777 Vector and Parallel Scientific Computing
_____ ISYE4331 Honors Optimization
_____ ISYE2028 Basic Statistics Methods
_____ ME2016 Computing Techniques
_____ CHBE2120 Numerical Methods

### Modeling & Simulation in Industrial Engineering
_____ ISYE2030 Modeling in Industrial Engineering
_____ ISYE3133 Engineering Optimization
_____ ISYE3044 Simulation Analysis and Design
_____ ISYE3232 Stochastic Manufacturing & Service Systems

### Biology/Chemistry
_____ BIOL2400 Mathematical Models in Biology
_____ BIOL4401 Exp Design & Statistical Methods in Biology
_____ CHBE2100 Chemical Process Principles

### Geoscience
_____ EAS4610 Earth System Modeling
_____ EAS3620 Geochemistry
_____ EAS4630 Physics of the Earth
_____ EAS4655 Atmospheric Dynamics
_____ EAS4602 Biochemical Cycles
_____ EAS4803 Water Chemistry Modeling
_____ PHYS3266 Computational Physics

* Required Thread Pick

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE
## THREAD: MODELING & SIMULATION & INFORMATION INTERNETWORKS
## 2008 - 2009 DEGREE REQUIREMENTS
## COLLEGE OF COMPUTING

Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING* | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| SOCIAL SCIENCE ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| CS 1171 INTRODUCTORY COMPUTING IN MATLAB | 1 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| INTRODUCTION TO INFORMATION MANAGEMENT - PICK ONE * | 3 |
| **TOTAL SEMESTER HOURS =** | **14** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| MATH/CE/ISYE 3770 STATISTICS AND APPLICATIONS or<br>MATH 3215 PROBABILITY & STATISTICS | 3 |
| MATH 2403 DIFFERENTIAL EQUATIONS * | 4 |
| FREE ELECTIVE | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| INTRODUCTION TO INFORMATION MANAGEMENT- PICK ONE * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| COMPUTATIONAL SCIENCE & ENGINEERING - PICK ONE * | 3 |
| ADVANCED INFORMATION MANAGEMENT - PICK ONE * | 3 |
| FREE ELECTIVE | 6 |

| | |
|---|---|
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * | 3 |
| COMPUTATIONAL SCIENCE & ENGINEERING - PICK ONE * | 3 |
| FREE ELECTIVE | 6 |
| **TOTAL SEMESTER HOURS =** | **15** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

*Must earn a *C* or better in each of these courses.

**THREAD PICKS AND ELECTIVE COURSES**
(Information Internetworks and Modeling-Simulation)

### Introduction to Information Management *
_____ CS4400 Introduction to Database Systems
_____ CS4365 Introduction to Enterprise Computing
_____ CS4235 Introduction to Information Security
_____ CS3251 Computer Networking I

### Advanced Information Management *
_____ (Pick 1 of) Database Systems
_____ (Pick 1 of) Enterprise Computing
_____ (Pick 1 of) Information Security
_____ (Pick 1 of) Network Systems

### Database Systems
_____ CS4420 Database System Implementation
_____ CS4440 Emerging Database Technologies & Appl
_____ CS4460 Information Visualization

### Enterprise Computing
_____ CS4560 Verification of Systems
_____ CS4342 Software Generation, Testing, & Maint
_____ MGT4056 Electronic Commerce
_____ MGT4057 Business Process Analysis and Design

### Information Security
_____ CS4237 Computer and Network Security

### Network Systems
_____ CS4251 Computer Networking II
_____ CS4261 Mobile Appl & Services for Converged Netwks
_____ CS4255 Introduction to Network Management
_____ CS4270 Data Communications Laboratory

### Aerospace Engineering
_____ AE1350 Introduction to Aerospace Engineering
_____ AE4375 Fundamentals of Computer-Aided Eng & Design
_____ PHYS3266 Computational Physics

### Digital Signal Processing
_____ ECE4271 Applications of Digital Signal Processing
_____ ECE4270 Fundamentals of Digital Signal Processing
_____ ECE3075 Random Signals
_____ ECE3025 Electromagnetics

### Computational Science and Engineering *
_____ CS4140 Computational Modeling Algorithms
_____ CS4225 Introduction to High Performance Computing
_____ CS4245 Introduction to Data Mining and Analysis
_____ CS4335 Computer Simulation
_____ MATH4640/CS 4642 Numerical Analysis I

### Advanced Computational Methods & Software
_____ MATH4641/CS 4643 Numerical Analysis II
_____ CS4230 Distributed Simulation
_____ CS4343 Simulation and Military Gaming
_____ MATH4255 Monte Carlo Methods
_____ CS2335 Software Practicuum
_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS3451 Computer Graphics
_____ CS3600 Introduction to Artificial Intelligence
_____ CS4210 Advanced Operating Systems
_____ CS4230 Distributed Simulation Systems
_____ CS4495 Computer Vision
_____ CS4496 Computer Animation
_____ CS4550 Scientific Data Processing and Visualization
_____ CS4641 Machine Learning
_____ CS4777 Vector and Parallel Scientific Computing
_____ ISYE4331 Honors Optimization
_____ ISYE2028 Basic Statistics Methods
_____ ME2016 Computing Techniques
_____ CHBE2120 Numerical Methods

### Modeling & Simulation in Industrial Engineering
_____ ISYE2030 Modeling in Industrial Engineering
_____ ISYE3133 Engineering Optimization
_____ ISYE3044 Simulation Analysis and Design
_____ ISYE3232 Stochastic Manufacturing & Service Systems

### Biology/Chemistry
_____ BIOL2400 Mathematical Models in Biology
_____ BIOL4401 Exp Design & Statistical Methods in Biology
_____ CHBE2100 Chemical Process Principles

### Geoscience
_____ EAS4610 Earth System Modeling
_____ EAS3620 Geochemistry
_____ EAS4630 Physics of the Earth
_____ EAS4655 Atmospheric Dynamics
_____ EAS4602 Biochemical Cycles
_____ EAS4803 Water Chemistry Modeling
_____ PHYS3266 Computational Physics

* Required Thread Pick

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE
## THREAD: MODELING & SIMULATION & INTELLIGENCE
## 2008 - 2009 DEGREE REQUIREMENTS
## COLLEGE OF COMPUTING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING* | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| PSYC 1101 GENERAL PSYCHOLOGY | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| CS 1171 INTRODUCTORY COMPUTING IN MATLAB | 1 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| MATH 2403 DIFFERENTIAL EQUATIONS * | 4 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| MATH/CE/ISYE 3770 STATISTICS AND APPLICATIONS or<br>MATH 3215 PROBABILITY & STATISTICS | 3 |
| FREE ELECTIVE | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| CS 3600 INTRODUCTION TO ARTIFICIAL INTELLIGENCE * | 3 |
| EMBODIED INTELLIGENCE - PICK ONE * | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * | 3 |
| COMPUTATIONAL SCIENCE & ENGINEERING - PICK ONE * | 3 |
| APPROACHES TO INTELLIGENCE - PICK ONE * | 3 |

| | |
|---|---|
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| COMPUTATIONAL COMPLEXITY - PICK ONE * | 3 |
| COMPUTATIONAL SCIENCE & ENGINEERING - PICK ONE * | 3 |
| APPROACHES TO INTELLIGENCE - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

*Must earn a *C* or better in each of these courses.

**THREAD PICKS AND ELECTIVE COURSES**
(Intelligence and Modeling-Simulation)

### Computational Complexity *
_____ CS3240 Languages and Computation
_____ CS4510 Automata and Complexity Theory

### Embodied Intelligence *
_____ CS3630 Robotics and Perception
_____ CS3790 Introduction to Cognitive Science
_____ PSY3040 Sensation and Perception

### Approaches to Intelligence *
_____ CS4635 Knowledge-based AI
_____ CS4641 Machine Learning
_____ CS4495 Computer Vision

### Knowledge-Based Intelligence
_____ CS3790 Introduction to Cognitive Science
_____ CS4615 Knowledge-based Modeling & Design
_____ CS4635 Knowledge-based AI
_____ CS4650 Natural Language Understanding

### Data-Driven Intelligence
_____ CS4641 Machine Learning
_____ CS4616 Pattern Recognition
_____ MATH 4280 Introduction to Information Theory

### Intelligent Systems
_____ CS4495 Computer Vision
_____ CS4632 Advanced Intelligent Robotics
_____ CS3651 The Art of Building Intelligent Appliances
_____ CS4625 Intelligent and Interactive Systems
_____ CS4731 Game AI

### Philosophical Issues in Intelligence
_____ CS4793 Perspectives in Cognitive Science
_____ CS4752 Philosophical Issues in Computation

### Aerospace Engineering
_____ AE1350 Introduction to Aerospace Engineering
_____ AE4375 Fundamentals of Computer-Aided Eng & Design
_____ PHYS3266 Computational Physics

### Digital Signal Processing
_____ ECE4271 Applications of Digital Signal Processing
_____ ECE4270 Fundamentals of Digital Signal Processing
_____ ECE3075 Random Signals
_____ ECE3025 Electromagnetics

### Computational Science and Engineering *
_____ CS4140 Computational Modeling Algorithms
_____ CS4225 Introduction to High Performance Computing
_____ CS4245 Introduction to Data Mining and Analysis
_____ CS4335 Computer Simulation
_____ MATH4640/CS 4642 Numerical Analysis I

### Advanced Computational Methods & Software
_____ MATH4641/CS 4643 Numerical Analysis II
_____ CS4230 Distributed Simulation
_____ CS4343 Simulation and Military Gaming
_____ MATH4255 Monte Carlo Methods
_____ CS2335 Software Practicuum
_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS3451 Computer Graphics
_____ CS3600 Introduction to Artificial Intelligence
_____ CS4210 Advanced Operating Systems
_____ CS4230 Distributed Simulation Systems
_____ CS4495 Computer Vision
_____ CS4496 Computer Animation
_____ CS4550 Scientific Data Processing and Visualization
_____ CS4641 Machine Learning
_____ CS4777 Vector and Parallel Scientific Computing
_____ ISYE4331 Honors Optimization
_____ ISYE2028 Basic Statistics Methods
_____ ME2016 Computing Techniques
_____ CHBE2120 Numerical Methods

### Modeling & Simulation in Industrial Engineering
_____ ISYE2030 Modeling in Industrial Engineering
_____ ISYE3133 Engineering Optimization
_____ ISYE3044 Simulation Analysis and Design
_____ ISYE3232 Stochastic Manufacturing & Service Systems

### Biology/Chemistry
_____ BIOL2400 Mathematical Models in Biology
_____ BIOL4401 Exp Design & Statistical Methods in Biology
_____ CHBE2100 Chemical Process Principles

### Geoscience
_____ EAS4610 Earth System Modeling
_____ EAS3620 Geochemistry
_____ EAS4630 Physics of the Earth
_____ EAS4655 Atmospheric Dynamics
_____ EAS4602 Biochemical Cycles
_____ EAS4803 Water Chemistry Modeling
_____ PHYS3266 Computational Physics

* Required Thread Pick

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE
## THREAD: MODELING & SIMULATION & MEDIA
## 2008 - 2009 DEGREE REQUIREMENTS
## COLLEGE OF COMPUTING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * or CS 1315 INTRODUCTION TO MEDIA COMPUTATION * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| SOCIAL SCIENCE ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| CS 1171 INTRODUCTORY COMPUTING IN MATLAB | 1 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| MATH 2403 DIFFERENTIAL EQUATIONS * | 4 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| MATH/CE/ISYE 3770 STATISTICS AND APPLICATIONS or MATH 3215 PROBABILITY & STATISTICS | 3 |
| FREE ELECTIVE | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| CS 3451 COMPUTER GRAPHICS * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| COMPUTATIONAL SCIENCE & ENGINEERING - PICK ONE * | 3 |
| MEDIA TECHNOLOGIES - PICK ONE * | 3 |

| | |
|---|---|
| FREE ELECTIVES | 6 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * | 3 |
| COMPUTATIONAL SCIENCE & ENGINEERING - PICK ONE * | 3 |
| MEDIA TECHNOLOGIES - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

*Must earn a *C* or better in each of these courses.

**THREAD PICKS AND ELECTIVE COURSES**
(Media and Modeling-Simulation)

### Media Technologies *
_____ CS4455 Video Game Design and Programming
_____ CS4480 Digital Video Special Effects
_____ CS4496 Computer Animation
_____ CS4590 Computer Audio

### Computing Fundamentals
_____ CS1316 Rep Struct & Behavior (Must take before 1331)
_____ CS3240 Languages and Computation

### Multimedia Applications and Design
_____ CS4475 Computational Photography
_____ CS4803 Computational Journalism
_____ CS4770 Mixed Reality Experience Design

### Multimedia Connections
_____ CS4230 Distributed Simulation Systems
_____ CS4460 Information Visualization
_____ CS4470 Introduction to User Interface Software
_____ CS4550 Scientific Data Processing and Visualization

### Aerospace Engineering
_____ AE1350 Introduction to Aerospace Engineering
_____ AE4375 Fundamentals of Computer-Aided Eng & Design
_____ PHYS3266 Computational Physics

### Digital Signal Processing
_____ ECE4271 Applications of Digital Signal Processing
_____ ECE4270 Fundamentals of Digital Signal Processing
_____ ECE3075 Random Signals
_____ ECE3025 Electromagnetics

### Computational Science and Engineering *
_____ CS4140 Computational Modeling Algorithms
_____ CS4225 Introduction to High Performance Computing
_____ CS4245 Introduction to Data Mining and Analysis
_____ CS4335 Computer Simulation
_____ MATH4640/CS 4642 Numerical Analysis I

### Advanced Computational Methods & Software
_____ MATH4641/CS 4643 Numerical Analysis II
_____ CS4230 Distributed Simulation
_____ CS4343 Simulation and Military Gaming
_____ MATH4255 Monte Carlo Methods
_____ CS2335 Software Practicuum
_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS3451 Computer Graphics
_____ CS3600 Introduction to Artificial Intelligence
_____ CS4210 Advanced Operating Systems
_____ CS4230 Distributed Simulation Systems
_____ CS4495 Computer Vision
_____ CS4496 Computer Animation
_____ CS4550 Scientific Data Processing and Visualization
_____ CS4641 Machine Learning
_____ CS4777 Vector and Parallel Scientific Computing
_____ ISYE4331 Honors Optimization
_____ ISYE2028 Basic Statistics Methods
_____ ME2016 Computing Techniques
_____ CHBE2120 Numerical Methods

### Modeling & Simulation in Industrial Engineering
_____ ISYE2030 Modeling in Industrial Engineering
_____ ISYE3133 Engineering Optimization
_____ ISYE3044 Simulation Analysis and Design
_____ ISYE3232 Stochastic Manufacturing & Service Systems

### Biology/Chemistry
_____ BIOL2400 Mathematical Models in Biology
_____ BIOL4401 Exp Design & Statistical Methods in Biology
_____ CHBE2100 Chemical Process Principles

### Geoscience
_____ EAS4610 Earth System Modeling
_____ EAS3620 Geochemistry
_____ EAS4630 Physics of the Earth
_____ EAS4655 Atmospheric Dynamics
_____ EAS4602 Biochemical Cycles
_____ EAS4803 Water Chemistry Modeling
_____ PHYS3266 Computational Physics

* Required Thread Pick

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE
## THREAD: MODELING & SIMULATION & PEOPLE
## 2008 - 2009 DEGREE REQUIREMENTS
## COLLEGE OF COMPUTING

Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| PSYC 1101 GENERAL PSYCHOLOGY | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| CS 1171 INTRODUCTORY COMPUTING IN MATLAB | 1 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| MATH 2403 DIFFERENTIAL EQUATIONS * | 4 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| MATH/CE/ISYE 3770 STATISTICS AND APPLICATIONS or<br>MATH 3215 PROBABILITY & STATISTICS | 3 |
| FREE ELECTIVE | 6 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| SOCIAL/BEHAVIORAL SCIENCE FOR COMPUTING - PICK ONE * | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| COMPUTATIONAL SCIENCE & ENGINEERING - PICK ONE * | 3 |
| HUMAN CENTERED TECHNOLOGY - PICK ONE * | 3 |
| PSYC 2015 RESEARCH METHODS * | 4 |
| FREE ELECTIVE | 3 |

| TOTAL SEMESTER HOURS = | 16 |
|---|---|

| FOURTH YEAR-SPRING | HRS |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * | 3 |
| COMPUTATIONAL SCIENCE & ENGINEERING - PICK ONE * | 3 |
| HUMAN CENTERED TECHNOLOGY - PICK ONE * | 3 |
| FREE ELECTIVE | 2 |
| **TOTAL SEMESTER HOURS =** | **14** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

*Must earn a *C* or better in each of these courses.

**THREAD PICKS AND ELECTIVE COURSES**
(Modeling-Simulation and People)

### Computational Science and Engineering *

_____ CS4140 Computational Modeling Algorithms
_____ CS4225 Introduction to High Performance Computing
_____ CS4245 Introduction to Data Mining and Analysis
_____ CS4335 Computer Simulation
_____ MATH4640/CS 4642 Numerical Analysis I

### Advanced Computational Methods & Software

_____ MATH4641/CS 4643 Numerical Analysis II
_____ CS4230 Distributed Simulation
_____ CS4343 Simulation and Military Gaming
_____ MATH4255 Monte Carlo Methods
_____ CS2335 Software Practicuum
_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS3451 Computer Graphics
_____ CS3600 Introduction to Artificial Intelligence
_____ CS4210 Advanced Operating Systems
_____ CS4230 Distributed Simulation Systems
_____ CS4495 Computer Vision
_____ CS4496 Computer Animation
_____ CS4550 Scientific Data Processing and Visualization
_____ CS4641 Machine Learning
_____ CS4777 Vector and Parallel Scientific Computing
_____ ISYE4331 Honors Optimization
_____ ISYE2028 Basic Statistics Methods
_____ ME2016 Computing Techniques
_____ CHBE2120 Numerical Methods

### Modeling & Simulation in Industrial Engineering

_____ ISYE2030 Modeling in Industrial Engineering
_____ ISYE3133 Engineering Optimization
_____ ISYE3044 Simulation Analysis and Design
_____ ISYE3232 Stochastic Manufacturing & Service Systems

### Biology/Chemistry

_____ BIOL2400 Mathematical Models in Biology
_____ BIOL4401 Exp Design & Statistical Methods in Biology
_____ CHBE2100 Chemical Process Principles

### Geoscience

_____ EAS4610 Earth System Modeling
_____ EAS3620 Geochemistry
_____ EAS4630 Physics of the Earth
_____ EAS4655 Atmospheric Dynamics
_____ EAS4602 Biochemical Cycles
_____ EAS4803 Water Chemistry Modeling
_____ PHYS3266 Computational Physics

### Social/Behavioral Science for Computing *

_____ PSYC2210 Social Psychology
_____ PSYC2760 Psychology of Human Language
_____ PSYC3040 Sensation and Perception

### Human-Centered Technology *

_____ CS3790 Introduction to Cognitive Science
_____ CS3750 Human-Computer Interface Design and Eval
_____ CS4660 Introduction to Educational Technology

### User Support Technology

_____ CS4460 Information Visualization
_____ CS4470 Introduction to User Interface Software
_____ CS4605 Mobile and Ubiquitous Computing
_____ CS4625 Intelligent and Interactive Systems

### Educational Technology

_____ CS4660 Introduction to Educational Technology
_____ CS4665 Educational Technology: Design & Evaluation
_____ CS4670 Computer-Supported Collaborative Learning

### Design and Evaluation

_____ CS4690 Empirical Methods in HCI
_____ CS3750 Human-Computer Interface Design and Eval
_____ PSYC2020 Psychological Statistics
_____ CS4770 Mixed Reality Experience Design

### Human Cognition and Interaction

_____ CS3790 Introduction to Cognitive Science
_____ CS4793 Perspectives Cognitive Science
_____ PSYC2210 Social Psychology
_____ PSYC2760 Psychology of Human Language
_____ PSYC3011 Cognitive Psychology
_____ PSYC3040 Sensation and Perception
_____ PSYC4090 Cognitive Neuropsychology
_____ PSYC4260 Aging

### Aerospace Engineering

_____ AE1350 Introduction to Aerospace Engineering
_____ AE4375 Fundamentals of Computer-Aided Eng & Desigr
_____ PHYS3266 Computational Physics

### Digital Signal Processing

_____ ECE4271 Applications of Digital Signal Processing
_____ ECE4270 Fundamentals of Digital Signal Processing
_____ ECE3075 Random Signals
_____ ECE3025 Electromagnetics

* Required Thread Pick

**THREAD PICKS AND ELECTIVE COURSES**

(Modeling-Simulation and People)

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE
## THREAD: MODELING & SIMULATION & PLATFORMS
## 2008 - 2009 DEGREE REQUIREMENTS
### COLLEGE OF COMPUTING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| SOCIAL SCIENCE ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| CS 1171 INTRODUCTORY COMPUTING IN MATLAB | 1 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| MATH 2403 DIFFERENTIAL EQUATIONS * | 4 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| MATH/CE/ISYE 3770 STATISTICS AND APPLICATIONS or MATH 3215 PROBABILITY & STATISTICS | 3 |
| FREE ELECTIVE | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| CS 3210 DESIGN OF OPERATING SYSTEMS * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * | 3 |
| COMPUTATIONAL SCIENCE & ENGINEERING - PICK ONE * | 3 |
| COMPUTER ARCHITECTURES - PICK ONE * | 3 |

| | |
|---|---|
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| CS 3240 LANGUAGES & COMPUTATION * | 3 |
| COMPUTATIONAL SCIENCE & ENGINEERING - PICK ONE * | 3 |
| PLATFORM INTERFACES - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

*Must earn a *C* or better in each of these courses.

**THREAD PICKS AND ELECTIVE COURSES**
(Modeling-Simulation and Platforms)

### Computational Science and Engineering *
_____ CS4140 Computational Modeling Algorithms
_____ CS4225 Introduction to High Performance Computing
_____ CS4245 Introduction to Data Mining and Analysis
_____ CS4335 Computer Simulation
_____ MATH4640/CS 4642 Numerical Analysis I

### Advanced Computational Methods & Software
_____ MATH4641/CS 4643 Numerical Analysis II
_____ CS4230 Distributed Simulation
_____ CS4343 Simulation and Military Gaming
_____ MATH4255 Monte Carlo Methods
_____ CS2335 Software Practicuum
_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS3451 Computer Graphics
_____ CS3600 Introduction to Artificial Intelligence
_____ CS4210 Advanced Operating Systems
_____ CS4230 Distributed Simulation Systems
_____ CS4495 Computer Vision
_____ CS4496 Computer Animation
_____ CS4550 Scientific Data Processing and Visualization
_____ CS4641 Machine Learning
_____ CS4777 Vector and Parallel Scientific Computing
_____ ISYE4331 Honors Optimization
_____ ISYE2028 Basic Statistics Methods
_____ ME2016 Computing Techniques
_____ CHBE2120 Numerical Methods

### Modeling & Simulation in Industrial Engineering
_____ ISYE2030 Modeling in Industrial Engineering
_____ ISYE3133 Engineering Optimization
_____ ISYE3044 Simulation Analysis and Design
_____ ISYE3232 Stochastic Manufacturing & Service Systems

### Biology/Chemistry
_____ BIOL2400 Mathematical Models in Biology
_____ BIOL4401 Exp Design & Statistical Methods in Biology
_____ CHBE2100 Chemical Process Principles

### Geoscience
_____ EAS4610 Earth System Modeling
_____ EAS3620 Geochemistry
_____ EAS4630 Physics of the Earth
_____ EAS4655 Atmospheric Dynamics
_____ EAS4602 Biochemical Cycles
_____ EAS4803 Water Chemistry Modeling
_____ PHYS3266 Computational Physics

### Aerospace Engineering
_____ AE1350 Introduction to Aerospace Engineering
_____ AE4375 Fundamentals of Computer-Aided Eng & Design
_____ PHYS3266 Computational Physics

### Computer Architectures *
_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS4290 Advanced Computer Organization

### Platform Interfaces *
_____ CS3251 Computer Networking I
_____ CS3300 Introduction to Software Engineering

### Parallel Platforms
_____ CS4210 Advanced Operating Systems
_____ CS4290 Advanced Computer Organization
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4233 Parallel Computer Architecture
_____ CS4803 Design of Gaming Consoles

### Distributed Platforms
_____ CS4210 Advanced Operating Systems
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4675 Internet Computing Systems
_____ CS4685 Pervasive Systems and Networking

### Embedded and Ubiquitous Platforms
_____ CS4220 Programming Embedded Systems
_____ CS4685 Pervasive Systems and Networking
_____ CS4803 Design of Gaming Consoles

### Domain Specific Platforms
_____ CS4803 Design of Gaming Consoles
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4220 Programming Embedded Systems

### Platform Technologies
_____ CS4235 Introduction to Information Security
_____ CS4237 Computer and Network Security
_____ CS4560 Verification of Systems
_____ CS4220 Programming Embedded Systems
_____ CS4210 Advanced Operating Systems

### Software Interfaces, Tools & Technologies
_____ CS4220 Programming Embedded Systems
_____ CS4392 Programming Language Design
_____ CS4240 Compilers, Interpreters, & Program Analyzers
_____ CS6246 Object-oriented Systems and Languages
_____ CS6241 Design and Implementation of Compilers

### Digital Signal Processing
_____ ECE4271 Applications of Digital Signal Processing
_____ ECE4270 Fundamentals of Digital Signal Processing
_____ ECE3075 Random Signals
_____ ECE3025 Electromagnetics

## BACHELOR OF SCIENCE IN COMPUTER SCIENCE
### THREAD: MODELING & SIMULATION & THEORY
### 2008 - 2009 DEGREE REQUIREMENTS
### COLLEGE OF COMPUTING

Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING* | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| SOCIAL SCIENCE ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| CS 1171 INTRODUCTORY COMPUTING IN MATLAB | 1 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| MATH 2403 DIFFERENTIAL EQUATIONS * | 4 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| MATH/CE/ISYE 3770 STATISTICS AND APPLICATIONS or<br>MATH 3215 PROBABILITY & STATISTICS | 3 |
| FREE ELECTIVE | 6 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * or<br>CS 3511 Design and Analysis of Algorithms, Honors * | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| COMPUTATIONAL SCIENCE & ENGINEERING - PICK ONE * | 3 |
| CS APPL INVOLVING ALGORITHMS & COMPLEXITY - PICK ONE * | 3 |
| FREE ELECTIVE | 6 |

| | |
|---|---|
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| COMPUTATIONAL SCIENCE & ENGINEERING - PICK ONE * | 3 |
| MATHEMATICS RELATED TO COMPUTER SCIENCE - PICK ONE * | 3 |
| COMPUTATIONAL COMPLEXITY - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

*Must earn a *C* or better in each of these courses.

## THREAD PICKS AND ELECTIVE COURSES
(Modeling-Simulation and Theory)

**Computational Science and Engineering ***
_____ CS4140 Computational Modeling Algorithms
_____ CS4225 Introduction to High Performance Computing
_____ CS4245 Introduction to Data Mining and Analysis
_____ CS4335 Computer Simulation
_____ MATH4640/CS 4642 Numerical Analysis I

**Advanced Computational Methods & Software**
_____ MATH4641/CS 4643 Numerical Analysis II
_____ CS4230 Distributed Simulation
_____ CS4343 Simulation and Military Gaming
_____ MATH4255 Monte Carlo Methods
_____ CS2335 Software Practicuum
_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS3451 Computer Graphics
_____ CS3600 Introduction to Artificial Intelligence
_____ CS4210 Advanced Operating Systems
_____ CS4230 Distributed Simulation Systems
_____ CS4495 Computer Vision
_____ CS4496 Computer Animation
_____ CS4550 Scientific Data Processing and Visualization
_____ CS4641 Machine Learning
_____ CS4777 Vector and Parallel Scientific Computing
_____ ISYE4331 Honors Optimization
_____ ISYE2028 Basic Statistics Methods
_____ ME2016 Computing Techniques
_____ CHBE2120 Numerical Methods

**Modeling & Simulation in Industrial Engineering**
_____ ISYE2030 Modeling in Industrial Engineering
_____ ISYE3133 Engineering Optimization
_____ ISYE3044 Simulation Analysis and Design
_____ ISYE3232 Stochastic Manufacturing & Service Systems

**Biology/Chemistry**
_____ BIOL2400 Mathematical Models in Biology
_____ BIOL4401 Exp Design & Statistical Methods in Biology
_____ CHBE2100 Chemical Process Principles

**Geoscience**
_____ EAS4610 Earth System Modeling
_____ EAS3620 Geochemistry
_____ EAS4630 Physics of the Earth
_____ EAS4655 Atmospheric Dynamics
_____ EAS4602 Biochemical Cycles
_____ EAS4803 Water Chemistry Modeling
_____ PHYS3266 Computational Physics

**Aerospace Engineering**
_____ AE1350 Introduction to Aerospace Engineering
_____ AE4375 Fundamentals of Computer-Aided Eng & Design
_____ PHYS3266 Computational Physics

* Required Thread Pick - If the same course is used to meet

**Computational Complexity ***
_____ CS3240 Languages and Computation
_____ CS4510 Automata and Complexity Theory

**Mathematics Related to Computer Science ***
_____ MATH2406 Abstract Vector Spaces
_____ MATH4032 Combinatorial Analysis

**CS Appl Involving Algorithms & Complexity ***
_____ CS3251 Computer Networking I
_____ CS4400 Introduction to Database Systems
_____ CS4235 Introduction to Information Security
_____ CS3210 Design of Operating Systems
_____ CS3451 Computer Graphics
_____ CS4496 Computer Animation
_____ CS4641 Machine Learning
_____ CS4140 Computational Modeling Algorithms
_____ CS4335 Computer Simulation

**Advanced Algorithms and Complexity**
_____ CS3240 Languages and Computation
_____ CS4510 Automata and Complexity Theory
_____ CS4540 Advanced Algorithms
_____ CS6520 Computational Complexity
_____ CS4520 Approximation Algorithms
_____ CS4530 Randomized Algorithms

**Mathematics with CS Applications**
_____ MATH2406 Abstract Vector Spaces
_____ MATH4150 Intro to Number Theory & Cryptography
_____ MATH4107 Abstract Algebra I
_____ MATH4255 Monte Carlo Methods
_____ MATH4280 Introduction to Information Theory
_____ MATH4305 Topics in Linear Algebra
_____ MATH4580 Linear Programming
_____ MATH4640 Numerical Analysis I
_____ MATH4782 Quantum Info & Quantum Computation
_____ MATH3770 Statistics and Applications
_____ MATH4012 Algebraic Structures for Coding Theory

**Computational Methods in the Sciences**
_____ BIOL2400 Mathematical Models in Biology
_____ BIOL4755 Mathematical Biology
_____ PHYS3151 Mathematical Physics
_____ PHYS3266 Computational Physics
_____ ISYE3133 Optimization
_____ MGT3076 Investments
_____ MGT3078 Finance and Investments
_____ MGT3084 Derivative Securities
_____ ECON3110 Advanced Microeconomic Analysis
_____ ECON3120 Advanced Macroeconomic Analysis

**Digital Signal Processing**
_____ ECE4271 Applications of Digital Signal Processing
_____ ECE4270 Fundamentals of Digital Signal Processing

ECE3025 Electromagnetics

**BACHELOR OF SCIENCE IN COMPUTER SCIENCE**
**THREAD: DEVICES & PEOPLE**
**2008 - 2009 DEGREE REQUIREMENTS**
**COLLEGE OF COMPUTING**
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| PSYC 1101 GENERAL PSYCHOLOGY | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| ECE 2031 DIGITAL DESIGN LAB * | 2 |
| FREE ELECTIVE | 1 |
| **TOTAL SEMESTER HOURS =** | **14** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| BUILDING DEVICES - PICK ONE * | 4 |
| HUMAN CENTERED TECHNOLOGY - PICK ONE * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| CS 3251 COMPUTER NETWORKING I * | 3 |
| PSYC 2015 RESEARCH METHODS * | 4 |
| DEVICES IN THE REAL WORLD - PICK ONE * | 3 |
| HUMAN CENTERED TECHNOLOGY - PICK ONE * | 3 |

| TOTAL SEMESTER HOURS = | 16 |
|---|---|

| FOURTH YEAR-SPRING | HRS |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| ALGORITHM FUNDIMENTALS - PICK ONE * | 3 |
| SOCIAL/BEHAVIORAL SCIENCE FOR COMPUTING - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| THREAD ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

THREAD PICKS AND ELECTIVE COURSES
(Devices and People)

**Building Devices ***
_____ CS3651 The Art of Building Intelligent Appliances
_____ ECE4175 Embedded Micro-controller Design

**Devices in the Real World ***
_____ CS3630 Robotics and Perception
_____ CS4605 Mobile and Ubiquitous Computing
_____ CS4261 Mobile Appl & Services for Converged Netwks

**Algorithm Fundamentals ***
_____ CS 3510 Design and Analysis of Algorithms
_____ CS3240 Languages and Computation

**Device Platforms**
_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS4210 Advanced Operating Systems
_____ CS4220 Programming Embedded Systems
_____ CS4261 Mobile Appl & Services for Converged Netwks

**Intelligent Systems**
_____ CS3600 Introduction to Artificial Intelligence
_____ CS3630 Robotics and Perception
_____ CS4495 Computer Vision
_____ CS4616 Pattern Recognition
_____ CS4632 Advanced Intelligent Robotics
_____ CS4641 Machine Learning

**Devices for People**
_____ CS4685 Pervasive Systems and Networking
_____ CS4470 Introduction to User Interface Software
_____ CS4605 Mobile and Ubiquitous Computing

**Social/Behavioral Science for Computing ***
_____ PSYC2210 Social Psychology
_____ PSYC2760 Psychology of Human Language
_____ PSYC3040 Sensation and Perception

**Human-Centered Technology ***
_____ CS3790 Introduction to Cognitive Science
_____ CS3750 Human-Computer Interface Design and Eval
_____ CS4660 Introduction to Educational Technology

**User Support Technology**
_____ CS4460 Information Visualization
_____ CS4470 Introduction to User Interface Software
_____ CS4605 Mobile and Ubiquitous Computing
_____ CS4625 Intelligent and Interactive Systems

**Educational Technology**
_____ CS4660 Introduction to Educational Technology
_____ CS4665 Educational Technology: Design & Evaluation
_____ CS4670 Computer-Supported Collaborative Learning

**Design and Evaluation**
_____ CS4690 Empirical Methods in HCI
_____ CS3750 Human-Computer Interface Design and Eval
_____ PSYC2020 Psychological Statistics
_____ CS4770 Mixed Reality Experience Design

**Human Cognition and Interaction**
_____ CS3790 Introduction to Cognitive Science
_____ CS4793 Perspectives Cognitive Science
_____ PSYC2210 Social Psychology
_____ PSYC2760 Psychology of Human Language
_____ PSYC3011 Cognitive Psychology
_____ PSYC3040 Sensation and Perception
_____ PSYC4090 Cognitive Neuropsychology
_____ PSYC4260 Aging

* Required Thread Pick

## BACHELOR OF SCIENCE IN COMPUTER SCIENCE
### THREAD: INFORMATION INTERNETWORKS & PEOPLE
### 2008 - 2009 DEGREE REQUIREMENTS
### COLLEGE OF COMPUTING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
| --- | --- |
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
| --- | --- |
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
| --- | --- |
| PSYC 1101 GENERAL PSYCHOLOGY | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
| --- | --- |
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
| --- | --- |
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| PSYC 2015 RESEARCH METHODS * | 4 |
| FREE ELECTIVE | 1 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-SPRING | HRS |
| --- | --- |
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * | 3 |
| INTRODUCTION TO INFORMATION MANAGEMENT - PICK ONE * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FOURTH YEAR-FALL | HRS |
| --- | --- |
| CS SR PROJECT (4980 or 4911) * | 3 |
| INTRODUCTION TO INFORMATION MANAGEMENT - PICK ONE * | 3 |
| ADVANCED INFORMATION MANAGEMENT - PICK ONE * | 3 |
| HUMAN CENTERED TECHNOLOGY - PICK ONE * | 3 |
| FREE ELECTIVES | 3 |

| TOTAL SEMESTER HOURS = | 15 |
|---|---|

| FOURTH YEAR-SPRING | HRS |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| HUMAN CENTERED TECHNOLOGY - PICK ONE * | 3 |
| SOCIAL/BEHAVIORAL SCIENCE FOR COMPUTING - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

**THREAD PICKS AND ELECTIVE COURSES**
(Information Internetworks and People)

### Introduction to Information Management *
_____ CS4400 Introduction to Database Systems
_____ CS4365 Introduction to Enterprise Computing
_____ CS4235 Introduction to Information Security
_____ CS3251 Computer Networking I

### Advanced Information Management *
_____ (Pick 1 of) Database Systems
_____ (Pick 1 of) Enterprise Computing
_____ (Pick 1 of) Information Security
_____ (Pick 1 of) Network Systems

### Database Systems
_____ CS4420 Database System Implementation
_____ CS4440 Emerging Database Technologies & Appl
_____ CS4460 Information Visualization

### Enterprise Computing
_____ CS4560 Verification of Systems
_____ CS4342 Software Generation, Testing, & Maint
_____ MGT4056 Electronic Commerce
_____ MGT4057 Business Process Analysis and Design

### Information Security
_____ CS4237 Computer and Network Security

### Network Systems
_____ CS4251 Computer Networking II
_____ CS4261 Mobile Appl & Services for Converged Netwks
_____ CS4255 Introduction to Network Management
_____ CS4270 Data Communications Laboratory

### Social/Behavioral Science for Computing *
_____ PSYC2210 Social Psychology
_____ PSYC2760 Psychology of Human Language
_____ PSYC3040 Sensation and Perception

### Human-Centered Technology *
_____ CS3790 Introduction to Cognitive Science
_____ CS3750 Human-Computer Interface Design and Eval
_____ CS4660 Introduction to Educational Technology

### User Support Technology
_____ CS4460 Information Visualization
_____ CS4470 Introduction to User Interface Software
_____ CS4605 Mobile and Ubiquitous Computing
_____ CS4625 Intelligent and Interactive Systems

### Educational Technology
_____ CS4660 Introduction to Educational Technology
_____ CS4665 Educational Technology: Design & Evaluation
_____ CS4670 Computer-Supported Collaborative Learning

### Design and Evaluation
_____ CS4690 Empirical Methods in HCI
_____ CS3750 Human-Computer Interface Design and Eval
_____ PSYC2020 Psychological Statistics
_____ CS4770 Mixed Reality Experience Design

### Human Cognition and Interaction
_____ CS3790 Introduction to Cognitive Science
_____ CS4793 Perspectives Cognitive Science
_____ PSYC2210 Social Psychology
_____ PSYC2760 Psychology of Human Language
_____ PSYC3011 Cognitive Psychology
_____ PSYC3040 Sensation and Perception
_____ PSYC4090 Cognitive Neuropsychology
_____ PSYC4260 Aging

* Required Thread Pick

**BACHELOR OF SCIENCE IN COMPUTER SCIENCE**
**THREAD: INTELLIGENCE & PEOPLE**
**2008 - 2009 DEGREE REQUIREMENTS**
**COLLEGE OF COMPUTING**
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| PSYC 1101 GENERAL PSYCHOLOGY | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * | 3 |
| HUMAN CENTERED TECHNOLOGY - PICK ONE * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| CS 3600 INTRODUCTION TO ARTIFICIAL INTELLIGENCE * | 3 |
| EMBODIED INTELLIGENCE - PICK ONE * | 3 |
| SOCIAL/BEHAVIORAL SCIENCE FOR COMPUTING - PICK ONE * | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| PSYC 2015 RESEARCH METHODS * | 4 |
| APPROACHES TO INTELLIGENCE - PICK ONE * | 3 |
| COMPUTATIONAL COMPLEXITY - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |

| | |
|---|---|
| **TOTAL SEMESTER HOURS =** | **16** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| APPROACHES TO INTELLIGENCE - PICK ONE * | 3 |
| HUMAN CENTERED TECHNOLOGY - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| FREE ELECTIVE | 2 |
| **TOTAL SEMESTER HOURS =** | **14** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

**THREAD PICKS AND ELECTIVE COURSES**
(Intelligence and People)

### Computational Complexity *
_____ CS3240 Languages and Computation
_____ CS4510 Automata and Complexity Theory

### Embodied Intelligence *
_____ CS3630 Robotics and Perception
_____ CS3790 Introduction to Cognitive Science
_____ PSY3040 Sensation and Perception

### Approaches to Intelligence *
_____ CS4635 Knowledge-based AI
_____ CS4641 Machine Learning
_____ CS4495 Computer Vision

### Knowledge-Based Intelligence
_____ CS3790 Introduction to Cognitive Science
_____ CS4615 Knowledge-based Modeling & Design
_____ CS4635 Knowledge-based AI
_____ CS4650 Natural Language Understanding

### Data-Driven Intelligence
_____ CS4641 Machine Learning
_____ CS4616 Pattern Recognition
_____ MATH 4280 Introduction to Information Theory

### Intelligent Systems
_____ CS4495 Computer Vision
_____ CS4632 Advanced Intelligent Robotics
_____ CS3651 The Art of Building Intelligent Appliances
_____ CS4625 Intelligent and Interactive Systems
_____ CS4731 Game AI

### Philosophical Issues in Intelligence
_____ CS4793 Perspectives in Cognitive Science
_____ CS4752 Philosophical Issues in Computation

### Social/Behavioral Science for Computing *
_____ PSYC2210 Social Psychology
_____ PSYC2760 Psychology of Human Language
_____ PSYC3040 Sensation and Perception

### Human-Centered Technology *
_____ CS3790 Introduction to Cognitive Science
_____ CS3750 Human-Computer Interface Design and Eval
_____ CS4660 Introduction to Educational Technology

### User Support Technology
_____ CS4460 Information Visualization
_____ CS4470 Introduction to User Interface Software
_____ CS4605 Mobile and Ubiquitous Computing
_____ CS4625 Intelligent and Interactive Systems

### Educational Technology
_____ CS4660 Introduction to Educational Technology
_____ CS4665 Educational Technology: Design & Evaluation
_____ CS4670 Computer-Supported Collaborative Learning

### Design and Evaluation
_____ CS4690 Empirical Methods in HCI
_____ CS3750 Human-Computer Interface Design and Eval
_____ PSYC2020 Psychological Statistics
_____ CS4770 Mixed Reality Experience Design

### Human Cognition and Interaction
_____ CS3790 Introduction to Cognitive Science
_____ CS4793 Perspectives Cognitive Science
_____ PSYC2210 Social Psychology
_____ PSYC2760 Psychology of Human Language
_____ PSYC3011 Cognitive Psychology
_____ PSYC3040 Sensation and Perception
_____ PSYC4090 Cognitive Neuropsychology
_____ PSYC4260 Aging

* Required Thread Pick - If the same course is used to meet two Required Thread Picks, another Thread Elective course from this page must be taken to replace the hours.

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE
## THREAD: MEDIA & PEOPLE
## 2008 - 2009 DEGREE REQUIREMENTS
## COLLEGE OF COMPUTING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * or CS 1315 INTRODUCTION TO MEDIA COMPUTATION * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| PSYC 1101 GENERAL PSYCHOLOGY | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2261 (Media Thread) | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| CS 3451 COMPUTER GRAPHICS * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| HUMAN CENTERED TECHNOLOGY - PICK ONE * | 3 |
| SOCIAL/BEHAVIORAL SCIENCE FOR COMPUTING - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| PSYC 2015 RESEARCH METHODS * | 4 |
| HUMAN CENTERED TECHNOLOGY - PICK ONE * | 3 |
| MEDIA TECHNOLOGIES - PICK ONE * | 3 |

| | |
|---|---|
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| MEDIA TECHNOLOGIES - PICK ONE * | 3 |
| THREAD ELECTIVE (From List) * | 3 |
| FREE ELECTIVE | 3 |
| FREE ELECTIVE | 2 |
| **TOTAL SEMESTER HOURS =** | **14** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

**THREAD PICKS AND ELECTIVE COURSES**
(Media and People)

### Media Technologies *
_____ CS4455 Video Game Design and Programming
_____ CS4480 Digital Video Special Effects
_____ CS4496 Computer Animation
_____ CS4590 Computer Audio

### Computing Fundamentals
_____ CS1316 Rep Struct & Behavior (Must take before 1331)
_____ CS3240 Languages and Computation
_____ CS3510 Design and Analysis of Algorithms

### Multimedia Applications and Design
_____ CS4475 Computational Photography
_____ CS4803 Computational Journalism
_____ CS4770 Mixed Reality Experience Design

### Multimedia Connections
_____ CS4230 Distributed Simulation Systems
_____ CS4460 Information Visualization
_____ CS4470 Introduction to User Interface Software
_____ CS4550 Scientific Data Processing and Visualization

### Social/Behavioral Science for Computing *
_____ PSYC2210 Social Psychology
_____ PSYC2760 Psychology of Human Language
_____ PSYC3040 Sensation and Perception

### Human-Centered Technology *
_____ CS3790 Introduction to Cognitive Science
_____ CS3750 Human-Computer Interface Design and Eval
_____ CS4660 Introduction to Educational Technology

### User Support Technology
_____ CS4460 Information Visualization
_____ CS4470 Introduction to User Interface Software
_____ CS4605 Mobile and Ubiquitous Computing
_____ CS4625 Intelligent and Interactive Systems

### Educational Technology
_____ CS4660 Introduction to Educational Technology
_____ CS4665 Educational Technology: Design & Evaluation
_____ CS4670 Computer-Supported Collaborative Learning

### Design and Evaluation
_____ CS4690 Empirical Methods in HCI
_____ CS3750 Human-Computer Interface Design and Eval
_____ PSYC2020 Psychological Statistics
_____ CS4770 Mixed Reality Experience Design

### Human Cognition and Interaction
_____ CS3790 Introduction to Cognitive Science
_____ CS4793 Perspectives Cognitive Science
_____ PSYC2210 Social Psychology
_____ PSYC2760 Psychology of Human Language
_____ PSYC3011 Cognitive Psychology
_____ PSYC3040 Sensation and Perception
_____ PSYC4090 Cognitive Neuropsychology
_____ PSYC4260 Aging

* Required Thread Pick

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE
## THREAD: MODELING & SIMULATION & PEOPLE
## 2008 - 2009 DEGREE REQUIREMENTS
## COLLEGE OF COMPUTING

Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| PSYC 1101 GENERAL PSYCHOLOGY | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| CS 1171 INTRODUCTORY COMPUTING IN MATLAB | 1 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| MATH 2403 DIFFERENTIAL EQUATIONS * | 4 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| MATH/CE/ISYE 3770 STATISTICS AND APPLICATIONS or<br>MATH 3215 PROBABILITY & STATISTICS | 3 |
| FREE ELECTIVE | 6 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| SOCIAL/BEHAVIORAL SCIENCE FOR COMPUTING - PICK ONE * | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| COMPUTATIONAL SCIENCE & ENGINEERING - PICK ONE * | 3 |
| HUMAN CENTERED TECHNOLOGY - PICK ONE * | 3 |
| PSYC 2015 RESEARCH METHODS * | 4 |
| FREE ELECTIVE | 3 |

| | |
|---|---|
| **TOTAL SEMESTER HOURS =** | **16** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * | 3 |
| COMPUTATIONAL SCIENCE & ENGINEERING - PICK ONE * | 3 |
| HUMAN CENTERED TECHNOLOGY - PICK ONE * | 3 |
| FREE ELECTIVE | 2 |
| **TOTAL SEMESTER HOURS =** | **14** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

*Must earn a *C* or better in each of these courses.

**THREAD PICKS AND ELECTIVE COURSES**
(Modeling-Simulation and People)

### Computational Science and Engineering *
_____ CS4140 Computational Modeling Algorithms
_____ CS4225 Introduction to High Performance Computing
_____ CS4245 Introduction to Data Mining and Analysis
_____ CS4335 Computer Simulation
_____ MATH4640/CS 4642 Numerical Analysis I

### Advanced Computational Methods & Software
_____ MATH4641/CS 4643 Numerical Analysis II
_____ CS4230 Distributed Simulation
_____ CS4343 Simulation and Military Gaming
_____ MATH4255 Monte Carlo Methods
_____ CS2335 Software Practicuum
_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS3451 Computer Graphics
_____ CS3600 Introduction to Artificial Intelligence
_____ CS4210 Advanced Operating Systems
_____ CS4230 Distributed Simulation Systems
_____ CS4495 Computer Vision
_____ CS4496 Computer Animation
_____ CS4550 Scientific Data Processing and Visualization
_____ CS4641 Machine Learning
_____ CS4777 Vector and Parallel Scientific Computing
_____ ISYE4331 Honors Optimization
_____ ISYE2028 Basic Statistics Methods
_____ ME2016 Computing Techniques
_____ CHBE2120 Numerical Methods

### Modeling & Simulation in Industrial Engineering
_____ ISYE2030 Modeling in Industrial Engineering
_____ ISYE3133 Engineering Optimization
_____ ISYE3044 Simulation Analysis and Design
_____ ISYE3232 Stochastic Manufacturing & Service Systems

### Biology/Chemistry
_____ BIOL2400 Mathematical Models in Biology
_____ BIOL4401 Exp Design & Statistical Methods in Biology
_____ CHBE2100 Chemical Process Principles

### Geoscience
_____ EAS4610 Earth System Modeling
_____ EAS3620 Geochemistry
_____ EAS4630 Physics of the Earth
_____ EAS4655 Atmospheric Dynamics
_____ EAS4602 Biochemical Cycles
_____ EAS4803 Water Chemistry Modeling
_____ PHYS3266 Computational Physics

### Social/Behavioral Science for Computing *
_____ PSYC2210 Social Psychology
_____ PSYC2760 Psychology of Human Language
_____ PSYC3040 Sensation and Perception

### Human-Centered Technology *
_____ CS3790 Introduction to Cognitive Science
_____ CS3750 Human-Computer Interface Design and Eval
_____ CS4660 Introduction to Educational Technology

### User Support Technology
_____ CS4460 Information Visualization
_____ CS4470 Introduction to User Interface Software
_____ CS4605 Mobile and Ubiquitous Computing
_____ CS4625 Intelligent and Interactive Systems

### Educational Technology
_____ CS4660 Introduction to Educational Technology
_____ CS4665 Educational Technology: Design & Evaluation
_____ CS4670 Computer-Supported Collaborative Learning

### Design and Evaluation
_____ CS4690 Empirical Methods in HCI
_____ CS3750 Human-Computer Interface Design and Eval
_____ PSYC2020 Psychological Statistics
_____ CS4770 Mixed Reality Experience Design

### Human Cognition and Interaction
_____ CS3790 Introduction to Cognitive Science
_____ CS4793 Perspectives Cognitive Science
_____ PSYC2210 Social Psychology
_____ PSYC2760 Psychology of Human Language
_____ PSYC3011 Cognitive Psychology
_____ PSYC3040 Sensation and Perception
_____ PSYC4090 Cognitive Neuropsychology
_____ PSYC4260 Aging

### Aerospace Engineering
_____ AE1350 Introduction to Aerospace Engineering
_____ AE4375 Fundamentals of Computer-Aided Eng & Desigr
_____ PHYS3266 Computational Physics

### Digital Signal Processing
_____ ECE4271 Applications of Digital Signal Processing
_____ ECE4270 Fundamentals of Digital Signal Processing
_____ ECE3075 Random Signals
_____ ECE3025 Electromagnetics

* Required Thread Pick

**THREAD PICKS AND ELECTIVE COURSES**

(Modeling-Simulation and People)

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE
## THREAD: PEOPLE & PLATFORMS
## 2008 - 2009 DEGREE REQUIREMENTS
### COLLEGE OF COMPUTING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
| --- | --- |
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
| --- | --- |
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
| --- | --- |
| PSYC 1101 GENERAL PSYCHOLOGY | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
| --- | --- |
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
| --- | --- |
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-SPRING | HRS |
| --- | --- |
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| CS 3210 DESIGN OF OPERATING SYSTEMS * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
| --- | --- |
| CS SR PROJECT (4980 or 4911) * | 3 |
| PSYC 2015 RESEARCH METHODS * | 4 |
| HUMAN CENTERED TECHNOLOGY - PICK ONE * | 3 |
| COMPUTER ARCHITECTURES - PICK ONE * | 3 |
| PLATFORM INTERFACES - PICK ONE * | 3 |

| TOTAL SEMESTER HOURS = | 16 |
| --- | --- |

| FOURTH YEAR-SPRING | HRS |
| --- | --- |
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| CS 3240 LANGUAGES & COMPUTATION * | 3 |
| HUMAN CENTERED TECHNOLOGY - PICK ONE * | 3 |
| SOCIAL/BEHAVIORAL SCIENCE FOR COMPUTING - PICK ONE * | 3 |
| FREE ELECTIVE | 1 |
| **TOTAL SEMESTER HOURS =** | **13** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

**THREAD PICKS AND ELECTIVE COURSES**
(People and Platforms)

### Social/Behavioral Science for Computing *
_____ PSYC2210 Social Psychology
_____ PSYC2760 Psychology of Human Language
_____ PSYC3040 Sensation and Perception

### Human-Centered Technology *
_____ CS3790 Introduction to Cognitive Science
_____ CS3750 Human-Computer Interface Design and Eval
_____ CS4660 Introduction to Educational Technology

### User Support Technology
_____ CS4460 Information Visualization
_____ CS4470 Introduction to User Interface Software
_____ CS4605 Mobile and Ubiquitous Computing
_____ CS4625 Intelligent and Interactive Systems

### Educational Technology
_____ CS4660 Introduction to Educational Technology
_____ CS4665 Educational Technology: Design & Evaluation
_____ CS4670 Computer-Supported Collaborative Learning

### Design and Evaluation
_____ CS4690 Empirical Methods in HCI
_____ CS3750 Human-Computer Interface Design and Eval
_____ PSYC2020 Psychological Statistics
_____ CS4770 Mixed Reality Experience Design

### Human Cognition and Interaction
_____ CS3790 Introduction to Cognitive Science
_____ CS4793 Perspectives Cognitive Science
_____ PSYC2210 Social Psychology
_____ PSYC2760 Psychology of Human Language
_____ PSYC3011 Cognitive Psychology
_____ PSYC3040 Sensation and Perception
_____ PSYC4090 Cognitive Neuropsychology
_____ PSYC4260 Aging

### Computer Architectures *
_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS4290 Advanced Computer Organization

### Platform Interfaces *
_____ CS3251 Computer Networking I
_____ CS3300 Introduction to Software Engineering

### Parallel Platforms
_____ CS4210 Advanced Operating Systems
_____ CS4290 Advanced Computer Organization
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4233 Parallel Computer Architecture
_____ CS4803 Design of Gaming Consoles

### Distributed Platforms
_____ CS4210 Advanced Operating Systems
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4675 Internet Computing Systems
_____ CS4685 Pervasive Systems and Networking

### Embedded and Ubiquitous Platforms
_____ CS4220 Programming Embedded Systems
_____ CS4685 Pervasive Systems and Networking
_____ CS4803 Design of Gaming Consoles

### Domain Specific Platforms
_____ CS4803 Design of Gaming Consoles
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4220 Programming Embedded Systems

### Platform Technologies
_____ CS4235 Introduction to Information Security
_____ CS4237 Computer and Network Security
_____ CS4560 Verification of Systems
_____ CS4220 Programming Embedded Systems
_____ CS4210 Advanced Operating Systems

### Software Interfaces, Tools & Technologies
_____ CS4220 Programming Embedded Systems
_____ CS4392 Programming Language Design
_____ CS4240 Compilers, Interpreters, & Program Analyzers
_____ CS6246 Object-oriented Systems and Languages
_____ CS6241 Design and Implementation of Compilers

* Required Thread Pick

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE

## THREAD: THEORY & PEOPLE

## 2008 - 2009 DEGREE REQUIREMENTS

## COLLEGE OF COMPUTING

Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| PSYC 1101 GENERAL PSYCHOLOGY | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| CS 1171 INTRODUCTORY COMPUTING IN MATLAB | 1 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * or<br>CS 3511 Design and Analysis of Algorithms, Honors | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| COMPUTATIONAL COMPLEXITY - PICK ONE * | 3 |
| SOCIAL/BEHAVIORAL SCIENCE FOR COMPUTING - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| PSYC 2015 RESEARCH METHODS * | 4 |
| HUMAN CENTERED TECHNOLOGY - PICK ONE * | 3 |

| | |
|---|---|
| CS APPL INVOLVING ALGORITHMS & COMPLEXITY - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FOURTH YEAR-SPRING | HRS |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| HUMAN CENTERED TECHNOLOGY - PICK ONE * | 3 |
| MATHEMATICS RELATED TO COMPUTER SCIENCE - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| FREE ELECTIVE | 1 |
| **TOTAL SEMESTER HOURS =** | **13** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

**THREAD PICKS AND ELECTIVE COURSES**
(People and Theory)

### Social/Behavioral Science for Computing *
_____ PSYC2210 Social Psychology
_____ PSYC2760 Psychology of Human Language
_____ PSYC3040 Sensation and Perception

### Human-Centered Technology *
_____ CS3790 Introduction to Cognitive Science
_____ CS3750 Human-Computer Interface Design and Eval
_____ CS4660 Introduction to Educational Technology

### User Support Technology
_____ CS4460 Information Visualization
_____ CS4470 Introduction to User Interface Software
_____ CS4605 Mobile and Ubiquitous Computing
_____ CS4625 Intelligent and Interactive Systems

### Educational Technology
_____ CS4660 Introduction to Educational Technology
_____ CS4665 Educational Technology: Design & Evaluation
_____ CS4670 Computer-Supported Collaborative Learning

### Design and Evaluation
_____ CS4690 Empirical Methods in HCI
_____ CS3750 Human-Computer Interface Design and Eval
_____ PSYC2020 Psychological Statistics
_____ CS4770 Mixed Reality Experience Design

### Human Cognition and Interaction
_____ CS3790 Introduction to Cognitive Science
_____ CS4793 Perspectives Cognitive Science
_____ PSYC2210 Social Psychology
_____ PSYC2760 Psychology of Human Language
_____ PSYC3011 Cognitive Psychology
_____ PSYC3040 Sensation and Perception
_____ PSYC4090 Cognitive Neuropsychology
_____ PSYC4260 Aging

### Computational Complexity *
_____ CS3240 Languages and Computation
_____ CS4510 Automata and Complexity Theory

### Mathematics Related to Computer Science *
_____ MATH2406 Abstract Vector Spaces
_____ MATH4032 Combinatorial Analysis

### CS Appl Involving Algorithms & Complexity *
_____ CS4400 Introduction to Database Systems
_____ CS4235 Introduction to Information Security
_____ CS3210 Design of Operating Systems
_____ CS3451 Computer Graphics
_____ CS4496 Computer Animation
_____ CS3600 Introduction to Artificial Intelligence
_____ CS4641 Machine Learning
_____ CS4140 Computational Modeling Algorithms
_____ CS4335 Computer Simulation

### Advanced Algorithms and Complexity
_____ CS3240 Languages and Computation
_____ CS4510 Automata and Complexity Theory
_____ CS4540 Advanced Algorithms
_____ CS6520 Computational Complexity
_____ CS4520 Approximation Algorithms
_____ CS4530 Randomized Algorithms

### Mathematics with CS Applications
_____ MATH2406 Abstract Vector Spaces
_____ MATH4150 Intro to Number Theory & Cryptography
_____ MATH4107 Abstract Algebra I
_____ MATH4255 Monte Carlo Methods
_____ MATH4280 Introduction to Information Theory
_____ MATH4305 Topics in Linear Algebra
_____ MATH4580 Linear Programming
_____ MATH4640 Numerical Analysis I
_____ MATH4782 Quantum Info & Quantum Computation
_____ MATH3770 Statistics and Applications
_____ MATH4012 Algebraic Structures for Coding Theory

### Computational Methods in the Sciences
_____ BIOL2400 Mathematical Models in Biology
_____ BIOL4755 Mathematical Biology
_____ PHYS3151 Mathematical Physics
_____ PHYS3266 Computational Physics
_____ ISYE3133 Optimization
_____ MGT3076 Investments
_____ MGT3078 Finance and Investments
_____ MGT3084 Derivative Securities
_____ ECON3110 Advanced Microeconomic Analysis
_____ ECON3120 Advanced Macroeconomic Analysis

* Required Thread Pick

**BACHELOR OF SCIENCE IN COMPUTER SCIENCE**
**THREAD: DEVICES & PLATFORMS**
**2008 - 2009 DEGREE REQUIREMENTS**
**COLLEGE OF COMPUTING**
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| SOCIAL SCIENCE ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| ECE 2031 DIGITAL DESIGN LAB * | 2 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| BUILDING DEVICES - PICK ONE * | 4 |
| CS 3210 DESIGN OF OPERATING SYSTEMS * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * | 3 |
| DEVICES IN THE REAL WORLD - PICK ONE * | 3 |
| COMPUTER ARCHITECTURES - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |

| | |
|---|---|
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| CS 3240 LANGUAGES & COMPUTATION * | 3 |
| CS 3251 COMPUTER NETWORKING I * | 3 |
| FREE ELECTIVE | 3 |
| FREE ELECTIVE | 2 |
| **TOTAL SEMESTER HOURS =** | **14** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

## THREAD PICKS AND ELECTIVE COURSES
(Devices and Platforms)

### Building Devices *
_____ CS3651 The Art of Building Intelligent Appliances
_____ ECE4175 Embedded Micro-controller Design

### Devices in the Real World *
_____ CS3630 Robotics and Perception
_____ CS4605 Mobile and Ubiquitous Computing
_____ CS4261 Mobile Appl & Services for Converged Netwks

### Device Platforms
_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS4210 Advanced Operating Systems
_____ CS4220 Programming Embedded Systems
_____ CS4261 Mobile Appl & Services for Converged Netwks

### Intelligent Systems
_____ CS3600 Introduction to Artificial Intelligence
_____ CS3630 Robotics and Perception
_____ CS4495 Computer Vision
_____ CS4616 Pattern Recognition
_____ CS4632 Advanced Intelligent Robotics
_____ CS4641 Machine Learning

### Devices for People
_____ CS4685 Pervasive Systems and Networking
_____ CS4470 Introduction to User Interface Software
_____ CS4605 Mobile and Ubiquitous Computing

### Computer Architectures *
_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS4290 Advanced Computer Organization

### Platform Interfaces
_____ CS3300 Introduction to Software Engineering

### Parallel Platforms
_____ CS4210 Advanced Operating Systems
_____ CS4290 Advanced Computer Organization
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4233 Parallel Computer Architecture
_____ CS4803 Design of Gaming Consoles

### Distributed Platforms
_____ CS4210 Advanced Operating Systems
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4675 Internet Computing Systems
_____ CS4685 Pervasive Systems and Networking

### Embedded and Ubiquitous Platforms
_____ CS4220 Programming Embedded Systems
_____ CS4685 Pervasive Systems and Networking
_____ CS4803 Design of Gaming Consoles

### Domain Specific Platforms
_____ CS4803 Design of Gaming Consoles
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4220 Programming Embedded Systems

### Platform Technologies
_____ CS4235 Introduction to Information Security
_____ CS4237 Computer and Network Security
_____ CS4560 Verification of Systems
_____ CS4220 Programming Embedded Systems
_____ CS4210 Advanced Operating Systems

### Software Interfaces, Tools & Technologies
_____ CS4220 Programming Embedded Systems
_____ CS4392 Programming Language Design
_____ CS4240 Compilers, Interpreters, & Program Analyzers
_____ CS6246 Object-oriented Systems and Languages
_____ CS6241 Design and Implementation of Compilers

* Required Thread Pick

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE
## THREAD: INFORMATION INTERNETWORKS & PLATFORMS
## 2008 - 2009 DEGREE REQUIREMENTS
### COLLEGE OF COMPUTING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| SOCIAL SCIENCE ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| CS 3210 DESIGN OF OPERATING SYSTEMS * | 3 |
| CS 3240 LANGUAGES & COMPUTATION * | 3 |
| INTRODUCTION TO INFORMATION MANAGEMENT - PICK ONE * | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| INTRODUCTION TO INFORMATION MANAGEMENT - PICK ONE * | 3 |
| ADVANCED INFORMATION MANAGEMENT - PICK ONE * | 3 |
| COMPUTER ARCHITECTURES - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |

| | |
|---|---|
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * | 3 |
| PLATFORM INTERFACES - PICK ONE * | 3 |
| THREAD ELECTIVE | 3 |
| THREAD ELECTIVE | 2 |
| **TOTAL SEMESTER HOURS =** | **14** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

**THREAD PICKS AND ELECTIVE COURSES**
(Information Internetworks and Platforms)

### Introduction to Information Management *
_____ CS4400 Introduction to Database Systems
_____ CS4365 Introduction to Enterprise Computing
_____ CS4235 Introduction to Information Security
_____ CS3251 Computer Networking I

### Advanced Information Management *
_____ (Pick 1 of) Database Systems
_____ (Pick 1 of) Enterprise Computing
_____ (Pick 1 of) Information Security
_____ (Pick 1 of) Network Systems

### Database Systems
_____ CS4420 Database System Implementation
_____ CS4440 Emerging Database Technologies & Appl
_____ CS4460 Information Visualization

### Enterprise Computing
_____ CS4560 Verification of Systems
_____ CS4342 Software Generation, Testing, & Maint
_____ MGT4056 Electronic Commerce
_____ MGT4057 Business Process Analysis and Design

### Information Security
_____ CS4237 Computer and Network Security

### Network Systems
_____ CS4251 Computer Networking II
_____ CS4261 Mobile Appl & Services for Converged Netwks
_____ CS4255 Introduction to Network Management
_____ CS4270 Data Communications Laboratory

### Computer Architectures *
_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS4290 Advanced Computer Organization

### Platform Interfaces *
_____ CS3251 Computer Networking I
_____ CS3300 Introduction to Software Engineering

### Parallel Platforms
_____ CS4210 Advanced Operating Systems
_____ CS4290 Advanced Computer Organization
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4233 Parallel Computer Architecture
_____ CS4803 Design of Gaming Consoles

### Distributed Platforms
_____ CS4210 Advanced Operating Systems
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4675 Internet Computing Systems
_____ CS4685 Pervasive Systems and Networking

### Embedded and Ubiquitous Platforms
_____ CS4220 Programming Embedded Systems
_____ CS4685 Pervasive Systems and Networking
_____ CS4803 Design of Gaming Consoles

### Domain Specific Platforms
_____ CS4803 Design of Gaming Consoles
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4220 Programming Embedded Systems

### Platform Technologies
_____ CS4235 Introduction to Information Security
_____ CS4237 Computer and Network Security
_____ CS4560 Verification of Systems
_____ CS4220 Programming Embedded Systems
_____ CS4210 Advanced Operating Systems

### Software Interfaces, Tools & Technologies
_____ CS4220 Programming Embedded Systems
_____ CS4392 Programming Language Design
_____ CS4240 Compilers, Interpreters, & Program Analyzers
_____ CS6246 Object-oriented Systems and Languages
_____ CS6241 Design and Implementation of Compilers

* Required Thread Pick - If the same course is used to meet two Required Thread Picks, another Thread Elective course from this page must be taken to replace the hours.

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE
## THREAD: INTELLIGENCE & PLATFORMS
## 2008 - 2009 DEGREE REQUIREMENTS
## COLLEGE OF COMPUTING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| PSYC 1101 GENERAL PSYCHOLOGY | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| CS 3240 LANGUAGES & COMPUTATION * | 3 |
| CS 3600 INTRODUCTION TO ARTIFICIAL INTELLIGENCE * | 3 |
| EMBODIED INTELLIGENCE - PICK ONE * | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| APPROACHES TO INTELLIGENCE - PICK ONE * | 3 |
| COMPUTER ARCHITECTURES - PICK ONE * | 3 |
| PLATFORM INTERFACES - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |

| TOTAL SEMESTER HOURS = | 15 |
| --- | --- |

| FOURTH YEAR-SPRING | HRS |
| --- | --- |
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * | 3 |
| CS 3240 LANGUAGES & COMPUTATION * | 3 |
| APPROACHES TO INTELLIGENCE - PICK ONE * | 3 |
| THREAD ELECTIVE | 2 |
| **TOTAL SEMESTER HOURS =** | **14** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

**THREAD PICKS AND ELECTIVE COURSES**
(Intelligence and Platforms)

### Embodied Intelligence *
_____ CS3630 Robotics and Perception
_____ CS3790 Introduction to Cognitive Science
_____ PSY3040 Sensation and Perception

### Approaches to Intelligence *
_____ CS4635 Knowledge-based AI
_____ CS4641 Machine Learning
_____ CS4495 Computer Vision

### Computational Complexity
_____ CS4510 Automata and Complexity Theory

### Knowledge-Based Intelligence
_____ CS3790 Introduction to Cognitive Science
_____ CS4615 Knowledge-based Modeling & Design
_____ CS4635 Knowledge-based AI
_____ CS4650 Natural Language Understanding

### Data-Driven Intelligence
_____ CS4641 Machine Learning
_____ CS4616 Pattern Recognition
_____ MATH 4280 Introduction to Information Theory

### Intelligent Systems
_____ CS4495 Computer Vision
_____ CS4632 Advanced Intelligent Robotics
_____ CS3651 The Art of Building Intelligent Appliances
_____ CS4625 Intelligent and Interactive Systems
_____ CS4731 Game AI

### Philosophical Issues in Intelligence
_____ CS4793 Perspectives in Cognitive Science
_____ CS4752 Philosophical Issues in Computation

### Computer Architectures *
_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS4290 Advanced Computer Organization

### Platform Interfaces *
_____ CS3251 Computer Networking I
_____ CS3300 Introduction to Software Engineering

### Parallel Platforms
_____ CS4210 Advanced Operating Systems
_____ CS4290 Advanced Computer Organization
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4233 Parallel Computer Architecture
_____ CS4803 Design of Gaming Consoles

### Distributed Platforms
_____ CS4210 Advanced Operating Systems
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4675 Internet Computing Systems
_____ CS4685 Pervasive Systems and Networking

### Embedded and Ubiquitous Platforms
_____ CS4220 Programming Embedded Systems
_____ CS4685 Pervasive Systems and Networking
_____ CS4803 Design of Gaming Consoles

### Domain Specific Platforms
_____ CS4803 Design of Gaming Consoles
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4220 Programming Embedded Systems

### Platform Technologies
_____ CS4235 Introduction to Information Security
_____ CS4237 Computer and Network Security
_____ CS4560 Verification of Systems
_____ CS4220 Programming Embedded Systems
_____ CS4210 Advanced Operating Systems

### Software Interfaces, Tools & Technologies
_____ CS4220 Programming Embedded Systems
_____ CS4392 Programming Language Design
_____ CS4240 Compilers, Interpreters, & Program Analyzers
_____ CS6246 Object-oriented Systems and Languages
_____ CS6241 Design and Implementation of Compilers

* Required Thread Pick

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE
## THREAD: MEDIA & PLATFORMS
## 2008 - 2009 DEGREE REQUIREMENTS
## COLLEGE OF COMPUTING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * or CS 1315 INTRODUCTION TO MEDIA COMPUTATION * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| SOCIAL SCIENCE ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| CS 3210 DESIGN OF OPERATING SYSTEMS * | 3 |
| CS 3451 COMPUTER GRAPHICS * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| MEDIA TECHNOLOGIES - PICK ONE * | 3 |
| COMPUTER ARCHITECTURES - PICK ONE * | 3 |
| PLATFORM INTERFACES - PICK ONE * | 3 |

| | |
|---|---|
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| CS 3240 LANGUAGES & COMPUTATION * | 3 |
| MEDIA TECHNOLOGIES - PICK ONE * | 3 |
| THREAD ELECTIVE | 3 |
| THREAD ELECTIVE | 2 |
| **TOTAL SEMESTER HOURS =** | **14** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

**THREAD PICKS AND ELECTIVE COURSES**
(Media and Platforms)

### Media Technologies *
_____ CS4455 Video Game Design and Programming
_____ CS4480 Digital Video Special Effects
_____ CS4496 Computer Animation
_____ CS4590 Computer Audio

### Computing Fundamentals
_____ CS1316 Rep Struct & Behavior (Must take before 1331)
_____ CS3240 Languages and Computation

### Multimedia Applications and Design
_____ CS4475 Computational Photography
_____ CS4803 Computational Journalism
_____ CS4770 Mixed Reality Experience Design

### Multimedia Connections
_____ CS4230 Distributed Simulation Systems
_____ CS4460 Information Visualization
_____ CS4470 Introduction to User Interface Software
_____ CS4550 Scientific Data Processing and Visualization

### Computer Architectures *
_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS4290 Advanced Computer Organization

### Platform Interfaces *
_____ CS3251 Computer Networking I
_____ CS3300 Introduction to Software Engineering

### Parallel Platforms
_____ CS4210 Advanced Operating Systems
_____ CS4290 Advanced Computer Organization
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4233 Parallel Computer Architecture
_____ CS4803 Design of Gaming Consoles

### Distributed Platforms
_____ CS4210 Advanced Operating Systems
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4675 Internet Computing Systems
_____ CS4685 Pervasive Systems and Networking

### Embedded and Ubiquitous Platforms
_____ CS4220 Programming Embedded Systems
_____ CS4685 Pervasive Systems and Networking
_____ CS4803 Design of Gaming Consoles

### Domain Specific Platforms
_____ CS4803 Design of Gaming Consoles
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4220 Programming Embedded Systems

### Platform Technologies
_____ CS4235 Introduction to Information Security
_____ CS4237 Computer and Network Security
_____ CS4560 Verification of Systems
_____ CS4220 Programming Embedded Systems
_____ CS4210 Advanced Operating Systems

### Software Interfaces, Tools & Technologies
_____ CS4220 Programming Embedded Systems
_____ CS4392 Programming Language Design
_____ CS4240 Compilers, Interpreters, & Program Analyzers
_____ CS6246 Object-oriented Systems and Languages
_____ CS6241 Design and Implementation of Compilers

* Required Thread Pick

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE
## THREAD: MODELING & SIMULATION & PLATFORMS
## 2008 - 2009 DEGREE REQUIREMENTS
### COLLEGE OF COMPUTING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| SOCIAL SCIENCE ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| CS 1171 INTRODUCTORY COMPUTING IN MATLAB | 1 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| MATH 2403 DIFFERENTIAL EQUATIONS * | 4 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| MATH/CE/ISYE 3770 STATISTICS AND APPLICATIONS or MATH 3215 PROBABILITY & STATISTICS | 3 |
| FREE ELECTIVE | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| CS 3210 DESIGN OF OPERATING SYSTEMS * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * | 3 |
| COMPUTATIONAL SCIENCE & ENGINEERING - PICK ONE * | 3 |
| COMPUTER ARCHITECTURES - PICK ONE * | 3 |

| | |
|---|---|
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| CS 3240 LANGUAGES & COMPUTATION * | 3 |
| COMPUTATIONAL SCIENCE & ENGINEERING - PICK ONE * | 3 |
| PLATFORM INTERFACES - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

*Must earn a *C* or better in each of these courses.

**THREAD PICKS AND ELECTIVE COURSES**
(Modeling-Simulation and Platforms)

### Computational Science and Engineering *
_____ CS4140 Computational Modeling Algorithms
_____ CS4225 Introduction to High Performance Computing
_____ CS4245 Introduction to Data Mining and Analysis
_____ CS4335 Computer Simulation
_____ MATH4640/CS 4642 Numerical Analysis I

### Advanced Computational Methods & Software
_____ MATH4641/CS 4643 Numerical Analysis II
_____ CS4230 Distributed Simulation
_____ CS4343 Simulation and Military Gaming
_____ MATH4255 Monte Carlo Methods
_____ CS2335 Software Practicuum
_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS3451 Computer Graphics
_____ CS3600 Introduction to Artificial Intelligence
_____ CS4210 Advanced Operating Systems
_____ CS4230 Distributed Simulation Systems
_____ CS4495 Computer Vision
_____ CS4496 Computer Animation
_____ CS4550 Scientific Data Processing and Visualization
_____ CS4641 Machine Learning
_____ CS4777 Vector and Parallel Scientific Computing
_____ ISYE4331 Honors Optimization
_____ ISYE2028 Basic Statistics Methods
_____ ME2016 Computing Techniques
_____ CHBE2120 Numerical Methods

### Modeling & Simulation in Industrial Engineering
_____ ISYE2030 Modeling in Industrial Engineering
_____ ISYE3133 Engineering Optimization
_____ ISYE3044 Simulation Analysis and Design
_____ ISYE3232 Stochastic Manufacturing & Service Systems

### Biology/Chemistry
_____ BIOL2400 Mathematical Models in Biology
_____ BIOL4401 Exp Design & Statistical Methods in Biology
_____ CHBE2100 Chemical Process Principles

### Geoscience
_____ EAS4610 Earth System Modeling
_____ EAS3620 Geochemistry
_____ EAS4630 Physics of the Earth
_____ EAS4655 Atmospheric Dynamics
_____ EAS4602 Biochemical Cycles
_____ EAS4803 Water Chemistry Modeling
_____ PHYS3266 Computational Physics

### Aerospace Engineering
_____ AE1350 Introduction to Aerospace Engineering
_____ AE4375 Fundamentals of Computer-Aided Eng & Design
_____ PHYS3266 Computational Physics

### Computer Architectures *
_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS4290 Advanced Computer Organization

### Platform Interfaces *
_____ CS3251 Computer Networking I
_____ CS3300 Introduction to Software Engineering

### Parallel Platforms
_____ CS4210 Advanced Operating Systems
_____ CS4290 Advanced Computer Organization
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4233 Parallel Computer Architecture
_____ CS4803 Design of Gaming Consoles

### Distributed Platforms
_____ CS4210 Advanced Operating Systems
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4675 Internet Computing Systems
_____ CS4685 Pervasive Systems and Networking

### Embedded and Ubiquitous Platforms
_____ CS4220 Programming Embedded Systems
_____ CS4685 Pervasive Systems and Networking
_____ CS4803 Design of Gaming Consoles

### Domain Specific Platforms
_____ CS4803 Design of Gaming Consoles
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4220 Programming Embedded Systems

### Platform Technologies
_____ CS4235 Introduction to Information Security
_____ CS4237 Computer and Network Security
_____ CS4560 Verification of Systems
_____ CS4220 Programming Embedded Systems
_____ CS4210 Advanced Operating Systems

### Software Interfaces, Tools & Technologies
_____ CS4220 Programming Embedded Systems
_____ CS4392 Programming Language Design
_____ CS4240 Compilers, Interpreters, & Program Analyzers
_____ CS6246 Object-oriented Systems and Languages
_____ CS6241 Design and Implementation of Compilers

### Digital Signal Processing
_____ ECE4271 Applications of Digital Signal Processing
_____ ECE4270 Fundamentals of Digital Signal Processing
_____ ECE3075 Random Signals
_____ ECE3025 Electromagnetics

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE
## THREAD: PEOPLE & PLATFORMS
## 2008 - 2009 DEGREE REQUIREMENTS
## COLLEGE OF COMPUTING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| PSYC 1101 GENERAL PSYCHOLOGY | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| CS 3210 DESIGN OF OPERATING SYSTEMS * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| PSYC 2015 RESEARCH METHODS * | 4 |
| HUMAN CENTERED TECHNOLOGY - PICK ONE * | 3 |
| COMPUTER ARCHITECTURES - PICK ONE * | 3 |
| PLATFORM INTERFACES - PICK ONE * | 3 |

| TOTAL SEMESTER HOURS = | 16 |
| --- | --- |

| FOURTH YEAR-SPRING | HRS |
| --- | --- |
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| CS 3240 LANGUAGES & COMPUTATION * | 3 |
| HUMAN CENTERED TECHNOLOGY - PICK ONE * | 3 |
| SOCIAL/BEHAVIORAL SCIENCE FOR COMPUTING - PICK ONE * | 3 |
| FREE ELECTIVE | 1 |
| **TOTAL SEMESTER HOURS =** | **13** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

# THREAD PICKS AND ELECTIVE COURSES
(People and Platforms)

### Social/Behavioral Science for Computing *
_____ PSYC2210 Social Psychology
_____ PSYC2760 Psychology of Human Language
_____ PSYC3040 Sensation and Perception

### Human-Centered Technology *
_____ CS3790 Introduction to Cognitive Science
_____ CS3750 Human-Computer Interface Design and Eval
_____ CS4660 Introduction to Educational Technology

### User Support Technology
_____ CS4460 Information Visualization
_____ CS4470 Introduction to User Interface Software
_____ CS4605 Mobile and Ubiquitous Computing
_____ CS4625 Intelligent and Interactive Systems

### Educational Technology
_____ CS4660 Introduction to Educational Technology
_____ CS4665 Educational Technology: Design & Evaluation
_____ CS4670 Computer-Supported Collaborative Learning

### Design and Evaluation
_____ CS4690 Empirical Methods in HCI
_____ CS3750 Human-Computer Interface Design and Eval
_____ PSYC2020 Psychological Statistics
_____ CS4770 Mixed Reality Experience Design

### Human Cognition and Interaction
_____ CS3790 Introduction to Cognitive Science
_____ CS4793 Perspectives Cognitive Science
_____ PSYC2210 Social Psychology
_____ PSYC2760 Psychology of Human Language
_____ PSYC3011 Cognitive Psychology
_____ PSYC3040 Sensation and Perception
_____ PSYC4090 Cognitive Neuropsychology
_____ PSYC4260 Aging

### Computer Architectures *
_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS4290 Advanced Computer Organization

### Platform Interfaces *
_____ CS3251 Computer Networking I
_____ CS3300 Introduction to Software Engineering

### Parallel Platforms
_____ CS4210 Advanced Operating Systems
_____ CS4290 Advanced Computer Organization
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4233 Parallel Computer Architecture
_____ CS4803 Design of Gaming Consoles

### Distributed Platforms
_____ CS4210 Advanced Operating Systems
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4675 Internet Computing Systems
_____ CS4685 Pervasive Systems and Networking

### Embedded and Ubiquitous Platforms
_____ CS4220 Programming Embedded Systems
_____ CS4685 Pervasive Systems and Networking
_____ CS4803 Design of Gaming Consoles

### Domain Specific Platforms
_____ CS4803 Design of Gaming Consoles
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4220 Programming Embedded Systems

### Platform Technologies
_____ CS4235 Introduction to Information Security
_____ CS4237 Computer and Network Security
_____ CS4560 Verification of Systems
_____ CS4220 Programming Embedded Systems
_____ CS4210 Advanced Operating Systems

### Software Interfaces, Tools & Technologies
_____ CS4220 Programming Embedded Systems
_____ CS4392 Programming Language Design
_____ CS4240 Compilers, Interpreters, & Program Analyzers
_____ CS6246 Object-oriented Systems and Languages
_____ CS6241 Design and Implementation of Compilers

* Required Thread Pick

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE
## THREAD: THEORY & PLATFORMS
## 2008 - 2009 DEGREE REQUIREMENTS
## COLLEGE OF COMPUTING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| SOCIAL SCIENCE ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| CS 1171 INTRODUCTORY COMPUTING IN MATLAB | 1 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| FREE ELECTIVE | 1 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| CS 3210 DESIGN OF OPERATING SYSTEMS * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * or<br>CS 3511 Design and Analysis of Algorithms, Honors | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| COMPUTER ARCHITECTURES - PICK ONE * | 3 |
| PLATFORM INTERFACES - PICK ONE * | 3 |

| | |
|---|---|
| FREE ELECTIVE | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| CS 3240 LANGUAGES & COMPUTATION * | 3 |
| MATHEMATICS RELATED TO COMPUTER SCIENCE - PICK ONE * | 3 |
| THREAD ELECTIVE (From List) * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

**THREAD PICKS AND ELECTIVE COURSES**
(Platforms and Theory)

### Computer Architectures *
_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS4290 Advanced Computer Organization

### Platform Interfaces *
_____ CS3251 Computer Networking I
_____ CS3300 Introduction to Software Engineering

### Parallel Platforms
_____ CS4210 Advanced Operating Systems
_____ CS4290 Advanced Computer Organization
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4233 Parallel Computer Architecture
_____ CS4803 Design of Gaming Consoles

### Distributed Platforms
_____ CS4210 Advanced Operating Systems
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4675 Internet Computing Systems
_____ CS4685 Pervasive Systems and Networking

### Embedded and Ubiquitous Platforms
_____ CS4220 Programming Embedded Systems
_____ CS4685 Pervasive Systems and Networking
_____ CS4803 Design of Gaming Consoles

### Domain Specific Platforms
_____ CS4803 Design of Gaming Consoles
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4220 Programming Embedded Systems

### Platform Technologies
_____ CS4235 Introduction to Information Security
_____ CS4237 Computer and Network Security
_____ CS4560 Verification of Systems
_____ CS4220 Programming Embedded Systems
_____ CS4210 Advanced Operating Systems

### Software Interfaces, Tools & Technologies
_____ CS4220 Programming Embedded Systems
_____ CS4392 Programming Language Design
_____ CS4240 Compilers, Interpreters, & Program Analyzers
_____ CS6246 Object-oriented Systems and Languages
_____ CS6241 Design and Implementation of Compilers

### Mathematics Related to Computer Science *
_____ MATH2406 Abstract Vector Spaces
_____ MATH4032 Combinatorial Analysis

### CS Appl Involving Algorithms & Complexity
_____ CS4400 Introduction to Database Systems
_____ CS4235 Introduction to Information Security
_____ CS3210 Design of Operating Systems
_____ CS3451 Computer Graphics
_____ CS4496 Computer Animation
_____ CS3600 Introduction to Artificial Intelligence
_____ CS4641 Machine Learning
_____ CS4140 Computational Modeling Algorithms
_____ CS4335 Computer Simulation

### Advanced Algorithms and Complexity
_____ CS3240 Languages and Computation
_____ CS4510 Automata and Complexity Theory
_____ CS4540 Advanced Algorithms
_____ CS6520 Computational Complexity
_____ CS4520 Approximation Algorithms
_____ CS4530 Randomized Algorithms

### Mathematics with CS Applications
_____ MATH2406 Abstract Vector Spaces
_____ MATH4150 Intro to Number Theory & Cryptography
_____ MATH4107 Abstract Algebra I
_____ MATH4255 Monte Carlo Methods
_____ MATH4280 Introduction to Information Theory
_____ MATH4305 Topics in Linear Algebra
_____ MATH4580 Linear Programming
_____ MATH4640 Numerical Analysis I
_____ MATH4782 Quantum Info & Quantum Computation
_____ MATH3770 Statistics and Applications
_____ MATH4012 Algebraic Structures for Coding Theory

### Computational Methods in the Sciences
_____ BIOL2400 Mathematical Models in Biology
_____ BIOL4755 Mathematical Biology
_____ PHYS3151 Mathematical Physics
_____ PHYS3266 Computational Physics
_____ ISYE3133 Optimization
_____ MGT3076 Investments
_____ MGT3078 Finance and Investments
_____ MGT3084 Derivative Securities
_____ ECON3110 Advanced Microeconomic Analysis
_____ ECON3120 Advanced Macroeconomic Analysis

* Required Thread Pick

**BACHELOR OF SCIENCE IN COMPUTER SCIENCE**
**THREAD: DEVICES & THEORY**
**2008 - 2009 DEGREE REQUIREMENTS**
**COLLEGE OF COMPUTING**
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| SOCIAL SCIENCE ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| CS 1171 INTRODUCTORY COMPUTING IN MATLAB | 1 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| ECE 2031 DIGITAL DESIGN LAB * | 2 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| BUILDING DEVICES - PICK ONE * | 4 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| CS 3251 COMPUTER NETWORKING I * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * or<br>CS 3511 Design and Analysis of Algorithms, Honors * | 3 |

| | |
|---|---|
| DEVICES IN THE REAL WORLD - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| COMPUTATIONAL COMPLEXITY - PICK ONE * | 3 |
| MATHEMATICS RELATED TO COMPUTER SCIENCE - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| FREE ELECTIVE | 1 |
| **TOTAL SEMESTER HOURS =** | **13** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

*Must earn a *C* or better in each of these courses.

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

**THREAD PICKS AND ELECTIVE COURSES**
(Devices and Theory)

### Building Devices *
- _____ CS3651 The Art of Building Intelligent Appliances
- _____ ECE4175 Embedded Micro-controller Design

### Devices in the Real World *
- _____ CS3630 Robotics and Perception
- _____ CS4605 Mobile and Ubiquitous Computing
- _____ CS4261 Mobile Appl & Services for Converged Netwks

### Algorithm Fundamentals
- _____ CS3240 Languages and Computation

### Device Platforms
- _____ CS3220 Comp Struct: HW/SW Codesign of a Processor
- _____ CS4210 Advanced Operating Systems
- _____ CS4220 Programming Embedded Systems
- _____ CS4261 Mobile Appl & Services for Converged Netwks

### Intelligent Systems
- _____ CS3600 Introduction to Artificial Intelligence
- _____ CS3630 Robotics and Perception
- _____ CS4495 Computer Vision
- _____ CS4616 Pattern Recognition
- _____ CS4632 Advanced Intelligent Robotics
- _____ CS4641 Machine Learning

### Devices for People
- _____ CS4685 Pervasive Systems and Networking
- _____ CS4470 Introduction to User Interface Software
- _____ CS4605 Mobile and Ubiquitous Computing

### Computational Complexity *
- _____ CS3240 Languages and Computation
- _____ CS4510 Automata and Complexity Theory

### Mathematics Related to Computer Science *
- _____ MATH2406 Abstract Vector Spaces
- _____ MATH4032 Combinatorial Analysis

### CS Appl Involving Algorithms & Complexity
- _____ CS4400 Introduction to Database Systems
- _____ CS4235 Introduction to Information Security
- _____ CS3210 Design of Operating Systems
- _____ CS3451 Computer Graphics
- _____ CS4496 Computer Animation
- _____ CS3600 Introduction to Artificial Intelligence
- _____ CS4641 Machine Learning
- _____ CS4140 Computational Modeling Algorithms
- _____ CS4335 Computer Simulation

### Advanced Algorithms and Complexity
- _____ CS3240 Languages and Computation
- _____ CS4510 Automata and Complexity Theory
- _____ CS4540 Advanced Algorithms
- _____ CS6520 Computational Complexity
- _____ CS4520 Approximation Algorithms
- _____ CS4530 Randomized Algorithms

### Mathematics with CS Applications
- _____ MATH2406 Abstract Vector Spaces
- _____ MATH4150 Intro to Number Theory & Cryptography
- _____ MATH4107 Abstract Algebra I
- _____ MATH4255 Monte Carlo Methods
- _____ MATH4280 Introduction to Information Theory
- _____ MATH4305 Topics in Linear Algebra
- _____ MATH4580 Linear Programming
- _____ MATH4640 Numerical Analysis I
- _____ MATH4782 Quantum Info & Quantum Computation
- _____ MATH3770 Statistics and Applications
- _____ MATH4012 Algebraic Structures for Coding Theory

### Computational Methods in the Sciences
- _____ BIOL2400 Mathematical Models in Biology
- _____ BIOL4755 Mathematical Biology
- _____ PHYS3151 Mathematical Physics
- _____ PHYS3266 Computational Physics
- _____ ISYE3133 Optimization
- _____ MGT3076 Investments
- _____ MGT3078 Finance and Investments
- _____ MGT3084 Derivative Securities
- _____ ECON3110 Advanced Microeconomic Analysis
- _____ ECON3120 Advanced Macroeconomic Analysis

* Required Thread Pick

**BACHELOR OF SCIENCE IN COMPUTER SCIENCE**
**THREAD: MODELING & SIMULATION & THEORY**
**2008 - 2009 DEGREE REQUIREMENTS**
**COLLEGE OF COMPUTING**
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING* | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| SOCIAL SCIENCE ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| CS 1171 INTRODUCTORY COMPUTING IN MATLAB | 1 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| MATH 2403 DIFFERENTIAL EQUATIONS * | 4 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| MATH/CE/ISYE 3770 STATISTICS AND APPLICATIONS or MATH 3215 PROBABILITY & STATISTICS | 3 |
| FREE ELECTIVE | 6 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * or CS 3511 Design and Analysis of Algorithms, Honors * | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| COMPUTATIONAL SCIENCE & ENGINEERING - PICK ONE * | 3 |
| CS APPL INVOLVING ALGORITHMS & COMPLEXITY - PICK ONE * | 3 |
| FREE ELECTIVE | 6 |

| TOTAL SEMESTER HOURS = | 15 |
| --- | --- |

| FOURTH YEAR-SPRING | HRS |
| --- | --- |
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| COMPUTATIONAL SCIENCE & ENGINEERING - PICK ONE * | 3 |
| MATHEMATICS RELATED TO COMPUTER SCIENCE - PICK ONE * | 3 |
| COMPUTATIONAL COMPLEXITY - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

*Must earn a *C* or better in each of these courses.

## THREAD PICKS AND ELECTIVE COURSES
(Modeling-Simulation and Theory)

**Computational Science and Engineering ***

_____ CS4140 Computational Modeling Algorithms
_____ CS4225 Introduction to High Performance Computing
_____ CS4245 Introduction to Data Mining and Analysis
_____ CS4335 Computer Simulation
_____ MATH4640/CS 4642 Numerical Analysis I

**Advanced Computational Methods & Software**

_____ MATH4641/CS 4643 Numerical Analysis II
_____ CS4230 Distributed Simulation
_____ CS4343 Simulation and Military Gaming
_____ MATH4255 Monte Carlo Methods
_____ CS2335 Software Practicuum
_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS3451 Computer Graphics
_____ CS3600 Introduction to Artificial Intelligence
_____ CS4210 Advanced Operating Systems
_____ CS4230 Distributed Simulation Systems
_____ CS4495 Computer Vision
_____ CS4496 Computer Animation
_____ CS4550 Scientific Data Processing and Visualization
_____ CS4641 Machine Learning
_____ CS4777 Vector and Parallel Scientific Computing
_____ ISYE4331 Honors Optimization
_____ ISYE2028 Basic Statistics Methods
_____ ME2016 Computing Techniques
_____ CHBE2120 Numerical Methods

**Modeling & Simulation in Industrial Engineering**

_____ ISYE2030 Modeling in Industrial Engineering
_____ ISYE3133 Engineering Optimization
_____ ISYE3044 Simulation Analysis and Design
_____ ISYE3232 Stochastic Manufacturing & Service Systems

**Biology/Chemistry**

_____ BIOL2400 Mathematical Models in Biology
_____ BIOL4401 Exp Design & Statistical Methods in Biology
_____ CHBE2100 Chemical Process Principles

**Geoscience**

_____ EAS4610 Earth System Modeling
_____ EAS3620 Geochemistry
_____ EAS4630 Physics of the Earth
_____ EAS4655 Atmospheric Dynamics
_____ EAS4602 Biochemical Cycles
_____ EAS4803 Water Chemistry Modeling
_____ PHYS3266 Computational Physics

**Aerospace Engineering**

_____ AE1350 Introduction to Aerospace Engineering
_____ AE4375 Fundamentals of Computer-Aided Eng & Design
_____ PHYS3266 Computational Physics

* Required Thread Pick - If the same course is used to meet

**Computational Complexity ***

_____ CS3240 Languages and Computation
_____ CS4510 Automata and Complexity Theory

**Mathematics Related to Computer Science ***

_____ MATH2406 Abstract Vector Spaces
_____ MATH4032 Combinatorial Analysis

**CS Appl Involving Algorithms & Complexity ***

_____ CS3251 Computer Networking I
_____ CS4400 Introduction to Database Systems
_____ CS4235 Introduction to Information Security
_____ CS3210 Design of Operating Systems
_____ CS3451 Computer Graphics
_____ CS4496 Computer Animation
_____ CS4641 Machine Learning
_____ CS4140 Computational Modeling Algorithms
_____ CS4335 Computer Simulation

**Advanced Algorithms and Complexity**

_____ CS3240 Languages and Computation
_____ CS4510 Automata and Complexity Theory
_____ CS4540 Advanced Algorithms
_____ CS6520 Computational Complexity
_____ CS4520 Approximation Algorithms
_____ CS4530 Randomized Algorithms

**Mathematics with CS Applications**

_____ MATH2406 Abstract Vector Spaces
_____ MATH4150 Intro to Number Theory & Cryptography
_____ MATH4107 Abstract Algebra I
_____ MATH4255 Monte Carlo Methods
_____ MATH4280 Introduction to Information Theory
_____ MATH4305 Topics in Linear Algebra
_____ MATH4580 Linear Programming
_____ MATH4640 Numerical Analysis I
_____ MATH4782 Quantum Info & Quantum Computation
_____ MATH3770 Statistics and Applications
_____ MATH4012 Algebraic Structures for Coding Theory

**Computational Methods in the Sciences**

_____ BIOL2400 Mathematical Models in Biology
_____ BIOL4755 Mathematical Biology
_____ PHYS3151 Mathematical Physics
_____ PHYS3266 Computational Physics
_____ ISYE3133 Optimization
_____ MGT3076 Investments
_____ MGT3078 Finance and Investments
_____ MGT3084 Derivative Securities
_____ ECON3110 Advanced Microeconomic Analysis
_____ ECON3120 Advanced Macroeconomic Analysis

**Digital Signal Processing**

_____ ECE4271 Applications of Digital Signal Processing
_____ ECE4270 Fundamentals of Digital Signal Processing

ECE3025 Electromagnetics

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE
## THREAD: THEORY & INFORMATION INTERNETWORKS
## 2008 - 2009 DEGREE REQUIREMENTS
## COLLEGE OF COMPUTING

Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| SOCIAL SCIENCE ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| CS 1171 INTRODUCTORY COMPUTING IN MATLAB | 1 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * or<br>CS 3511 Design and Analysis of Algorithms, Honors * | 3 |
| FREE ELECTIVE | 1 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| INTRODUCTION TO INFORMATION MANAGEMENT - PICK ONE * | 3 |
| THREAD ELECTIVE (From List) * | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| INTRODUCTION TO INFORMATION MANAGEMENT - PICK ONE * | 3 |
| ADVANCED INFORMATION MANAGEMENT - PICK ONE * | 3 |

| | |
|---|---|
| FREE ELECTIVE | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| MATHEMATICS RELATED TO COMPUTER SCIENCE - PICK ONE * | 3 |
| COMPUTATIONAL COMPLEXITY - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

**THREAD PICKS AND ELECTIVE COURSES**
(Information Internetworks and Theory)

### Introduction to Information Management *
_____ CS4400 Introduction to Database Systems
_____ CS4365 Introduction to Enterprise Computing
_____ CS4235 Introduction to Information Security
_____ CS3251 Computer Networking I

### Advanced Information Management *
_____ (Pick 1 of) Database Systems
_____ (Pick 1 of) Enterprise Computing
_____ (Pick 1 of) Information Security
_____ (Pick 1 of) Network Systems

### Database Systems
_____ CS4420 Database System Implementation
_____ CS4440 Emerging Database Technologies & Appl
_____ CS4460 Information Visualization

### Enterprise Computing
_____ CS4560 Verification of Systems
_____ CS4342 Software Generation, Testing, & Maint
_____ MGT4056 Electronic Commerce
_____ MGT4057 Business Process Analysis and Design

### Information Security
_____ CS4237 Computer and Network Security

### Network Systems
_____ CS4251 Computer Networking II
_____ CS4261 Mobile Appl & Services for Converged Netwks
_____ CS4255 Introduction to Network Management
_____ CS4270 Data Communications Laboratory

### Computational Complexity *
_____ CS3240 Languages and Computation
_____ CS4510 Automata and Complexity Theory

### Mathematics Related to Computer Science *
_____ MATH2406 Abstract Vector Spaces
_____ MATH4032 Combinatorial Analysis

### CS Appl Involving Algorithms & Complexity
_____ CS3251 Computer Networking I
_____ CS4400 Introduction to Database Systems
_____ CS4235 Introduction to Information Security
_____ CS3210 Design of Operating Systems
_____ CS3451 Computer Graphics
_____ CS4496 Computer Animation
_____ CS3600 Introduction to Artificial Intelligence
_____ CS4641 Machine Learning
_____ CS4140 Computational Modeling Algorithms
_____ CS4335 Computer Simulation

### Advanced Algorithms and Complexity
_____ CS3240 Languages and Computation
_____ CS4510 Automata and Complexity Theory
_____ CS4540 Advanced Algorithms
_____ CS6520 Computational Complexity
_____ CS4520 Approximation Algorithms
_____ CS4530 Randomized Algorithms

### Mathematics with CS Applications
_____ MATH2406 Abstract Vector Spaces
_____ MATH4150 Intro to Number Theory & Cryptography
_____ MATH4107 Abstract Algebra I
_____ MATH4255 Monte Carlo Methods
_____ MATH4280 Introduction to Information Theory
_____ MATH4305 Topics in Linear Algebra
_____ MATH4580 Linear Programming
_____ MATH4640 Numerical Analysis I
_____ MATH4782 Quantum Info & Quantum Computation
_____ MATH3770 Statistics and Applications
_____ MATH4012 Algebraic Structures for Coding Theory

### Computational Methods in the Sciences
_____ BIOL2400 Mathematical Models in Biology
_____ BIOL4755 Mathematical Biology
_____ PHYS3151 Mathematical Physics
_____ PHYS3266 Computational Physics
_____ ISYE3133 Optimization
_____ MGT3076 Investments
_____ MGT3078 Finance and Investments
_____ MGT3084 Derivative Securities
_____ ECON3110 Advanced Microeconomic Analysis
_____ ECON3120 Advanced Macroeconomic Analysis

* Required Thread Pick

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE
## THREAD: THEORY & INTELLIGENCE
## 2008 - 2009 DEGREE REQUIREMENTS
### COLLEGE OF COMPUTING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| PSYC 1101 GENERAL PSYCHOLOGY | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| CS 1171 INTRODUCTORY COMPUTING IN MATLAB | 1 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * or<br>CS 3511 Design and Analysis of Algorithms, Honors * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| CS 3600 INTRODUCTION TO ARTIFICIAL INTELLIGENCE * | 3 |
| EMBODIED INTELLIGENCE - PICK ONE * | 3 |
| COMPUTATIONAL COMPLEXITY - PICK ONE * | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| APPROACHES TO INTELLIGENCE - PICK ONE * | 3 |
| MATHEMATICS RELATED TO COMPUTER SCIENCE - PICK ONE * | 3 |

| | |
|---|---|
| FREE ELECTIVE | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| APPROACHES TO INTELLIGENCE - PICK ONE * | 3 |
| THREAD ELECTIVE (From List) * | 3 |
| FREE ELECTIVE | 3 |
| FREE ELECTIVE | 2 |
| **TOTAL SEMESTER HOURS =** | **14** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

**THREAD PICKS AND ELECTIVE COURSES**
(Intelligence and Theory)

### Computational Complexity *
_____ CS3240 Languages and Computation
_____ CS4510 Automata and Complexity Theory

### Embodied Intelligence *
_____ CS3630 Robotics and Perception
_____ CS3790 Introduction to Cognitive Science
_____ PSY3040 Sensation and Perception

### Approaches to Intelligence *
_____ CS4635 Knowledge-based AI
_____ CS4641 Machine Learning
_____ CS4495 Computer Vision

### Knowledge-Based Intelligence
_____ CS3790 Introduction to Cognitive Science
_____ CS4615 Knowledge-based Modeling & Design
_____ CS4635 Knowledge-based AI
_____ CS4650 Natural Language Understanding

### Data-Driven Intelligence
_____ CS4641 Machine Learning
_____ CS4616 Pattern Recognition
_____ MATH 4280 Introduction to Information Theory

### Intelligent Systems
_____ CS4495 Computer Vision
_____ CS4632 Advanced Intelligent Robotics
_____ CS3651 The Art of Building Intelligent Appliances
_____ CS4625 Intelligent and Interactive Systems
_____ CS4731 Game AI

### Philosophical Issues in Intelligence
_____ CS4793 Perspectives in Cognitive Science
_____ CS4752 Philosophical Issues in Computation

### Mathematics Related to Computer Science *
_____ MATH2406 Abstract Vector Spaces
_____ MATH4032 Combinatorial Analysis

### CS Appl Involving Algorithms & Complexity
_____ CS3251 Computer Networking I
_____ CS4400 Introduction to Database Systems
_____ CS4235 Introduction to Information Security
_____ CS3210 Design of Operating Systems
_____ CS3451 Computer Graphics
_____ CS4496 Computer Animation
_____ CS4641 Machine Learning
_____ CS4140 Computational Modeling Algorithms
_____ CS4335 Computer Simulation

### Advanced Algorithms and Complexity
_____ CS3240 Languages and Computation
_____ CS4510 Automata and Complexity Theory
_____ CS4540 Advanced Algorithms
_____ CS6520 Computational Complexity
_____ CS4520 Approximation Algorithms
_____ CS4530 Randomized Algorithms

### Mathematics with CS Applications
_____ MATH2406 Abstract Vector Spaces
_____ MATH4150 Intro to Number Theory & Cryptography
_____ MATH4107 Abstract Algebra I
_____ MATH4255 Monte Carlo Methods
_____ MATH4280 Introduction to Information Theory
_____ MATH4305 Topics in Linear Algebra
_____ MATH4580 Linear Programming
_____ MATH4640 Numerical Analysis I
_____ MATH4782 Quantum Info & Quantum Computation
_____ MATH3770 Statistics and Applications
_____ MATH4012 Algebraic Structures for Coding Theory

### Computational Methods in the Sciences
_____ BIOL2400 Mathematical Models in Biology
_____ BIOL4755 Mathematical Biology
_____ PHYS3151 Mathematical Physics
_____ PHYS3266 Computational Physics
_____ ISYE3133 Optimization
_____ MGT3076 Investments
_____ MGT3078 Finance and Investments
_____ MGT3084 Derivative Securities
_____ ECON3110 Advanced Microeconomic Analysis
_____ ECON3120 Advanced Macroeconomic Analysis

* Required Thread Pick

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE
## THREAD: THEORY & MEDIA
## 2008 - 2009 DEGREE REQUIREMENTS
## COLLEGE OF COMPUTING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * or CS 1315 INTRODUCTION TO MEDIA COMPUTATION * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| SOCIAL SCIENCE ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 * or CS 2261 * | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| CS 1171 INTRODUCTORY COMPUTING IN MATLAB | 1 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * or CS 3511 Design and Analysis of Algorithms, Honors | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| CS 3451 COMPUTER GRAPHICS * | 3 |
| COMPUTATIONAL COMPLEXITY - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| MEDIA TECHNOLOGIES - PICK ONE * | 3 |

| | |
|---|---|
| THREAD ELECTIVE (From List) * | 3 |
| FREE ELECTIVE | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| MEDIA TECHNOLOGIES - PICK ONE * | 3 |
| MATHEMATICS RELATED TO COMPUTER SCIENCE - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| FREE ELECTIVE | 2 |
| **TOTAL SEMESTER HOURS =** | **14** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

**THREAD PICKS AND ELECTIVE COURSES**
(Media and Theory)

### Media Technologies *
_____ CS4455 Video Game Design and Programming
_____ CS4480 Digital Video Special Effects
_____ CS4496 Computer Animation
_____ CS4590 Computer Audio

### Computing Fundamentals
_____ CS1316 Rep Struct & Behavior (Must take before 1331)
_____ CS3240 Languages and Computation

### Multimedia Applications and Design
_____ CS4475 Computational Photography
_____ CS4803 Computational Journalism
_____ CS4770 Mixed Reality Experience Design

### Multimedia Connections
_____ CS4230 Distributed Simulation Systems
_____ CS4460 Information Visualization
_____ CS4470 Introduction to User Interface Software
_____ CS4550 Scientific Data Processing and Visualization

### Computational Complexity *
_____ CS3240 Languages and Computation
_____ CS4510 Automata and Complexity Theory

### Mathematics Related to Computer Science *
_____ MATH2406 Abstract Vector Spaces
_____ MATH4032 Combinatorial Analysis

### CS Appl Involving Algorithms & Complexity
_____ CS4400 Introduction to Database Systems
_____ CS4235 Introduction to Information Security
_____ CS3210 Design of Operating Systems
_____ CS4496 Computer Animation
_____ CS3600 Introduction to Artificial Intelligence
_____ CS4641 Machine Learning
_____ CS4140 Computational Modeling Algorithms
_____ CS4335 Computer Simulation

### Advanced Algorithms and Complexity
_____ CS3240 Languages and Computation
_____ CS4510 Automata and Complexity Theory
_____ CS4540 Advanced Algorithms
_____ CS6520 Computational Complexity
_____ CS4520 Approximation Algorithms
_____ CS4530 Randomized Algorithms

### Mathematics with CS Applications
_____ MATH2406 Abstract Vector Spaces
_____ MATH4150 Intro to Number Theory & Cryptography
_____ MATH4107 Abstract Algebra I
_____ MATH4255 Monte Carlo Methods
_____ MATH4280 Introduction to Information Theory
_____ MATH4305 Topics in Linear Algebra
_____ MATH4580 Linear Programming
_____ MATH4640 Numerical Analysis I
_____ MATH4782 Quantum Info & Quantum Computation
_____ MATH3770 Statistics and Applications
_____ MATH4012 Algebraic Structures for Coding Theory

### Computational Methods in the Sciences
_____ BIOL2400 Mathematical Models in Biology
_____ BIOL4755 Mathematical Biology
_____ PHYS3151 Mathematical Physics
_____ PHYS3266 Computational Physics
_____ ISYE3133 Optimization
_____ MGT3076 Investments
_____ MGT3078 Finance and Investments
_____ MGT3084 Derivative Securities
_____ ECON3110 Advanced Microeconomic Analysis
_____ ECON3120 Advanced Macroeconomic Analysis

* Required Thread Pick

## BACHELOR OF SCIENCE IN COMPUTER SCIENCE
### THREAD: THEORY & PEOPLE
### 2008 - 2009 DEGREE REQUIREMENTS
### COLLEGE OF COMPUTING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| PSYC 1101 GENERAL PSYCHOLOGY | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| CS 1171 INTRODUCTORY COMPUTING IN MATLAB | 1 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * or<br>CS 3511 Design and Analysis of Algorithms, Honors | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| COMPUTATIONAL COMPLEXITY - PICK ONE * | 3 |
| SOCIAL/BEHAVIORAL SCIENCE FOR COMPUTING - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| PSYC 2015 RESEARCH METHODS * | 4 |
| HUMAN CENTERED TECHNOLOGY - PICK ONE * | 3 |

| | |
|---|---|
| CS APPL INVOLVING ALGORITHMS & COMPLEXITY - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| HUMAN CENTERED TECHNOLOGY - PICK ONE * | 3 |
| MATHEMATICS RELATED TO COMPUTER SCIENCE - PICK ONE * | 3 |
| FREE ELECTIVE | 3 |
| FREE ELECTIVE | 1 |
| **TOTAL SEMESTER HOURS =** | **13** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

**THREAD PICKS AND ELECTIVE COURSES**
(People and Theory)

### Social/Behavioral Science for Computing *
_____ PSYC2210 Social Psychology
_____ PSYC2760 Psychology of Human Language
_____ PSYC3040 Sensation and Perception

### Human-Centered Technology *
_____ CS3790 Introduction to Cognitive Science
_____ CS3750 Human-Computer Interface Design and Eval
_____ CS4660 Introduction to Educational Technology

### User Support Technology
_____ CS4460 Information Visualization
_____ CS4470 Introduction to User Interface Software
_____ CS4605 Mobile and Ubiquitous Computing
_____ CS4625 Intelligent and Interactive Systems

### Educational Technology
_____ CS4660 Introduction to Educational Technology
_____ CS4665 Educational Technology: Design & Evaluation
_____ CS4670 Computer-Supported Collaborative Learning

### Design and Evaluation
_____ CS4690 Empirical Methods in HCI
_____ CS3750 Human-Computer Interface Design and Eval
_____ PSYC2020 Psychological Statistics
_____ CS4770 Mixed Reality Experience Design

### Human Cognition and Interaction
_____ CS3790 Introduction to Cognitive Science
_____ CS4793 Perspectives Cognitive Science
_____ PSYC2210 Social Psychology
_____ PSYC2760 Psychology of Human Language
_____ PSYC3011 Cognitive Psychology
_____ PSYC3040 Sensation and Perception
_____ PSYC4090 Cognitive Neuropsychology
_____ PSYC4260 Aging

### Computational Complexity *
_____ CS3240 Languages and Computation
_____ CS4510 Automata and Complexity Theory

### Mathematics Related to Computer Science *
_____ MATH2406 Abstract Vector Spaces
_____ MATH4032 Combinatorial Analysis

### CS Appl Involving Algorithms & Complexity *
_____ CS4400 Introduction to Database Systems
_____ CS4235 Introduction to Information Security
_____ CS3210 Design of Operating Systems
_____ CS3451 Computer Graphics
_____ CS4496 Computer Animation
_____ CS3600 Introduction to Artificial Intelligence
_____ CS4641 Machine Learning
_____ CS4140 Computational Modeling Algorithms
_____ CS4335 Computer Simulation

### Advanced Algorithms and Complexity
_____ CS3240 Languages and Computation
_____ CS4510 Automata and Complexity Theory
_____ CS4540 Advanced Algorithms
_____ CS6520 Computational Complexity
_____ CS4520 Approximation Algorithms
_____ CS4530 Randomized Algorithms

### Mathematics with CS Applications
_____ MATH2406 Abstract Vector Spaces
_____ MATH4150 Intro to Number Theory & Cryptography
_____ MATH4107 Abstract Algebra I
_____ MATH4255 Monte Carlo Methods
_____ MATH4280 Introduction to Information Theory
_____ MATH4305 Topics in Linear Algebra
_____ MATH4580 Linear Programming
_____ MATH4640 Numerical Analysis I
_____ MATH4782 Quantum Info & Quantum Computation
_____ MATH3770 Statistics and Applications
_____ MATH4012 Algebraic Structures for Coding Theory

### Computational Methods in the Sciences
_____ BIOL2400 Mathematical Models in Biology
_____ BIOL4755 Mathematical Biology
_____ PHYS3151 Mathematical Physics
_____ PHYS3266 Computational Physics
_____ ISYE3133 Optimization
_____ MGT3076 Investments
_____ MGT3078 Finance and Investments
_____ MGT3084 Derivative Securities
_____ ECON3110 Advanced Microeconomic Analysis
_____ ECON3120 Advanced Macroeconomic Analysis

* Required Thread Pick

## BACHELOR OF SCIENCE IN COMPUTER SCIENCE
### THREAD: THEORY & PLATFORMS
### 2008 - 2009 DEGREE REQUIREMENTS
### COLLEGE OF COMPUTING
Suggested Schedule

| **FIRST YEAR-FALL** | **HRS** |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1301 INTRODUCTION TO COMPUTING * | 3 |
| CS 1100 FRESHMAN LEAP SEMINAR | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| **FIRST YEAR-SPRING** | **HRS** |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS * | 3 |
| CS 1331 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING * | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| **SECOND YEAR-FALL** | **HRS** |
|---|---|
| SOCIAL SCIENCE ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1332 DATA STRUCTURES AND ALGORITHMS FOR APPLICATIONS* | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| **SECOND YEAR-SPRING** | **HRS** |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 3012 APPLIED COMBINATORICS | 3 |
| CS 2110 COMPUTER ORGANIZATION & PROGRAMMING * | 4 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| CS 1171 INTRODUCTORY COMPUTING IN MATLAB | 1 |
| **TOTAL SEMESTER HOURS =** | **17** |

| **THIRD YEAR-FALL** | **HRS** |
|---|---|
| LAB SCIENCE SEQUENCE | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CS 2340 OBJECTS & DESIGN * | 3 |
| CS 2200 COMPUTER SYSTEMS & NETWORKS * | 4 |
| FREE ELECTIVE | 1 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **THIRD YEAR-SPRING** | **HRS** |
|---|---|
| PROBABILITY & STATISTICS OPTION (See Note 1) | 3 |
| FREE ELECTIVE (See Note 1) | 3 |
| CS 3210 DESIGN OF OPERATING SYSTEMS * | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * or<br>CS 3511 Design and Analysis of Algorithms, Honors | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-FALL** | **HRS** |
|---|---|
| CS SR PROJECT (4980 or 4911) * | 3 |
| COMPUTER ARCHITECTURES - PICK ONE * | 3 |
| PLATFORM INTERFACES - PICK ONE * | 3 |

| | |
|---|---|
| FREE ELECTIVE | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY * | 3 |
| CS 3240 LANGUAGES & COMPUTATION * | 3 |
| MATHEMATICS RELATED TO COMPUTER SCIENCE - PICK ONE * | 3 |
| THREAD ELECTIVE (From List) * | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

- * Must earn a *C* or better in each of these courses.
- **Note 1:**
  MATH 3215, MATH/CEE/ISYE 3770 or ISYE 2027 and ISYE 2028. If ISYE 2027/2028 option is selected, ISYE 2028 becomes a Thread Elective.

**THREAD PICKS AND ELECTIVE COURSES**
(Platforms and Theory)

### Computer Architectures *
_____ CS3220 Comp Struct: HW/SW Codesign of a Processor
_____ CS4290 Advanced Computer Organization

### Platform Interfaces *
_____ CS3251 Computer Networking I
_____ CS3300 Introduction to Software Engineering

### Parallel Platforms
_____ CS4210 Advanced Operating Systems
_____ CS4290 Advanced Computer Organization
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4233 Parallel Computer Architecture
_____ CS4803 Design of Gaming Consoles

### Distributed Platforms
_____ CS4210 Advanced Operating Systems
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4675 Internet Computing Systems
_____ CS4685 Pervasive Systems and Networking

### Embedded and Ubiquitous Platforms
_____ CS4220 Programming Embedded Systems
_____ CS4685 Pervasive Systems and Networking
_____ CS4803 Design of Gaming Consoles

### Domain Specific Platforms
_____ CS4803 Design of Gaming Consoles
_____ CS4803 Scalable Information Systems & Technologies
_____ CS4220 Programming Embedded Systems

### Platform Technologies
_____ CS4235 Introduction to Information Security
_____ CS4237 Computer and Network Security
_____ CS4560 Verification of Systems
_____ CS4220 Programming Embedded Systems
_____ CS4210 Advanced Operating Systems

### Software Interfaces, Tools & Technologies
_____ CS4220 Programming Embedded Systems
_____ CS4392 Programming Language Design
_____ CS4240 Compilers, Interpreters, & Program Analyzers
_____ CS6246 Object-oriented Systems and Languages
_____ CS6241 Design and Implementation of Compilers

### Mathematics Related to Computer Science *
_____ MATH2406 Abstract Vector Spaces
_____ MATH4032 Combinatorial Analysis

### CS Appl Involving Algorithms & Complexity
_____ CS4400 Introduction to Database Systems
_____ CS4235 Introduction to Information Security
_____ CS3210 Design of Operating Systems
_____ CS3451 Computer Graphics
_____ CS4496 Computer Animation
_____ CS3600 Introduction to Artificial Intelligence
_____ CS4641 Machine Learning
_____ CS4140 Computational Modeling Algorithms
_____ CS4335 Computer Simulation

### Advanced Algorithms and Complexity
_____ CS3240 Languages and Computation
_____ CS4510 Automata and Complexity Theory
_____ CS4540 Advanced Algorithms
_____ CS6520 Computational Complexity
_____ CS4520 Approximation Algorithms
_____ CS4530 Randomized Algorithms

### Mathematics with CS Applications
_____ MATH2406 Abstract Vector Spaces
_____ MATH4150 Intro to Number Theory & Cryptography
_____ MATH4107 Abstract Algebra I
_____ MATH4255 Monte Carlo Methods
_____ MATH4280 Introduction to Information Theory
_____ MATH4305 Topics in Linear Algebra
_____ MATH4580 Linear Programming
_____ MATH4640 Numerical Analysis I
_____ MATH4782 Quantum Info & Quantum Computation
_____ MATH3770 Statistics and Applications
_____ MATH4012 Algebraic Structures for Coding Theory

### Computational Methods in the Sciences
_____ BIOL2400 Mathematical Models in Biology
_____ BIOL4755 Mathematical Biology
_____ PHYS3151 Mathematical Physics
_____ PHYS3266 Computational Physics
_____ ISYE3133 Optimization
_____ MGT3076 Investments
_____ MGT3078 Finance and Investments
_____ MGT3084 Derivative Securities
_____ ECON3110 Advanced Microeconomic Analysis
_____ ECON3120 Advanced Macroeconomic Analysis

* Required Thread Pick

## THE COMPUTING AND THEORY THREAD

The Theory thread is where computing meets itself. Theory teaches students the theoretical and mathematical foundations underlying a wide range of computational disciplines. Early preparation includes discrete mathematics, algorithms, and complexity. Knowledge goals are for students to mature in development and analysis of abstract models for applications ranging from theoretical computer science to computational physics, biology, mathematics, economics, and optimization.

### READ ABOUT OTHER THREADS TO CREATE A B.S. IN CS

- Computing and Modeling & Simulation
- Computing and Devices
- Computing and Information Internetworks
- Computing and Intelligence
- Computing and Media
- Computing and People
- Computing and Platforms

## COOPERATIVE PROGRAMS

The College of Computing participates in the undergraduate and graduate Cooperative Programs. See links below for further Information.

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE
## INTERNATIONAL PLAN
## 2008 - 2009 DEGREE REQUIREMENTS
### COLLEGE OF COMPUTING

The College of Computing has an approved B.S.C.S. International Plan that accommodates the unique requirements of this option discussed in the International Plan section of the catalog.

However, due to the flexible nature of the Threads curriculum, the International Plan designation may not be available with all of the Thread combinations. Efforts will be made to work with interested students to accommodate their individual circumstances with regard to the International Plan designator for the Bachelor of Science in Computer Science.

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE - RESEARCH OPTION

To complete the Research Option in the College of Computing, students must:

- Complete at least nine units of undergraduate research
  - Over at least two, preferably three terms
  - Research may be for either pay or credit
- Write an undergraduate thesis/report of research on their findings
- Take LCC 4700 "Writing an Undergraduate Thesis"
  - Taken during the thesis-writing semester

## RESEARCH CLASSES

The following classes count toward fulfillment of the Research Option:

### Research for Credit:

CS 2699-Undergraduate Research (freshman and sophomore)

CS 4699-Undergraduate Research (junior and senior)

CS 4980-Research Capstone Project

### Research for Pay (Audit only):

CS 2698-Research Assistantship (freshman and sophomore)

CS 4698-Research Assistantship (junior and senior)

To get credit toward completion of the Research Option for research for pay, students must be registered for the appropriate audit-only, research for pay class (CS 2698 or 4698). If work on research for pay begins after the close of registration and the student has not signed up for the appropriate class, unfortunately it is not possible to get credit toward the Research Option for work that term.

A research project will also fulfill the capstone design requirement if the student registers for CS 4980 Capstone Project for one of the research terms. This is typically done the last semester of research, while taking LCC 4700.

Completion of the Research Option is noted on the student's transcript. For more information, see: www.urop.gatech.edu.

## SCHOOL OF COMPUTER SCIENCE

The School of Computer Science in the College of Computing is comprised of faculty and students engaged in research and teaching within computing systems, broadly defined, and computing theory. The School of Computer Science spans areas including:

- computer architecture
- databases
- distributed and embedded systems
- enterprise computing
- information security
- networking
- operating systems
- programming languages and compilers
- software engineering
- theory

The School participates in degree programs at the undergraduate level (BS in Computer Science), the master's level (MS in Computer Science; M.S. in Information Security; M.S. in BioInformatics), and the Ph.D. level (Ph.D. in Computer Science; Ph.D. in Algorithms, Combinatorics & Optimization; Ph.D. in BioEngineering, Ph.D. in BioInformatics). We welcome your interest in our community.

The mission of the School of Computer Science is to push the boundaries in education and research that will be necessary to design, build and understand the complex systems that are central to society. Examples of such systems include the Internet, enterprise computing systems, secure information spaces, and mobile communication systems. We accomplish this by creating a community of collaborators who are focused on high quality, high impact work.

## BIOENGINEERING PROGRAMS

In response to the increased need for engineers and medical scientists with advanced training in bioengineering, Georgia Tech now offers master's and Ph.D. degrees in bioengineering. The purpose of bioengineering as a research discipline is to develop new and better physical and mathematical concepts and techniques that may be applied to problems in medicine and biology, to the development of new medical technologies, and to the organization and delivery of cost-effective healthcare. Interdisciplinary graduate programs in bioengineering are offered by the College of Computing in conjunction with the Bioengineering Center (in the Office of Interdisciplinary Programs), the College of Engineering, and the College of Sciences. The student's home unit will be the College of Computing, which, upon completion of the student's requirements, will recommend the degree. This interdisciplinary approach has been approved by the faculty in the Schools of Aerospace Engineering, Chemical and Biomolecular Engineering, Electrical and Computer Engineering, Materials Science and Engineering, Mechanical Engineering, and Polymer, Textile and Fiber Engineering, and by the deans of the Colleges of Computing, Engineering, and Sciences.

The program is for computer science or engineering graduates who wish to pursue a degree in bioengineering rather than in a traditional field of computing or engineering, or who have done bioengineering research in other disciplines. In addition, those interested students with non-engineering backgrounds (with degrees in such fields as physics, chemistry, biology, or mathematics) who meet the admission requirements will be admitted to the program. Applications from physicians with undergraduate degrees in engineering or the physical sciences will also be considered. All applications will be processed through the Bioengineering Center.

Additional information is available at www.bme.gatech.edu/academics/grad/bioengineering.html.

## MASTER OF SCIENCE IN BIOENGINEERING

Students who wish to pursue a master's degree in bioengineering may also do so through the College of Computing. The specific requirements differ from those of the computer science master's program, and while the degree is granted from the College, applications for this program are processed through the Bioengineering Center of the Office of Interdisciplinary Programs.

Additional information is available at www.bme.gatech.edu/academics/grad/bioengineering.html.

## MASTER OF SCIENCE IN COMPUTER SCIENCE

The program for the Master of Science in Computer Science (M.S.C.S.) prepares students for more highly productive careers in industry. Graduates receive the M.S.C.S. for completing one of three options in the program as described in this section. Students may apply to the program if they possess a bachelor's degree in computer science from an accredited institution. Students without a bachelor's degree in computer science are encouraged to apply as well, with the understanding that they will be required to complete remedial coursework appropriate to their background in addition to the requirements of the M.S.C.S. degree. All applicants are evaluated according to their prior academic record, scores on the Graduate Record Examination, a personal statement, and letters of recommendation. Applicants are selected for fall semester admission only. The application deadline is February 1. However, all applicants are encouraged to apply as early as possible because the selection process may begin well before the deadline.

The College's master's degree requirements supplement the Institute's master's requirements listed in this catalog. Students must achieve a grade point average of at least 3.0 to graduate, and no course grades below C will count toward graduation. Undergraduate courses required for the B.S.C.S. degree may not be used toward the M.S.C.S. degree. In addition, no graduate credit will be given for 3000 level courses or lower-level courses. Students must take all master's degree coursework on a letter-grade basis. The maximum total credit hours of Special Problems that may be applied toward the M.S.C.S. degree is three. Students may choose from one of three options in pursuing the M.S.C.S. degree, including:

**Course option:** This option requires the student to complete thirty-six hours of coursework.

Total Course Credit Hours 36
Minimum Credit Hours in CS 24
Minimum Credit Hours(6000/8000 Level) in CS 18
Minimum Credit Hours (6000/8000 Level) 24

**Project option:**
This option requires the student to complete twenty-seven hours of coursework and a nine-hour project. The project requires approval by a faculty advisor and the M.S. program coordinator in the semester prior to its inception.

Total Credit Hours 36
M.S. Project Hours 9
Total Course Credit Hours 27
Minimum Credit Hours in CS 24*
Minimum Credit Hours (6000/8000 Level) in CS 18*

**Thesis option:**
This option requires the student to complete twenty-four hours of coursework and a twelve-hour thesis. The thesis process is defined elsewhere in this catalog.

Total Credit Hours 36
M.S. Thesis Hours 12
Total Course Credit Hours 24
Minimum Credit Hours in CS 24*
Minimum Credit Hours (6000/8000 Level) in CS 18*

* May not include M.S. project or thesis hours.

All three of these options require students to complete three hours of courses in each of the core areas of Systems and Theory at the graduate level. In addition, students entering the program must demonstrate a core competency in computing equivalent to undergraduate-level courses in the following areas: systems, design and analysis of algorithms, formal languages and automata theory, databases, networking and communications, computer architecture, and human-computer interaction. This requirement can be satisfied by having taken undergraduate courses as a part of an undergraduate degree, taking remedial courses in the M.S.C.S. program, or by examination. Beyond the core requirements, students may specialize in areas of their choice. A specialization is achieved by completing at least two graduate-level courses in the selected area. Every student must complete at least one specialization as a part of his or her degree program. The current eleven specialization areas are: computer architecture, database systems, graphics and visualization, human-computer interaction, information security, intelligent systems, networking and communications, programming languages and compilers, software methodology and engineering, systems, and theoretical computer science.

A student who is enrolled in another graduate program of the Institute may pursue an M.S.C.S. while

that student is also pursuing his or her degree in the other major. To be granted permission to pursue the M.S.C.S., a student must submit to the M.S. program coordinator of the College of Computing the material required for admission to the M.S.C.S. program. This includes transcripts, letters of recommendation, and GRE General Test and Computer Science Subject Test scores. If the student is approved by the College to pursue the M.S.C.S., the student will be notified in writing. At no time will a student outside the College be allowed to pursue a concurrent degree without prior permission of the M.S. program coordinator of the College of Computing.

A student enrolled in the M.S. degree program in computer science who wishes to be admitted to the Ph.D. program in computer science should apply via the same process as external students. It is expected that such a student will have at least two letters of recommendation from College of Computing faculty.

For more information about the M.S.C.S. program, visit www.cc.gatech.edu.

## MASTER OF SCIENCE IN INFORMATION SECURITY

The College of Computing in cooperation with the Sam Nunn School of International Affairs has established a Master of Science degree in Information Security. The program operates in conjunction with the Georgia Tech Information Security Center (GTISC), which was named a Center of Excellence in Information Assurance by the National Security Agency. The Information Security program provides students with background and insight into general knowledge issues before concentrating on either technical or policy coverage of key elements of information security. The general knowledge aspects of the program touch on the issues surrounding the impact of information security on our lives, private citizens' concern for privacy, information security risks to business and government, and the impact of laws and public policy. The technical concentration focuses on examining the general dimension of providing security for information processing systems (secure operating systems and applications, network security, cryptography, and security protocols). The policy concentration focuses on the many non-technical dimensions of information processing and security, including domestic and international policy processes, organizational routines and innovation, risk perception, industry-government relations, and the constitutional framework for governmental actions. These unique, interdisciplinary strengths of computing and policy are at the core of our program.

### COURSE OF STUDY

The Master of Science in Information Security is a three-semester program for a total of thirty-two semester hours. Each student is required to take a set of core courses, a practicum, and one of two concentrations (technology or policy). The core is composed of seven courses, and the concentrations are three courses tailored to the student's needs and desires, but are focused on technology or policy.

### FIXED CORE COURSES (TWENTY-THREE HOURS)

CS 4235 (3-0-3) Introduction to Information Security
CS 6238 (3-0-3) Secure Computer Systems
CS 6260 (3-0-3) Applied Cryptography
CS 6262 (3-0-3) Network Security
CS 6265 (0-9-3) Information Security Laboratory
CS 6725 (3-0-3) Information Security Strategies and Policies
CS 8903 (5-0-5) Practicum/Project/Research

### CONCENTRATION I (TECHNOLOGY CENTRIC: NINE HOURS)

Choose three courses from the following:

MATH 4150 (3-0-3) Introduction to Number Theory
CS 4500 (3-0-3) Theory II
CS 6210 (3-0-3) Advanced Operating Systems
CS 6250 (3-0-3) Computer Networks
CS 6269 (3-0-3) Formal Models and Methods for Information Assurance
CS 6300 (3-0-3) Software Development Process
CS 6400 (3-0-3) Database Systems Concepts and Designs
CS 7260 (3-0-3) Internetworking Architecture and Protocols

### CONCENTRATION II (POLICY CENTRIC: NINE HOURS)

Choose three courses from the following:

PUBP 4756 (3-0-3) Technology Forecasting and Assessment
PUBP 6401 (3-0-3) Science, Technology, and Public Policy
ECON 6150 (3-0-3) Cost and Benefit Analysis
MGT 6050 (3-0-3) Management Information Systems
MGT 6057 (3-0-3) Business Process Analysis and Design (SAP)
CIS 8680 (3-0-3) Security and Privacy of Information and Information Systems (offered by Georgia State University)

The College's master's degree requirements supplement the Institute's master's requirements listed in this catalog. Students must achieve a grade point average of at least 3.0 to graduate, and no course grade below *C* will count toward graduation.

For more information about the M.S.I.S. program, visit www.cc.gatech.edu.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN ALGORITHMS, COMBINATORICS, OPTIMIZATION

The College of Computing is one of the sponsors of the multidisciplinary program in Algorithms, Combinatorics, and Optimization (ACO), an approved doctoral degree program at Georgia Tech. The other sponsoring units are the Stewart School of Industrial and Systems Engineering and the School of Mathematics. The degree program is administered by an oversight committee drawn primarily from the sponsoring units.

The study of discrete structures is a rapidly growing area in computer science, applied mathematics, and operations research, most obviously in the analysis of algorithms, combinatorics, and discrete optimization. Collaborative work among the three traditionally separate disciplines is already common. The doctorate in Algorithms, Combinatorics, and Optimization will prepare students for careers in this exciting and expanding field.

Students are expected to be well prepared in at least one of the three fields represented by the sponsoring units (computer science, mathematics, and operations research). Each student in the program is admitted through one of the three sponsoring units, which serves as the home department. Coursework is drawn from all three disciplines. The research advisor may be any member of the ACO program faculty, which is drawn from electrical and computer engineering, management, and other disciplines in addition to the three sponsoring units.

Additional details about the ACO program are available at www.math.gatech.edu/aco.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN BIOENGINEERING

The Bioengineering Ph.D. degree requires a thesis based on independent study of a bioengineering research topic under the guidance of a bioengineering program faculty member. It also requires thirty six hours of coursework in a mixture of bioscience, mathematics, bioengineering, traditional engineering, and elective classes.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN BIOINFORMATICS

The mission of the Georgia Tech Bioinformatics Ph.D. Program is to educate and prepare graduate students to reach the forefront of leadership in the field of bioinformatics and computational biology; and to integrate research and education on the use of information technologies in biology and medicine. Thus, the program leading to a Ph.D. in Bioinformatics is an interdisciplinary program spanning a variety of academic departments at Georgia Tech.

Bioinformatics is a multidisciplinary field in which physical sciences, life sciences, computer science, and engineering are merged to solve both fundamental and applied problems in biology and medicine. The outcomes of bioinformatics and computational biology particularly include

1. new and global perspectives into the organization and function of biological systems (fundamental biology);
2. new and novel targets for drug discovery and development; and
3. genetic/proteomic profiling for pharmaco-genomics or personalized medicine.

Thus, bioinformatics is emerging as a strategic discipline at the frontier between biology, biochemistry, biomedicine, bioengineering, computer science, and mathematics, impacting fundamental science, medicine, biotechnology, and society.

With its broad mission statement, this program at Georgia Tech has the following focus / strength areas:

1. Development of software tools, algorithms, and databases for gene identification, protein structural prediction, clustering analysis, and data mining.
2. Application of bioinformatics to disease diagnosis, classification, prognosis, and treatment.
3. Application of bioinformatics to fundamental biology and systems biology.

There is an increasing demand for scientists with advanced training in bioinformatics. Professionals in this area should have a thorough knowledge of molecular biology, mathematics, and statistics as well as computer science and engineering.

In 1997 the College of Sciences at Georgia Tech proposed and established a professional Master of Science in Bioinformatics degree program, the first of its kind in the United States. This interdisciplinary program consists of a unique combination of courses. Students are taught with equal strength in several scientific disciplines and are prepared for further successful work in industry or academia. At present there are more than forty students in the program, with twelve graduates already employed in academia and industry, particularly at SmithKlineGlaxo, Navartis, Johnson & Johnson, Informax, Los Alamos National Lab, Vanderbilt University, and the U.S. Centers for Disease Control and Prevention.

In 1993, the School of Biology at Georgia Tech implemented a Ph.D. in Biology with a concentration in Bioinformatics. This option will stay in place for those students who would like to pursue a Ph.D. in Biology.

The group of prospective applicants for the Ph.D. program is expected to consist of students with an M.S. in Bioinformatics as well as holders of B.S./B.A. and higher degrees in different disciplines. The applicants with life science degrees are usually looking for an interdisciplinary education with a focus on mathematics, physics, and computer science. This demand fits perfectly with what Georgia Tech can offer: high- quality education in mathematics, physics, and computing along with advanced courses in biology and biochemistry.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN COMPUTER SCIENCE

The Computer Science Doctoral Program begins with research and breadth components. The research component helps students place an early focus on research. Students must complete an "Introduction to Graduate Studies" course (CS 7001) and then take at least three hours of directed research study (CS 8903) under faculty guidance each semester until their qualifying examination. The breadth component is intended to facilitate students' learning about a variety of areas within computing, as well as core computer science areas. Students must take at least twelve courses from the different areas of study within the College. The current twelve areas are computer architecture, database systems, graphics and visualization, human-computer interaction, information security, intelligent systems and robotics, learning sciences and technology, networking and communications, programming languages and compilers, software methodology and engineering, systems (including operating systems, distributed and parallel systems), and theoretical computer science. Students must include courses from the systems and theory areas in those breadth courses.

As students' research progresses, they must select a primary, and possibly secondary, area of focus from the areas listed previously, and then pass a qualifier (comprehensive exam) in that area or areas. The qualifier consists of three parts:

1. A one-day written examination covering the pertinent research area(s)
2. The submission of a high-quality research deliverable, as evidenced by a portfolio consisting of at least an exam committee-reviewed and publishable article, and possibly other work products as approved by the exam committee
3. An oral presentation and examination

After successfully completing the qualifier, a student focuses on research leading toward a dissertation. The topic of the student's research is formalized through a written dissertation proposal followed by an oral presentation. When the student passes his or her proposal, the student is admitted to candidacy and proceeds with dissertation research. This phase is completed with the successful defense and submission of the approved doctoral dissertation. Students are also required to complete a nine-hour minor outside the College.

For more information about the Computer Science Ph.D. program, visit www.cc.gatech.edu.

## COOPERATIVE PROGRAMS

The College of Computing participates in the undergraduate and graduate Cooperative Programs. See links below for further Information.

## SCHOOL OF INTERACTIVE COMPUTING

Interactive and intelligent computing is an emerging discipline on the frontier of ways computation impacts the external world. The School of Interactive Computing advances computing-mediated interactions by encompassing fields ranging from artificial intelligence and machine learning to graphics and computer vision to interface design and empirical methods. We don't just evaluate technology, we create technology that makes interactions better. Much of the research within the School of Interactive Computing produces new artifacts that embody new capabilities or methods. Examples include:

- Individuals working with traditional computers
- Groups of people using ubiquitous computing capabilities throughout various environments
- Researchers visualizing scientific data
- Students developing and altering middle school physics simulations
- Automated intelligent surveillance systems monitoring airport tarmacs
- Robots delivering pharmaceuticals to patients in hospitals

Whether an advance is in robotics, augmented reality, or ubiquitous computing, it is developed in the context of a prototype. School of Interactive Computing students become proficient in many areas such as mechanical or electrical engineering, and industrial design. The School of Interactive Computing develops practitioners, future innovators and researchers by offering numerous degree programs.

At the undergraduate level, the School of Interactive Computing is an integral part of the College's BS in Computer Science, and oversees aspects of Computational Media's Bachelor's degree-offered jointly with the School of Literature, Communication and Culture (LCC). The School of Interactive Computing also administers the interdisciplinary Master's in Human Computer Interaction (HCI) program in which students from the School of Interactive Computing, LCC, and Psychology participate. At the graduate level the School of Interactive Computing students can pursue Master's and Ph.D. degrees in Computer Science, or a Ph.D. in Human-Centric Computing-the first of its kind in the nation. The School of Interactive Computing is also developing a Robotics Ph.D. to be offered in conjunction with schools from the College of Engineering.

## BACHELOR OF SCIENCE IN COMPUTATIONAL MEDIA

The Bachelor of Science in Computational Media is a collaborative effort by the College of Computing and the School of Literature, Communication, and Culture (LCC). The program offers a thorough education in all aspects of the computer as a medium: the technical, the historical-critical, and the applied. Program graduates will have both significant hands-on and theoretical knowledge of computing and an understanding of visual design and the history of media. Graduates will be uniquely positioned to plan, create, and critique new digital media forms for entertainment, education, and business communication.

The program requires thirty-six semester hours of courses in computer science and thirty hours of courses in LCC (in addition to the humanities requirement). A substantial number of required courses in each unit ensures that every student has basic competence in:

- computational principles;
- the representation and manipulation of digital media, including graphics and sound;
- software design;
- visual and interactive design;
- digital arts; and
- media theory and history.

After completing required courses, students specialize in a specific area of media computing. Typical specialty areas include:

- Interactive games design: This is one of the fastest growing areas of digial media production and is already a $7 billion industry.
- Special effects: As special effects become more complex and focused on computer-generated imagery, employment in this area will increasingly require expertise in both media and computer science.
- Culturally informed program design: As programming work is increasingly outsourced to nations offering lower labor costs, programming that adds value through a sophisticated response to the needs of specific corporate and group cultures will offer job security to American programmers.

Depending on their coursework within the B.S. program, students will also be qualified to enter graduate studies in computer science, digital arts, digital media studies, and human-computer interface.

# BACHELOR OF SCIENCE IN COMPUTATIONAL MEDIA

## 2008 - 2009 DEGREE REQUIREMENTS

**INTERDISCIPLINARY DEGREE** WITH THE COLLEGE OF COMPUTING AND IVAN ALLEN COLLEGE

Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1315 or 1301 or 1371 | 3 |
| **TOTAL SEMESTER HOURS =** | **13** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| CS 1331 INTRO TO OBJECT ORIENTED PROGRAMMING | 3 |
| LCC 2720 PRINCIPLES OF VISUAL DESIGN | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| CS 2261 MEDIA DEVICE ARCHITECTURES | 4 |
| LCC 2400 or 2500 or 2600 | 3 |
| LCC 2700 INTRODUCTION TO COMPUTATIONAL MEDIA | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| CS 1050 UNDERSTANDING AND CONSTRUCTING PROOFS | 3 |
| CS 2340 OBJECTS AND DESIGN | 3 |
| LCC 2730 or 3705 or 3710 (STUDIO) | 3 |
| LAB SCIENCE (BIOL, CHEM, EAS, PHYS) | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| CS SPECIALTY COURSE (3000 OR 4000 LEVEL, FROM CS MEDIA THREAD OR CS PEOPLE THREAD) | 3 |
| LCC SPECIALTY COURSE (MUST BE APPROVED BY ADVISOR) | 3 |
| LCC 2730 OR 3705 OR 3710 (STUDIO) | 3 |
| LCC 3206 OR 3314 | 3 |
| LAB SCIENCE (BIOL, CHEM, EAS, PHYS) | 4 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| CS SPECIALTY COURSE (3000 OR 4000 LEVEL, FROM CS MEDIA THREAD OR CS PEOPLE THREAD) | 3 |
| LCC SPECIALTY COURSE (MUST BE APPROVED BY ADVISOR) | 3 |
| LCC ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CS SPECIALTY COURSE (3000 OR 4000 LEVEL, FROM CS MEDIA THREAD OR CS PEOPLE THREAD) | 3 |
| LCC SPECIALTY COURSE (MUST BE APPROVED BY ADVISOR) | 3 |
| CS 4001 COMPUTING, SOCIETY, AND PROFESSIONALISM | 3 |
| LCC 4699 OR 4720 OR 4725 OR 4730 OR 4731 OR 4732 (ADVANCED STUDIO) | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |

| | |
|---|---|
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CAPSTONE | 4 |
| CS SPECIALTY COURSE (3000 OR 4000 LEVEL, FROM CS MEDIA THREAD OR CS PEOPLE THREAD) | 3 |
| FREE ELECTIVES | 8 |
| **TOTAL SEMESTER HOURS =** | **15** |

**TOTAL PROGRAM HOURS = 120 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

## COOPERATIVE PROGRAMS

The College of Computing participates in the undergraduate and graduate Cooperative Programs. See links below for further Information.

## BACHELOR OF SCIENCE IN COMPUTATIONAL MEDIA - INTERNATIONAL PLAN

The Computational Media (CM) International Plan follows the Institute model to develop a global competence within the student's major program of study. It thus integrates international studies and experiences with work in all aspects of the computer as a medium, preparing graduates to plan, create, and critique new digital media forms within an international professional environment.

As in the basic CM program, students following the International Plan will take thirty-six hours of courses in CS and thirty hours of courses in LCC (in addition to the basic humanities requirement). Students will also:

1. take three international courses, including one from each of the following categories: International Relations, Global Economics, and a course on a specific country or region;
2. spend two terms abroad engaged in any combination of study abroad, research, or internship;
3. demonstrate language proficiency equivalent to two years of college-level language study (to be determined by testing); and
4. complete a CM capstone course that links international studies with the major.

## BACHELOR OF SCIENCE IN COMPUTATIONAL MEDIA - RESEARCH OPTION

The Computational Media (CM) Research Plan follows the Institute model to allow students to incorporate research experiences into the major program of study. Students will complete nine hours of credit research work on various aspects of the computer as a medium, working in such areas as computational principles, the representation and manipulation of digital media, software design, visual and interactive design, digital art, and media theory and history.

As in the basic CM program, students following the Research Plan will take thirty-six hours of courses in CS and thirty hours of courses in LCC (in addition to the basic humanities requirement). Students will also:

1. complete nine hours of undergraduate research and
2. complete LCC 4700 Writing the Undergraduate Thesis.

## MASTER OF SCIENCE IN COMPUTER SCIENCE

The program for the Master of Science in Computer Science (M.S.C.S.) prepares students for more highly productive careers in industry. Graduates receive the M.S.C.S. for completing one of three options in the program as described in this section. Students may apply to the program if they possess a bachelor's degree in computer science from an accredited institution. Students without a bachelor's degree in computer science are encouraged to apply as well, with the understanding that they will be required to complete remedial coursework appropriate to their background in addition to the requirements of the M.S.C.S. degree. All applicants are evaluated according to their prior academic record, scores on the Graduate Record Examination, a personal statement, and letters of recommendation. Applicants are selected for fall semester admission only. The application deadline is February 1. However, all applicants are encouraged to apply as early as possible because the selection process may begin well before the deadline.

The College's master's degree requirements supplement the Institute's master's requirements listed in this catalog. Students must achieve a grade point average of at least 3.0 to graduate, and no course grades below C will count toward graduation. Undergraduate courses required for the B.S.C.S. degree may not be used toward the M.S.C.S. degree. In addition, no graduate credit will be given for 3000 level courses or lower-level courses. Students must take all master's degree coursework on a letter-grade basis. The maximum total credit hours of Special Problems that may be applied toward the M.S.C.S. degree is three. Students may choose from one of three options in pursuing the M.S.C.S. degree, including:

**Course option:** This option requires the student to complete thirty-six hours of coursework.

Total Course Credit Hours 36
Minimum Credit Hours in CS 24
Minimum Credit Hours(6000/8000 Level) in CS 18
Minimum Credit Hours (6000/8000 Level) 24

**Project option:**
This option requires the student to complete twenty-seven hours of coursework and a nine-hour project. The project requires approval by a faculty advisor and the M.S. program coordinator in the semester prior to its inception.

Total Credit Hours 36
M.S. Project Hours 9
Total Course Credit Hours 27
Minimum Credit Hours in CS 24*
Minimum Credit Hours (6000/8000 Level) in CS 18*

**Thesis option:**
This option requires the student to complete twenty-four hours of coursework and a twelve-hour thesis. The thesis process is defined elsewhere in this catalog.

Total Credit Hours 36
M.S. Thesis Hours 12
Total Course Credit Hours 24
Minimum Credit Hours in CS 24*
Minimum Credit Hours (6000/8000 Level) in CS 18*

* May not include M.S. project or thesis hours.

All three of these options require students to complete three hours of courses in each of the core areas of Systems and Theory at the graduate level. In addition, students entering the program must demonstrate a core competency in computing equivalent to undergraduate-level courses in the following areas: systems, design and analysis of algorithms, formal languages and automata theory, databases, networking and communications, computer architecture, and human-computer interaction. This requirement can be satisfied by having taken undergraduate courses as a part of an undergraduate degree, taking remedial courses in the M.S.C.S. program, or by examination. Beyond the core requirements, students may specialize in areas of their choice. A specialization is achieved by completing at least two graduate-level courses in the selected area. Every student must complete at least one specialization as a part of his or her degree program. The current eleven specialization areas are: computer architecture, database systems, graphics and visualization, human-computer interaction, information security, intelligent systems, networking and communications, programming languages and compilers, software methodology and engineering, systems, and theoretical computer science.

A student who is enrolled in another graduate program of the Institute may pursue an M.S.C.S. while

that student is also pursuing his or her degree in the other major. To be granted permission to pursue the M.S.C.S., a student must submit to the M.S. program coordinator of the College of Computing the material required for admission to the M.S.C.S. program. This includes transcripts, letters of recommendation, and GRE General Test and Computer Science Subject Test scores. If the student is approved by the College to pursue the M.S.C.S., the student will be notified in writing. At no time will a student outside the College be allowed to pursue a concurrent degree without prior permission of the M.S. program coordinator of the College of Computing.

A student enrolled in the M.S. degree program in computer science who wishes to be admitted to the Ph.D. program in computer science should apply via the same process as external students. It is expected that such a student will have at least two letters of recommendation from College of Computing faculty.

For more information about the M.S.C.S. program, visit www.cc.gatech.edu.

# MASTER OF SCIENCE IN HUMAN - COMPUTER INTERACTION

## OVERVIEW

The interdisciplinary Master of Science in Human-Computer Interaction (HCI) degree program is a cooperative effort of the College of Computing; the School of Literature, Communication, and Culture; and the School of Psychology. The program provides students with the practical, interdisciplinary skills and theoretical understanding they will need to become leaders in the design, implementation, and evaluation of the computer interfaces of the future.

## COURSE OF STUDY

The HCI master's degree is a four-semester program consisting of a total of thirty-six semester hours. Each student will be required to complete a set of core courses, a set of area specialization courses, and a master's project. The core is divided into fixed and flexible sets of courses. Students are required to complete three courses in the fixed core and a subset of courses in the flexible core based upon their academic background. The specific courses for each student will be determined by the HCI program coordinator in consultation with the academic unit. The area specialization courses are determined by the academic unit in which the student resides. The areas of specialization are Computing; Digital Media (DM, through the School of Literature, Communication, and Culture); and Psychology.

## FIXED CORE (NINE HOURS)

CS/PSYC 6750, Human-Computer Interaction (must be taken during the first semester)
PSYC 6018, Principles of Research Design
PSYC 7101, Engineering Psychology I: Methods and Controls

## FLEXIBLE CORE (12 HRS COMPUTING AND PSYCHOLOGY SPECIALIZATIONS; 9 HRS IDT)

All specialization courses may also be taken as part of the Flexible Core, but at least nine hours of the Flexible Core must be taken outside your specialization. A maximum of three hours of CS 8903 may count toward the Flexible Core.

## COMPUTING

COA/CS 6763, Design of Environments
COA 8901, Special Problems: Network Music
COA 8903, Special Problems: Project Studio in Music Technology
COA 8903, Special Problems: Computer Music Composition
CS 7467, Computer-Supported Collaborative Learning
CS 8803, Special Topics: Computer Audio
CS/PSYC 6795, Introduction to Cognitive Science

## INTERNATIONAL AFFAIRS

INTA 8803, Special Topics: Computers, Communications, and International Development
INTA 8803 / PUBP 8803, Special Topics: Information Technology Policy

## INDUSTRIAL AND SYSTEMS ENGINEERING

ISYE 6205 / AE 8803, Cognitive Engineering
ISYE 6215, Models in Human-Machine Systems
ISYE 6224, Topics in Human-Integrated Systems
ISYE 6231, Design of Human-Integrated Systems
ISYE 6413, Design and Analysis of Experiments
ISYE 6414, Statistical Modeling and Regression Analysis
ISYE 6739, Basic Statistical Methods

## LITERATURE, COMMUNICATION, AND CULTURE

LCC 6213, Educational Applications of New Media
LCC 6215, Issues in Media Studies
LCC 6314, Design of Networked Media
LCC 6315, Project Production
LCC 6316, Historical Approaches to Digital Media
LCC 6317, Interactive Fiction
LCC 6318, Experimental Media
LCC 6319, Intellectual Property Policy and Law
LCC 6320, Globalization and New Media
LCC 6321, The Architecture of Responsive Spaces
LCC 6325, Game Design and Analysis

LCC 6330, Expressive Virtual Space
LCC 6350 / ARCH 8821 / COA 8904, Spatial Constructions of Meaning
LCC 8000, Proseminar in Media Theory

### MUSIC

COA 8901, Network Music
COA 8903, Special Problems: Computer Music Composition
COA 8903, Special Problems: Music Technology Research
COA 8903, Special Problems: Project Studio in Music Technology
MUSI 4803, Special Topics: Interactive Music

### PSYCHOLOGY

PSYC 7104, Psychomotor and Cognitive Skills
PSYC 8040, Seminar in Engineering Psychology: Assistive Technologies
PSYC 8040, Seminar in Engineering Psychology: The Psychology of HCI

### PUBLIC POLICY

PUBP 8803, Special Topics: The Internet and Public Policy
Certificate Option for the Flexible Core
Certificate in Management of Technology, http://mgt.gatech.edu/programs/mba/concen_cert.html
MGT 6056, Electronic Commerce
MGT 6057, Business Process Analysis and Design
MGT 6111, Innovation and Entrepreneurial Behavior
MGT 6165, Venture Creation
MGT 6326, Collaborative Product Development
MGT 6351, Operations Resource Planning and Execution
MGT 6353, Operations Strategy
MGT 6772, Managing Resources of the Technological Firm
MGT 8803, Special Topics in Management: Database and Customer-Relationship Marketing
MGT 8803, Special Topics in Management: Seminar on Emerging Technologies
PUBP 6401, Science, Technology, and Public Policy

### COMPUTING SPECIALIZATION (11 HOURS)

Software (3 hours):
CS 4452, Human-Centered Computing Concepts
CS 6300, Software Development Process
CS 6452, Prototyping Interactive Systems
CS 6456, Principles of User Interface Software
CS 7470, Mobile and Ubiquitous Computing
CS 8803, Special Topics: Adaptive Personalized Information Environments
CS 8803, Special Topics: Augmented Reality Design

### DESIGN, EVALUATION, AND COGNITIVE MODELING (6 HOURS):

CS 6010, Principles of Design
CS 6451, Introduction to Human-Centered Computing
CS 6455, User Interface Design and Evaluation
CS 6460, Educational Technology: Conceptual Foundations
CS 6470, Design of Online Communities
CS 7450, Information Visualization
CS 7460, Collaborative Computing
CS 7610, Modeling and Design
CS/PSYC 7790, Cognitive Modeling
CS 8902, Special Problems

The remaining two credit hours may be taken from either section. A maximum of three hours of CS 8903 may count toward the Computing specialization. The master's degree requirements for students in the College of Computing supplement those of the Institute. Students must achieve a grade point average of at least 3.0 to graduate, and no course grade below C will count toward graduation.

### DIGITAL MEDIA (DM) SPECIALIZATION (12 HOURS)

Required (may be repeated; up to six hours of LCC 6650 may be applied toward the specialization) LCC 6650, Project Studio (enrollment by permission of instructor)

One of the following courses, preferably taken in the first year of study:
LCC 6310, The Computer as an Expressive Medium
LCC 6311, Visual Culture and Design
LCC 6312, Design, Technology, and Representation
LCC 6313, Principles of Interactive Design

Students may fulfill the rest of the required hours with any other LCC 6000 or 8000 level course.

## PSYCHOLOGY SPECIALIZATION (11 HOURS)

Required:
PSYC 6019, Statistical Analysis of Psychological Data I (5 hours)
PSYC 7102, Engineering Psychology II: Displays and Stressors

## AT LEAST 3 HOURS FROM THE FOLLOWING COURSES:

PSYC 6011, Cognitive Psychology
PSYC 6014, Sensation and Perception
PSYC 6020, Statistical Analysis of Psychological Data II (5 hours)

## PROJECT (4 HOURS; 6 HOURS FOR STUDENTS IN THE DM SPECIALIZATION)

Each student should complete this requirement, under the supervision of a faculty member, during the last two semesters of the program. Students should also submit a brief written report to their project supervisors at the end of each semester of work and present their work during the MS-HCI student seminar during the semester of graduation.

CS 8902, Special Problems (repeatable; variable semester hours)
or
PSYC 8903, Special Problems in HCI (repeatable; variable semester hours)

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN COMPUTER SCIENCE

The Computer Science Doctoral Program begins with research and breadth components. The research component helps students place an early focus on research. Students must complete an "Introduction to Graduate Studies" course (CS 7001) and then take at least three hours of directed research study (CS 8903) under faculty guidance each semester until their qualifying examination. The breadth component is intended to facilitate students' learning about a variety of areas within computing, as well as core computer science areas. Students must take at least twelve courses from the different areas of study within the College. The current twelve areas are computer architecture, database systems, graphics and visualization, human-computer interaction, information security, intelligent systems and robotics, learning sciences and technology, networking and communications, programming languages and compilers, software methodology and engineering, systems (including operating systems, distributed and parallel systems), and theoretical computer science. Students must include courses from the systems and theory areas in those breadth courses.

As students' research progresses, they must select a primary, and possibly secondary, area of focus from the areas listed previously, and then pass a qualifier (comprehensive exam) in that area or areas. The qualifier consists of three parts:

1. A one-day written examination covering the pertinent research area(s)
2. The submission of a high-quality research deliverable, as evidenced by a portfolio consisting of at least an exam committee-reviewed and publishable article, and possibly other work products as approved by the exam committee
3. An oral presentation and examination

After successfully completing the qualifier, a student focuses on research leading toward a dissertation. The topic of the student's research is formalized through a written dissertation proposal followed by an oral presentation. When the student passes his or her proposal, the student is admitted to candidacy and proceeds with dissertation research. This phase is completed with the successful defense and submission of the approved doctoral dissertation. Students are also required to complete a nine-hour minor outside the College.

For more information about the Computer Science Ph.D. program, visit www.cc.gatech.edu.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN HUMAN-CENTERED COMPUTING (HCC)

Human - Centered Computing (HCC) is the interdisciplinary science of designing computational artifacts that better support human endeavors. HCC students examine issues - such as computer-supported collaborative work and learning, human-computer interaction, human-robot interaction, learning sciences and technology, and mobile and ubiquitous computing - that lie at the intersection of human concerns (such as anthropology, cognitive science, human factors, industrial design, media studies, psychology, and sociology) and computing studies (such as artificial intelligence, computational perception, databases, graphics, information security, networks, programming languages, and robotics).

Students must complete a core of the three courses described below. The required courses will help students develop the first two of the four competencies that must be demonstrated; these competency areas are computing concepts and skills, evaluation of HCC systems, written research communication, and oral research communication. In consultation with their advisors, students must also complete at least three elective courses, including at least one outside the area of HCC specialization. Areas of elective study may include, but are not restricted to, artificial intelligence, cognitive science, collaboration, human-computer interaction, information security, learning sciences and technology, software, software engineering, and visualization. Students must also pass a written and oral qualifier (comprehensive examination) and submit and receive approval for a dissertation topic and committee. Students may then be admitted to candidacy.

Students begin to familiarize themselves with HCC concepts and work on HCC projects in their first required course, CS 6451, Introduction to Human-Centered Computing. In the same semester, students who need to develop skills in programming may do so by taking CS 4452, Human-Centered Computing Concepts. This class will prepare students for the second required course, CS 6452, Prototyping Interactive Systems. In their second year, students take the third required course, CS 7455, Issues in Human-Centered Computing, which delves deeply into theoretical, methodological, conceptual, and technical issues.

Concurrently, each student develops a research portfolio under the supervision of a faculty advisor. The submission of a conference- or journal-quality paper, and a conference-style presentation, satisfies the competencies of written and oral research communications.

Students are also required to complete a nine-hour minor outside the College of Computing, in accordance with Institute requirements.

For more information about the HCC program, visit www.cc.gatech.edu.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN ROBOTICS

Students pursuing a Ph.D. in Robotics must take thirty-six semester hours of core research and elective courses, pass a comprehensive qualifying exam with written and oral components, and successfully complete, document, and defend a piece of original research culminating in a doctoral thesis. Students select a home school, such as ECE, AE, ME, or CS, and apply for admission to the Ph.D. program in robotics through that home school.

## COOPERATIVE PROGRAMS

The College of Computing participates in the undergraduate and graduate Cooperative Programs. See links below for further Information.

## COMPUTATIONAL SCIENCE AND ENGINEERING DIVISION

The Computational Science & Engineering (CSE) division was established in 2005 to strengthen and better reflect the critical role that computation plays in the science and engineering disciplines at Georgia Tech and in the broader technology community. Along with theory and experimentation, computation has gained widespread acceptance as a key component in the advancement of knowledge and practice.

As a division of the College of Computing, CSE supports interdisciplinary research and education in computer science and applied mathematics. CSE is designed to innovate and create new expertise, technologies, and practitioners.

CSE bridges the gap between traditional computer science (CS) and computational research. The division is currently developing programs that immerse students both in computing and important computational problems within specific domain contexts. Developing solutions to difficult computation problems that allow all the richness, subtleties, and requirements of the domain to be adequately considered or addressed is crucial.

CSE is concerned with those technologies that lie at the boundary between computer science and science and engineering. Some of these areas include:

- high performance and grid computing
- modeling
- simulation
- data analysis and mining
- numeric and geometric methods
- visualization
- combinatorial optimization

A distinguishing aspect of the CSE division is its emphasis on modeling and simulation (M&S). Spanning both continuous and discrete M&S, CSE graduates will be well equipped to compete for positions and establish technical leadership in areas such as defense and the entertainment industries, in additional to more traditional areas of computational science and engineering.

CSE involves deep collaboration with scientists and engineers, as well as traditional computer scientists. Therefore, division faculty team up with researchers and educators working in high impact areas both at Georgia Tech and at peer research organizations, such as Oak Ridge National Laboratories. Current projects span the following areas:

- aerospace engineering
- chemistry
- computational biology
- civil and environmental engineering
- industrial and systems engineering
- materials science
- mechanical engineering
- defense

## BIOENGINEERING PROGRAMS

In response to the increased need for engineers and medical scientists with advanced training in bioengineering, Georgia Tech now offers master's and Ph.D. degrees in bioengineering. The purpose of bioengineering as a research discipline is to develop new and better physical and mathematical concepts and techniques that may be applied to problems in medicine and biology, to the development of new medical technologies, and to the organization and delivery of cost-effective healthcare. Interdisciplinary graduate programs in bioengineering are offered by the College of Computing in conjunction with the Bioengineering Center (in the Office of Interdisciplinary Programs), the College of Engineering, and the College of Sciences. The student's home unit will be the College of Computing, which, upon completion of the student's requirements, will recommend the degree. This interdisciplinary approach has been approved by the faculty in the Schools of Aerospace Engineering, Chemical and Biomolecular Engineering, Electrical and Computer Engineering, Materials Science and Engineering, Mechanical Engineering, and Polymer, Textile and Fiber Engineering, and by the deans of the Colleges of Computing, Engineering, and Sciences.

The program is for computer science or engineering graduates who wish to pursue a degree in bioengineering rather than in a traditional field of computing or engineering, or who have done bioengineering research in other disciplines. In addition, those interested students with non-engineering backgrounds (with degrees in such fields as physics, chemistry, biology, or mathematics) who meet the admission requirements will be admitted to the program. Applications from physicians with undergraduate degrees in engineering or the physical sciences will also be considered. All applications will be processed through the Bioengineering Center.

Additional information is available at www.bme.gatech.edu/academics/grad/bioengineering.html.

## MASTER OF SCIENCE IN BIOENGINEERING

Students who wish to pursue a master's degree in bioengineering may also do so through the College of Computing. The specific requirements differ from those of the computer science master's program, and while the degree is granted from the College, applications for this program are processed through the Bioengineering Center of the Office of Interdisciplinary Programs.

Additional information is available at www.bme.gatech.edu/academics/grad/bioengineering.html.

## MASTER OF SCIENCE IN COMPUTER SCIENCE

The program for the Master of Science in Computer Science (M.S.C.S.) prepares students for more highly productive careers in industry. Graduates receive the M.S.C.S. for completing one of three options in the program as described in this section. Students may apply to the program if they possess a bachelor's degree in computer science from an accredited institution. Students without a bachelor's degree in computer science are encouraged to apply as well, with the understanding that they will be required to complete remedial coursework appropriate to their background in addition to the requirements of the M.S.C.S. degree. All applicants are evaluated according to their prior academic record, scores on the Graduate Record Examination, a personal statement, and letters of recommendation. Applicants are selected for fall semester admission only. The application deadline is February 1. However, all applicants are encouraged to apply as early as possible because the selection process may begin well before the deadline.

The College's master's degree requirements supplement the Institute's master's requirements listed in this catalog. Students must achieve a grade point average of at least 3.0 to graduate, and no course grades below C will count toward graduation. Undergraduate courses required for the B.S.C.S. degree may not be used toward the M.S.C.S. degree. In addition, no graduate credit will be given for 3000 level courses or lower-level courses. Students must take all master's degree coursework on a letter-grade basis. The maximum total credit hours of Special Problems that may be applied toward the M.S.C.S. degree is three. Students may choose from one of three options in pursuing the M.S.C.S. degree, including:

**Course option:** This option requires the student to complete thirty-six hours of coursework.

Total Course Credit Hours 36
Minimum Credit Hours in CS 24
Minimum Credit Hours(6000/8000 Level) in CS 18
Minimum Credit Hours (6000/8000 Level) 24

**Project option:**
This option requires the student to complete twenty-seven hours of coursework and a nine-hour project. The project requires approval by a faculty advisor and the M.S. program coordinator in the semester prior to its inception.

Total Credit Hours 36
M.S. Project Hours 9
Total Course Credit Hours 27
Minimum Credit Hours in CS 24*
Minimum Credit Hours (6000/8000 Level) in CS 18*

**Thesis option:**
This option requires the student to complete twenty-four hours of coursework and a twelve-hour thesis. The thesis process is defined elsewhere in this catalog.

Total Credit Hours 36
M.S. Thesis Hours 12
Total Course Credit Hours 24
Minimum Credit Hours in CS 24*
Minimum Credit Hours (6000/8000 Level) in CS 18*

* May not include M.S. project or thesis hours.

All three of these options require students to complete three hours of courses in each of the core areas of Systems and Theory at the graduate level. In addition, students entering the program must demonstrate a core competency in computing equivalent to undergraduate-level courses in the following areas: systems, design and analysis of algorithms, formal languages and automata theory, databases, networking and communications, computer architecture, and human-computer interaction. This requirement can be satisfied by having taken undergraduate courses as a part of an undergraduate degree, taking remedial courses in the M.S.C.S. program, or by examination. Beyond the core requirements, students may specialize in areas of their choice. A specialization is achieved by completing at least two graduate-level courses in the selected area. Every student must complete at least one specialization as a part of his or her degree program. The current eleven specialization areas are: computer architecture, database systems, graphics and visualization, human-computer interaction, information security, intelligent systems, networking and communications, programming languages and compilers, software methodology and engineering, systems, and theoretical computer science.

A student who is enrolled in another graduate program of the Institute may pursue an M.S.C.S. while

that student is also pursuing his or her degree in the other major. To be granted permission to pursue the M.S.C.S., a student must submit to the M.S. program coordinator of the College of Computing the material required for admission to the M.S.C.S. program. This includes transcripts, letters of recommendation, and GRE General Test and Computer Science Subject Test scores. If the student is approved by the College to pursue the M.S.C.S., the student will be notified in writing. At no time will a student outside the College be allowed to pursue a concurrent degree without prior permission of the M.S. program coordinator of the College of Computing.

A student enrolled in the M.S. degree program in computer science who wishes to be admitted to the Ph.D. program in computer science should apply via the same process as external students. It is expected that such a student will have at least two letters of recommendation from College of Computing faculty.

For more information about the M.S.C.S. program, visit www.cc.gatech.edu.

## MASTER OF SCIENCE IN COMPUTATIONAL SCIENCE AND ENGINEERING

Computational Science and Engineering (CSE) is a discipline concerned with the body of knowledge, skills, and practices associated with the study of computer-based models of natural phenomena and engineered systems. Students will be required to obtain a breadth of knowledge across a set of core areas in the CSE discipline, depth of knowledge in a specific computational specialization (e.g., numerical computing), and knowledge to apply computational techniques in a domain of application. Students will be expected to integrate principles from mathematics, computer science, and engineering to be able to create significant computational artifacts, e.g., software.

The CSE M.S. degree program is an interdisciplinary program offered by the College of Computing, the College of Engineering, and the College of Sciences. Upon application, students select a desired “home unit” among those academic units that formally participate in the program.

Students must complete four of the five courses making up the core curriculum: CSE/Math 6643 (Numerical Linear Algebra), CSE 6140 (Computational Science and Engineering Algorithms), CSE 6730 (Modeling and Simulation: Fundamentals & Implementation), CSE/ISYE 6740 (Computational Data Analysis), and CSE 6220 (High Performance Computing). A home unit minor is required consisting of twelve hours of coursework relevant to the CSE discipline that includes one applications area; this must include at least six hours of courses that do not carry the CS/CSE course designation. Finally, students must either complete 6 additional hours of approved coursework (course option) or an M.S. thesis (thesis option) that is defended to the student’s thesis committee who is responsible for overseeing the student’s research. Six hours of thesis credit are required in the thesis option. Additional requirements may apply depending on the student’s home unit. A plan of study must be approved by the CSE program director and the student’s home unit coordinator.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN BIOENGINEERING

The Bioengineering Ph.D. degree requires a thesis based on independent study of a bioengineering research topic under the guidance of a bioengineering program faculty member. It also requires thirty six hours of coursework in a mixture of bioscience, mathematics, bioengineering, traditional engineering, and elective classes.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN BIOINFORMATICS

The mission of the Georgia Tech Bioinformatics Ph.D. Program is to educate and prepare graduate students to reach the forefront of leadership in the field of bioinformatics and computational biology; and to integrate research and education on the use of information technologies in biology and medicine. Thus, the program leading to a Ph.D. in Bioinformatics is an interdisciplinary program spanning a variety of academic departments at Georgia Tech.

Bioinformatics is a multidisciplinary field in which physical sciences, life sciences, computer science, and engineering are merged to solve both fundamental and applied problems in biology and medicine. The outcomes of bioinformatics and computational biology particularly include

1. new and global perspectives into the organization and function of biological systems (fundamental biology);
2. new and novel targets for drug discovery and development; and
3. genetic/proteomic profiling for pharmaco-genomics or personalized medicine.

Thus, bioinformatics is emerging as a strategic discipline at the frontier between biology, biochemistry, biomedicine, bioengineering, computer science, and mathematics, impacting fundamental science, medicine, biotechnology, and society.

With its broad mission statement, this program at Georgia Tech has the following focus / strength areas:

1. Development of software tools, algorithms, and databases for gene identification, protein structural prediction, clustering analysis, and data mining.
2. Application of bioinformatics to disease diagnosis, classification, prognosis, and treatment.
3. Application of bioinformatics to fundamental biology and systems biology.

There is an increasing demand for scientists with advanced training in bioinformatics. Professionals in this area should have a thorough knowledge of molecular biology, mathematics, and statistics as well as computer science and engineering.

In 1997 the College of Sciences at Georgia Tech proposed and established a professional Master of Science in Bioinformatics degree program, the first of its kind in the United States. This interdisciplinary program consists of a unique combination of courses. Students are taught with equal strength in several scientific disciplines and are prepared for further successful work in industry or academia. At present there are more than forty students in the program, with twelve graduates already employed in academia and industry, particularly at SmithKlineGlaxo, Navartis, Johnson & Johnson, Informax, Los Alamos National Lab, Vanderbilt University, and the U.S. Centers for Disease Control and Prevention.

In 1993, the School of Biology at Georgia Tech implemented a Ph.D. in Biology with a concentration in Bioinformatics. This option will stay in place for those students who would like to pursue a Ph.D. in Biology.

The group of prospective applicants for the Ph.D. program is expected to consist of students with an M.S. in Bioinformatics as well as holders of B.S./B.A. and higher degrees in different disciplines. The applicants with life science degrees are usually looking for an interdisciplinary education with a focus on mathematics, physics, and computer science. This demand fits perfectly with what Georgia Tech can offer: high- quality education in mathematics, physics, and computing along with advanced courses in biology and biochemistry.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN COMPUTATIONAL SCIENCE AND ENGINEERING

Computational Science and Engineering (CSE) is a discipline concerned with the body of knowledge, skills, and practices associated with the study of computer-based models of natural phenomena and engineered systems. Students will be required to obtain a breadth of knowledge across a set of core areas, depth of knowledge in a specific computational specialization (e.g., numerical computing), and knowledge to apply computational techniques in a domain of application. Students will be expected to integrate principles from mathematics, computing, science, and engineering to be able to create significant computational artifacts, e.g., software, and to complete independent research that advances the state-of-the-art in the CSE discipline.

The CSE M.S. degree program is an interdisciplinary program offered by the College of Computing, the College of Engineering, and the College of Sciences. Upon application students select a desired “home unit” among those academic units that formally participate in the program.

Required coursework includes CSE 6001 (Introduction to Computational Science and Engineering), CSE core courses (twelve hours), a computation specialization (nine hours), and an application specialization (nine hours). To complete the core course requirement, students must complete four of the five courses making up the core curriculum: CSE/Math 6643 (Numerical Linear Algebra), CSE 6140 (Computational Science and Engineering Algorithms), CSE 6730 (Modeling and Simulation: Fundamentals & Implementation), CSE/ISYE 6740 (Computational Data Analysis), and CSE 6220 (High Performance Computing). The computational specialization includes at least nine hours of courses that increase the student’s depth of understanding of computational methods in a specific area, as approved by the student’s academic advisor. These courses must go beyond “using computers” to deepen understanding of computational methods, preferably in the context of some application domain. The application specialization includes at least nine hours of courses that increase depth of understanding in an application field; these need not be computation-focused courses. At least nine hours of Ph.D. courses must be courses that do not carry the CS/CSE course designation. These hours may be taken in the home unit. Hours taken as part of the computation and/or application specialization can be used to fulfill this requirement. Additional requirements may apply depending on the student’s home unit.

A qualifying examination must be attempted by the end of the second year of enrollment in the CSE doctoral program (normally taken after the student completes CSE core coursework). A qualifying examination committee shall be appointed by the CSE program coordinator for each student and is responsible for making an overall recommendation concerning the outcome of the qualifying examination.

Students are required to complete a doctoral thesis reporting the results of independent research that advances the state-of-the-art in the computational science and engineering discipline. The dissertation must be successfully defended to the student's dissertation research committee.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN COMPUTER SCIENCE

The Computer Science Doctoral Program begins with research and breadth components. The research component helps students place an early focus on research. Students must complete an "Introduction to Graduate Studies" course (CS 7001) and then take at least three hours of directed research study (CS 8903) under faculty guidance each semester until their qualifying examination. The breadth component is intended to facilitate students' learning about a variety of areas within computing, as well as core computer science areas. Students must take at least twelve courses from the different areas of study within the College. The current twelve areas are computer architecture, database systems, graphics and visualization, human-computer interaction, information security, intelligent systems and robotics, learning sciences and technology, networking and communications, programming languages and compilers, software methodology and engineering, systems (including operating systems, distributed and parallel systems), and theoretical computer science. Students must include courses from the systems and theory areas in those breadth courses.

As students' research progresses, they must select a primary, and possibly secondary, area of focus from the areas listed previously, and then pass a qualifier (comprehensive exam) in that area or areas. The qualifier consists of three parts:

1. A one-day written examination covering the pertinent research area(s)
2. The submission of a high-quality research deliverable, as evidenced by a portfolio consisting of at least an exam committee-reviewed and publishable article, and possibly other work products as approved by the exam committee
3. An oral presentation and examination

After successfully completing the qualifier, a student focuses on research leading toward a dissertation. The topic of the student's research is formalized through a written dissertation proposal followed by an oral presentation. When the student passes his or her proposal, the student is admitted to candidacy and proceeds with dissertation research. This phase is completed with the successful defense and submission of the approved doctoral dissertation. Students are also required to complete a nine-hour minor outside the College.

For more information about the Computer Science Ph.D. program, visit www.cc.gatech.edu.

## COOPERATIVE PROGRAMS

The College of Computing participates in the undergraduate and graduate Cooperative Programs. See links below for further Information.

# COLLEGE OF COMPUTING

Bachelor of Science in Computer Science

Additional Options:

- Cooperative Plan
- International Plan
- Research Option

## SCHOOL OF COMPUTER SCIENCE

Master of Science in Bioengineering

Master of Science in Computer Science

Master of Science in Information Security

Doctor of Philosophy with a Major in Algorithms, Combinatorics, Optimization

Doctor of Philosophy with a Major in Bioengineering

Doctor of Philosophy with a Major in Bioinformatics

Doctor of Philosophy with a Major in Computer Science

## SCHOOL OF INTERACTIVE COMPUTING

Bachelor of Science in Computational Media (Interdisciplinary with IAC )

Additional Options:

- Cooperative Plan
- International Plan
- Research Option

Master of Science in Computer Science

Master of Science in Human-Computer Interaction

Doctor of Philosophy with a Major in Computer Science

Doctor of Philosophy with a Major in Human-Centered Computing

Doctor of Philosophy with a Major in Robotics

## COMPUTATIONAL SCIENCE AND ENGINEERING DIVISION

Master of Science in Bioengineering

Master of Science in Computational Science and Engineering

Master of Science in Computer Science

Doctor of Philosophy with a Major in Bioengineering

Doctor of Philosophy with a Major in Bioinformatics

Doctor of Philosophy with a Major in Computational Science and Engineering

Doctor of Philosophy with a Major in Computer Science

## MINOR IN COMPUTER SCIENCE

For those students majoring in disciplines other than computer science who wish to gain a deeper understanding of computing and its applications, the College of Computing offers the minor in computer science. The minor in computer science requires at least eighteen semester hours of computer science coursework, of which at least twelve hours must be at the 3000 level or higher, and be selected from any required or elective CS course in any thread. At least two courses at the 3000 level or higher must be chosen from the same thread. Click here for additional information.

## CERTIFICATE IN SOFTWARE ENGINEERING

This certificate program provides students with emphasis in Software Engineering through a focused set of courses. The certificate requires twelve semester hours of coursework.

Certificate requirements are the same for all students, whether enrolled in the College of Computing or in another school within the Institute.

There are two required courses in the certificate that must be take on a letter grade basis, and the student must earn a grade of *C* or better. These required courses are:

CS2335 Software Practicum

CS3300 Introduction to Software Engineering

**For students in Threads where CS3300 is a required course, an additional elective course below must be substituted since Institute policy prohibits required courses from being used as certificate credit.**

Students must take two additional courses within the Software Engineering field on a letter grade basis and must earn a grade of *C* or better. The elective courses to choose from are:

CS4320 Software Process

CS4330 Software Applications

CS4332 Software Generation, Testing, and Maintenance

CS4400 Introduction to Database Systems

CS4560 Verification of Systems

**If CS4400 is required by your field of study, you may not use it as an elective for the Software Engineering Certificate.**

## COLLEGE OF ENGINEERING ACCREDITATION STATEMENT

The following undergraduate engineering programs are accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012 - Telephone number: (410) 347-7700:

- Bachelor of Science in Aerospace Engineering
- Bachelor of Science in Biomedical Engineering
- Bachelor of Science in Chemical and Biomolecular Engineering
- Bachelor of Science in Civil Engineering
- Bachelor of Science in Civil Engineering - Regional Engineering Program (offered through Georgia Tech-Savannah)
- Bachelor of Science in Computer Engineering
- Bachelor of Science in Computer Engineering - Regional Engineering Program (offered through Georgia Tech-Savannah)
- Bachelor of Science in Electrical Engineering
- Bachelor of Science in Industrial Engineering
- Bachelor of Science in Materials Science and Engineering
- Bachelor of Science in Mechanical Engineering
- Bachelor of Science in Nuclear and Radiological Engineering
- Bachelor of Science in Polymer and Fiber Engineering

The following undergraduate engineering programs are not currently accredited by the Engineering Accreditation Commission of ABET:

- Bachelor of Science in Electrical Engineering - Regional Engineering Program (offered through Georgia Tech-Savannah)
- Bachelor of Science in Environmental Engineering
- Bachelor of Science in Mechanical Engineering - Regional Engineering Program (offered through Georgia Tech-Savannah)

# COLLEGE OF ENGINEERING

College established in 1948
First engineering program in 1885
Location: 225 North Avenue
Atlanta, GA 30332-0360
Telephone: 404.894.3350
Fax: 404.894.0168
Web site: www.coe.gatech.edu

## GENERAL INFORMATION

The College of Engineering comprises nine academic units of instruction and research. These units offer programs of study and research leading to bachelor's, master's, and doctoral degrees. Some also offer programs in one or more subdisciplines or subspecialties.

The programs in engineering are designed to provide a fundamental understanding of the engineering sciences (which are based on mathematics and the natural sciences), of the basic concepts of the humanities and social sciences, and an understanding of the manner in which these elements are interwoven in engineering practice. Each curriculum provides enough flexibility through elective course opportunities to permit a certain amount of program individualism while meeting basic requirements.

## FACULTY

### Dean

Don P. Giddens

### Associate Deans

Jane C. Ammons, John D. Leonard, Laurence J. Jacobs

### Director of Finance

Pete Dawkins

### Director of Facilities and Capital Planning

Gregory B. Goolsby

### Director of Human Resources and Administration

Lynda D. Buescher

### Director of Development

Vacant

## COURSES OF INSTRUCTION

Courses offered by the College of Engineering (COE) can be viewed on the course catalog .

## MULTIDISCIPLINARY ACTIVITIES AND PROGRAMS

The College of Engineering encourages cross-unit collaboration within the College and supports the interdisciplinary culture of Georgia Tech and the merging of disciplines that is the trait of modern technology development. Engineering faculty provide leadership for such activities through their involvement in more than thirty research centers and institutes on campus.

The College also provides opportunities for engineering students to participate in interdisciplinary activities by working with faculty in the centers as research assistants, by taking part in interdisciplinary design projects and competitions, and by completing one or more of the College's multidisciplinary certificate programs.

Any student in good academic standing who is pursuing a degree in one of the participating schools of the College of Engineering or a participating school in any of the other colleges may select elective courses and the subjects of special problems to satisfy simultaneously both the requirements of his or her major degree program and those of a specialized multidisciplinary program. Upon graduation, the student receives both the degree in the major field of study and a certificate attesting to successful completion of the particular related multidisciplinary program.

The following table shows available program offerings and the degree levels of the programs.

**Multidisciplinary Certificate Programs**

| Program | Degree Level | | |
|---|---|---|---|
| Composites Engineering | B.S. | M.S. | Ph.D. |
| Geohydrology | | M.S. | Ph.D. |
| Manufacturing | | M.S. | Ph.D. |
| Mechanical Properties of Solids | | | Ph.D. |
| Polymer Engineering | B.S. | M.S. | Ph.D. |
| Pulp and Paper Engineering | B.S. | | |

### GENERAL REQUIREMENTS OF UNDERGRADUATE MULTIDISCIPLINARY PROGRAMS

The specific design of the multidisciplinary program of any participating undergraduate student, while individualized, must meet certain general requirements as well as requirements that are specific to that multidisciplinary area. The general (minimum) undergraduate multidisciplinary requirements are as follows:

1. The program must relate the student's major area to the given multidisciplinary area.
2. Courses must be taken under more than one academic unit.
3. At least twelve credit hours (not required by name and number in the student's major) must be taken in a coherent program.
4. At least nine credit hours must be at the 3000 level or higher.
5. At least three credit hours must be outside the major field (cross listed courses may be counted outside the student's major).
6. Courses must be taken on a letter-grade basis, and a *C* or better must be earned in each course counting toward a multidisciplinary certificate.

### GENERAL REQUIREMENTS OF GRADUATE MULTIDISCIPLINARY PROGRAMS

The specific design of the multidisciplinary program of any participating graduate student, while individualized, must meet certain general requirements as well as requirements that are specific to that multidisciplinary area. The general (minimum) graduate multidisciplinary requirements are the same as those listed previously for the undergraduate programs, with the following exceptions:

1. at least three of the coherent multidisciplinary program courses as well as nine credit hours must be at the 6000 level or higher; and
2. students at the doctoral level must, on an individual basis, meet additional requirements specified by the student's doctoral committee, consistent with a program beyond the master's level, whose objective it is to develop a doctoral-level multidisciplinary program.

Interested students may obtain detailed information on the various undergraduate-level and graduate-level multidisciplinary programs from the main office of the school in which they are enrolled.

### CERTIFICATE PROCEDURES

Petitions for multidisciplinary program certificates are processed as follows:

1. During the semester in which the student expects to graduate, the student completes a Petition for Multidisciplinary Certificate form and obtains the signature of the chair of his or her school, as well as the signature of the chair of the certificate program.
2. When complete, the petition is forwarded to the Office of the Dean of Engineering.
3. At the end of the semester in which all graduation requirements have been met, the certificate will be signed by the dean of the College of Engineering and mailed to the student.

## TRANSFER PROGRAMS IN THE COLLEGE OF ENGINEERING

To encourage and accommodate students who desire to study engineering, but who for various reasons may prefer to attend another college before coming to Georgia Tech, the College of Engineering offers the opportunity to transfer to Georgia Tech through the Regents' Engineering Transfer Program (RETP) or the Dual Degree Program.

### DUAL DEGREE PROGRAM

Under the Dual Degree Program, students attend the participating Dual Degree school for three years and then come to Georgia Tech for approximately two years. Students participating in the Dual Degree Program may seek a degree from any undergraduate degree-granting program in the College of Engineering. Upon completion of the program, the student receives a bachelor's degree from the first school and a bachelor's degree in one of the engineering disciplines at Georgia Tech.

Participating in the Dual Degree Program are many of the schools in the University System of Georgia, Morehouse College, Spelman College, Clark Atlanta University, and other traditionally black colleges and predominantly women's colleges in the Southeast. For additional information on either of these programs, contact the College of Engineering at Georgia Tech or the RETP or Dual Degree coordinator at a participating RETP or Dual Degree institution.

## TRANSFER PROGRAMS IN THE COLLEGE OF ENGINEERING

To encourage and accommodate students who desire to study engineering, but who for various reasons may prefer to attend another college before coming to Georgia Tech, the College of Engineering offers the opportunity to transfer to Georgia Tech through the Regents' Engineering Transfer Program (RETP) or the Dual Degree Program.

### REGENTS' ENGINEERING TRANSFER PROGRAM

The RETP is a cooperative program between Georgia Tech and fourteen colleges in the University System of Georgia:
Albany State University
Armstrong Atlantic State University
Columbus State University
Dalton State College
Gainesville State College
Georgia College and State University
Georgia Perimeter College
Georgia Southern University
Macon State College
Middle Georgia College
North Georgia College and State University
Savannah State University
Southern Polytechnic State University
University of West Georgia
Valdosta State University

For the first two years, students in this program attend one of the participating institutions, where they take all of the mathematics and science and many of the engineering courses required in the first two years of the Georgia Tech engineering curricula. Upon successful completion of the RETP requirements at the RETP institution, students are admitted to Georgia Tech to work toward completion of a bachelor of science in engineering degree.

By enrolling in RETP, students may attend a college close to home, thereby decreasing the cost of their education and easing the adjustment to college life. At the same time, RETP students enjoy many of the advantages of Tech students: they have equal access to engineering majors at Tech, they can participate in the Co-op Program, and they are invited to the Tech campus once a year for campus tours, information sessions, and meetings with advisors in their engineering major.

## GUGGENHEIM SCHOOL OF AEROSPACE ENGINEERING

Daniel Guggenheim School of Aeronautics
Established in 1930
Location: Montgomery Knight Building
Telephone: 404.894.3000
Fax: 404.894.2760
Web site: www.ae.gatech.edu

### GENERAL INFORMATION

The Guggenheim School of Aerospace Engineering prepares students at the bachelor's, master's, and doctoral levels for a career in vehicle engineering, with primary emphasis on flight vehicles. A combined B.S./M.S. honors program is also offered that prepares students for graduate studies and research (http://www.ae.gatech.edu/undergraduate/semester/honors/index.html). In addition, the School offers a minor with six different tracks. The School is housed in five buildings with a total floor space of approximately 122,000 square feet, most of which is devoted to instructional and research laboratories. Additional information can be found at www.ae.gatech.edu.

## FACULTY

**Chair and William R. T. Oakes Professor**
Robert G. Loewy

**Associate Chair for Graduate Programs and Research and Professor**
Jechiel I. Jagoda

**Associate Chair for Undergraduate Programs and Regents' Professor**
Lakshmi N. Sankar

**David S. Lewis Professor and Regents' Professor**
Ben T. Zinn

**Dutton/Ducoffe Professor of Aerospace Software Engineering**
Eric M. Feron

**Boeing Professor of Advanced Aerospace Systems Analysis**
Dimitri Mavris

**Langley Professor**
Alan W. Wilhite

**David and Andrew Lewis Associate Professor of Space Technology**
Robert D. Braun

**Sikorsky Associate Professor in Rotorcraft Technology**
Mark Costello

**David S. Lewis Associate Professor of Cognitive Engineering**
Amy R. Pritchett

**Lockheed Martin Assistant Professor of Avionics Integration**
Eric N. Johnson

**Regents' Professors Emeriti**
Robin B. Gray, Edward W. Price

**Professors**
K. K. Ahuja (joint, GTRI), Erian A. Armanios, Olivier A. Bauchau, Anthony J. Calise, James I. Craig, Don Giddens (joint, BME), Wassim M. Haddad, Sathyanarayana V. Hanagud, Dewey H. Hodges, John W. Holmes, George A. Kardomateas, Narayanan M. Komerath, Suresh Menon, J. V. R. Prasad, Daniel P. Schrage, Panagiotis Tsiotras, P. K. Yeung

**Professors Emeriti**
Robert L. Carlson, James E. Hubbartt, Manohar P. Kamat, David J. McGill (joint, CEE), Howard M. McMahon, G. Alvin Pierce, James C. Wu

**Associate Professors**
John-Paul Clarke, Timothy C. Lieuwen, John R. Olds, Stephen M. Ruffin, Jerry M. Seitzman, Marilyn J. Smith

**Assistant Professors**
Massimo Ruzzene, Mitchell L. R. Walker

**Adjunct Professors**
David A. Peters, Robert L. Sierakowski

**Adjunct Associate Professor**
Carlo Bottasso

**Principal Research Engineers**
Yedidia Neumeir, Douglas O. Stanley

**Senior Research Engineers**
R. Dale Atkins, Eugene Lubarsky, Andrew V. Makeev, R. Wayne Pickell, Vitali Volovoi

**Senior Research Scientist**
Bruce A. Fryxell

**Research Engineers II**
Byung Ho Ahn, Hongmei Chen, Jou-Young Choi, Russell K. Denney, Elena Garcia, Peter M. Hollingsworth, Jeong Hur, Michelle R. Kirby, Ralph L. Latham, Zhimin Liu, Jan W. Osburg, David E. Scarborough, Danielle S. Soban, Jimmy C. Tai, Neil R. Weston

**Research Scientist II**
Oleksandr Bibik

**Research Engineers I**
Adam T. Broughton, Cecile M. Burg, Henrik B. Christophersen, Kristin M. Kelly, Andrew J. Meyers, Reid W. Thomas

**Research Scientist I**
Christie M. Maldonado

**Systems Analyst III**
William Meyer

## BACHELOR OF SCIENCE IN AEROSPACE ENGINEERING ACCREDITATION

The B.S. in Aerospace Engineering program is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012 - telephone: (410) 347-7700.

# BACHELOR OF SCIENCE IN AEROSPACE ENGINEERING

The first two years focus on coursework in the areas of chemistry, mathematics, physics, humanities, social sciences, and general engineering sciences. The third and fourth years emphasize aerospace disciplines and vehicle systems integration. The undergraduate curriculum is designed to provide each student with a general background for either employment in industry or government laboratories, or advanced study in graduate school at the end of four years. The program stresses the theoretical, experimental, and design aspects of aerospace engineering. Courses do not have to be taken during the specific semester indicated in the curriculum, but all prerequisites must be satisfied for each course. Advisement by an assigned faculty member is required before registration. Each student is assigned a faculty advisor who remains the same for the full undergraduate program, unless the student requests a change. A certain degree of specialization is available to undergraduate students through the proper choice of electives, as are opportunities for undergraduate research, depending on the student's abilities and career objectives. Students should consult with academic advisors for the availability of courses and recommended course sequences.

## EDUCATIONAL OBJECTIVES

The undergraduate aerospace engineering degree program will:

- provide students with a comprehensive education that includes in-depth instruction in aerodynamics, aircraft and spacecraft structures (including structural dynamics and aeroelasticity), flight and orbital mechanics and controls, and design of aerospace systems;
- prepare students for careers in aerospace engineering by emphasizing aerospace vehicle, analysis, and problem solving, by providing methods to deal with open-ended problems and design, including costs, manufacturing, and maintenance, and by fostering teamwork, communication skills, and individual professionalism; and
- provide adequate research and independent study opportunities that cultivate lifelong learning skills and nourish creative talents.

## REQUIREMENTS

A grade of *C* or better is required in each 1000 and 2000 level mathematics and physics course; a course with a *D* or *F* grade must be repeated the next semester the student is in residence. A 2.0 or higher overall grade point average is required to schedule COE 2001 or AE 2020. No more than two *D* grades are permitted in AE and COE courses listed by number in the sophomore, junior, and senior years. Courses in which a D was earned may be repeated at any time with the approval of an advisor.

## PROGRAM OBJECTIVES

A. Our graduates will have the necessary understanding of the essential disciplines of aerodynamics, structures, vehicle dynamics and control, propulsion, and interdisciplinary design to be well prepared for careers in aerospace and related engineering fields.

B. Our graduates will be well trained to function as professionals who can formulate, analyze and solve open-ended problems that may include economic and societal constraints.

C. Our graduates will have good communication skills, and be able to function well in teams and in a global environment.

D. Our graduates will be trained to be lifelong learners who can continuously acquire the knowledge required to research, develop and implement next generation systems and applications.

# BACHELOR OF SCIENCE IN AEROSPACE ENGINEERING
## 2008 - 2009 DEGREE REQUIREMENTS
### SCHOOL OF AEROSPACE ENGINEERING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| MATH 1501 CALCULUS I | 4 |
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| CHEM 1310 GENERAL CHEMISTRY | 4 |
| CS 1371 COMPUTING FOR ENGINEERS | 3 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| MATH 1502 CALCULUS II | 4 |
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| AE 1350 INTRODUCTION TO AEROSPACE ENGINEERING | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| MATH 2401 CALCULUS III | 4 |
| PHYS 2212 INTRODUCTORY PHYSICS II | 4 |
| COE 2001 STATICS | 2 |
| ME/CE 1770 ENGINEERING GRAPHICS & VISUALIZATION | 3 |
| MSE 2001 PRINCIPLES & APPLICATIONS OF ENGINEERING MATERIALS | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| AE 2020 LOW SPEED AERODYNAMICS | 3 |
| AE 2220 DYNAMICS | 3 |
| TECHNICAL ELECTIVE | 3 |
| ECON 2100 or 2105 or 2106 | 3 |
| MATH 2403 DIFFERENTIAL EQUATIONS | 4 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| AE 3515 SYSTEM DYNAMICS & CONTROL | 4 |
| AE 3450 THERMODYNAMICS & COMPRESSIBLE FLOW | 3 |
| AE 3310 INTRODUCTION TO AEROSPACE VEHICLE PERFORMANCE | 3 |
| COE 3001 DEFORMABLE BODIES | 3 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| ECE 3710 CIRCUITS & ELECTRONICS | 2 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| AE 3125 AEROSPACE STRUCTURAL ANALYSIS | 4 |
| AE 3521 FLIGHT DYNAMICS | 4 |
| HUMANITIES ELECTIVE | 3 |
| ECE 3741 INSTRUMENTATION & ELECTRONICS LAB | 1 |
| AE 4451 JET & ROCKET PROPULSION | 3 |
| AE 3051 EXPERIMENTAL FLUID DYNAMICS | 2 |
| **TOTAL SEMESTER HOURS =** | **17** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| HUMANITIES ELECTIVE | 3 |
| CAPSTONE COURSE * | 3 |
| AE 3021 HIGH SPEED AERODYNAMICS | 3 |
| AE 3145 STRUCTURES LAB | 1 |
| SOCIAL SCIENCE ELECTIVE | 3 |

| | |
|---|---|
| FREE ELECTIVES | 4 |
| **TOTAL SEMESTER HOURS =** | **17** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| AE 4220 AEROELASTICITY | 3 |
| CAPSTONE COURSE * | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| FREE ELECTIVES | 6 |
| AE 4525 CONTROL SYSTEMS DESIGN LAB | 2 |
| **TOTAL SEMESTER HOURS =** | **17** |

**TOTAL PROGRAM HOURS = 130 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

* Capstone Course requirements fulfilled by completing one of these sequences:
(AE 4350 and AE 4351) or
(AE 4356 and AE 4357) or
(AE 4358 and AE 4359)

## ELECTIVES

### WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

### HUMANITIES/SOCIAL SCIENCES ELECTIVES

ENGL 1101 and 1102 apply toward satisfaction of the twelve-hour humanities requirement. An additional six hours of Institute-approved humanities courses are required to fulfill the twelve-hour humanities requirement. To satisfy the state requirements regarding coursework in the history and constitutions of the United States and Georgia, students must complete one of the following courses: HIST 2111, HIST 2112, POL 1101, PUBP 3000, or INTA 1200. One of these courses, combined with an additional nine hours of Institute-approved social science courses, satisfies the twelve-hour social sciences requirement. Courses taken in humanities and social sciences must be scheduled on a letter-grade basis.

### TECHNICAL ELECTIVE

The science elective must be chosen from a list of approved courses, including a computer science offering. These are listed at www.ae.gatech.edu/undergraduate.

### FREE ELECTIVES

The required ten credit hours of free electives may be taken at any time during the course of study. If ROTC is elected, four credit hours of basic and six hours of advanced ROTC may be applied toward these electives. HPS 1040 cannot be applied toward the free electives. Only the free electives may be taken on a pass/fail basis. Further details on the undergraduate program are available at www.ae.gatech.edu/undergraduate.

### REQUIREMENTS

A *C* or better is required in each 1000 and 2000 level mathematics and physics course; a course with a *D* or *F*
grade must be repeated the next semester the student is in residence. A 2.0 overall average or better is required to schedule COE 2001or AE 2020. No more than two *D* grades are permitted in AE and COE courses listed by number in the sophomore, junior, and senior years. Courses in which a D was earned may be repeated at any time with the approval of an advisor.

## BACHELOR OF SCIENCE IN AEROSPACE ENGINEERING - COOPERATIVE PLAN

The School of Aerospace Engineering offers BSAE with COOP option. Students graduating under this program will complete all the requirements of the BSAE degree program, and the coop work requirements. Students beginning work as freshmen or at the end of the freshman year will typically complete at least five terms of work, with no more than three of those terms being summer. Students beginning work as sophomores will typically complete at least four terms of work, with no more than two of those terms being summer. RETP, GTREP, dual degree, and second undergraduate degree students must complete a total of three terms of work (at least two of which must be completed after enrolling at Georgia Tech), with no more than one work term being a summer. For additional information about the Georgia Tech Co-Op program, please visit www.coop.gatech.edu.

The BSAE capstone design experience requires that the students complete a two course sequence during their senior year. This sequence begins in fall and is completed in spring. Students are advised to complete their co-op work before entering the 2 term design sequence.

# BACHELOR OF SCIENCE IN AEROSPACE ENGINEERING - INTERNATIONAL PLAN #1

The International Plan is a challenging and coherent academic program for undergraduates emphasizing global competence within the context of the aerospace engineering major. This program has specific language requirements. There are also coursework requirements related to history, global economy, international culture, and residential foreign experience. Refer to http://www.oie.gatech.edu/internationalplan/student/ for the general requirements of the International Plan. These requirements may be satisfied by carefully selecting the humanities, social sciences, and free elective hours available in the program, in consultation with a faculty advisor.

## EDUCATIONAL OBJECTIVES

The B.S. AE International Plan program will:

1. provide students with a comprehensive education that includes in-depth instruction in aerodynamics, aircraft and spacecraft structures (including structural dynamics and aeroelasticity), flight and orbital mechanics and controls, and design of aerospace systems;
2. prepare students for careers in aerospace engineering by emphasizing aerospace vehicles analysis, and problem solving, by providing methods to deal with open-ended problems and design, including costs, manufacturing, maintenance, and by fostering teamwork, communication skills, and individual professionalism;
3. provide adequate research and independent study opportunities that cultivate lifelong learning skills and nourish creative talents; and
4. prepare students for aerospace careers related to a country or region of their choice.

## REQUIREMENTS

A grade of *C* or better is required in each 1000 and 2000 level mathematics and physics course; a course with a *D* or *F* grade must be repeated the next semester the student is in residence. A 2.0 or higher overall grade point average is required to schedule COE 2001 or AE 2020. No more than two *D* grades are permitted in AE and COE courses listed by number in the sophomore, junior, and senior years. Courses in which a D was earned may be repeated at any time with the approval of an advisor.

## BACHELOR OF SCIENCE IN AEROSPACE ENGINEERING RESEARCH OPTION

Beginning in fall 2007, the school of Aerospace Engineering will offer “Research Option” under the BSAE degree program. In order to graduate with a BSAE (RO) degree, the students must

- Maintain a cumulative GPA of 3.25 or above during the junior and senior years
- Complete at least nine units of undergraduate research (over at least two, preferably three terms). Research may be for either pay (AE 2698 or AE 4698) or credit (AE 2699 or 4699). Research for credit may be used towards the BSAE free elective requirements.
- Write an undergraduate thesis/report of research on their findings. This is usually done during the graduating term.
- Take the class LCC 4700 “Writing an Undergraduate Thesis” (taken during the thesis-writing semester).

At least six of the nine required hours of research should be on the same topic. A research proposal must be approved by a faculty advisor and one other faculty member. This proposal and at least six hours of research are required for admission to the LCC 4700 undergraduate thesis course. Completion of Research Option is noted on the student’s transcript.

For additional details, please contact either:

or

## B.S./M.S. HONORS PROGRAM

A combined B.S./M.S. honors program is also offered that prepares students for graduate studies and research. Please see www.ae.gatech.edu/undergraduate/semester/honors/index.html for more information.

## MINORS

The School of Aerospace Engineering offers a minor with six different tracks.

- Aeroelasticity
- Aerodynamics
- Avionics
- Flight Dynamics and Control
- Propulsion
- Structures

For more information please visit www.ae.gatech.edu/undergraduate/AE_Minor.html.

## MASTER OF SCIENCE IN AEROSPACE ENGINEERING

At the graduate level, the School of Aerospace Engineering offers master's and doctoral degrees. In addition, the School offers a distance learning-based master's degree.

The master's degree may be earned by completing thirty-three semester hours of coursework, which must include three hours of Special Problems research credit. Alternatively, the candidate may elect to complete twenty-four semester hours of coursework along with nine hours of M.S. thesis work. The candidate must propose a thesis topic, complete the thesis, and successfully defend it before being awarded the degree. A GPA of 2.7 is required to graduate with an M.S. degree. All coursework, including Special Problems, must be taken on a letter-grade basis. The program of study for the master's degree is very flexible and can be tailored, in agreement with the student's advisor, to meet the candidate's professional goals.

For further details governing the graduate program, access the *Aerospace Engineering Graduate Handbook* at www.ae.gatech.edu/graduate. Graduate students may specialize in the following areas: aerodynamics and fluid mechanics, aeroelasticity and structural dynamics, flight mechanics and control, propulsion and combustion, structural mechanics and materials behavior, and system design and optimization. Further information on these areas of specialization and research can be found at www.ae.gatech.edu/research.

## MASTER OF SCIENCE IN COMPUTATIONAL SCIENCE AND ENGINEERING

Computational Science and Engineering (CSE) is a discipline concerned with the body of knowledge, skills, and practices associated with the study of computer-based models of natural phenomena and engineered systems. Students will be required to obtain a breadth of knowledge across a set of core areas in the CSE discipline, depth of knowledge in a specific computational specialization (e.g., numerical computing), and knowledge to apply computational techniques in a domain of application. Students will be expected to integrate principles from mathematics, computer science, and engineering to be able to create significant computational artifacts, e.g., software.

The CSE M.S. degree program is an interdisciplinary program offered by the College of Computing, the College of Engineering, and the College of Sciences. Upon application, students select a desired "home unit" among those academic units that formally participate in the program.

Students must complete four of the five courses making up the core curriculum: CSE/Math 6643 (Numerical Linear Algebra), CSE 6140 (Computational Science and Engineering Algorithms), CSE 6730 (Modeling and Simulation: Fundamentals & Implementation), CSE/ISYE 6740 (Computational Data Analysis), and CSE 6220 (High Performance Computing). A home unit minor is required consisting of twelve hours of coursework relevant to the CSE discipline that includes one applications area; this must include at least six hours of courses that do not carry the CS/CSE course designation. Finally, students must either complete 6 additional hours of approved coursework (course option) or an M.S. thesis (thesis option) that is defended to the student's thesis committee who is responsible for overseeing the student's research. Six hours of thesis credit are required in the thesis option. Additional requirements may apply depending on the student's home unit. A plan of study must be approved by the CSE program director and the student's home unit coordinator.

## B.S./M.S. HONORS PROGRAM

A combined B.S./M.S. honors program is also offered that prepares students for graduate studies and research. Please see www.ae.gatech.edu/undergraduate/semester/honors/index.html for more information.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN AEROSPACE ENGINEERING

The School of Aerospace Engineering offers a doctoral degree. The Ph.D. degree is a research degree.

The degree requires fifty semester hours of coursework beyond the bachelor's degree; however, the main emphasis is on the research leading to a Ph.D. dissertation. The candidate must pass a qualifying examination and present a thesis proposal and a thesis defense. A GPA of 3.25 is required to graduate with a Ph.D. degree. All coursework, including Special Problems, must be taken on a letter-grade basis. The programs of study for both the master's and doctoral degrees are very flexible and can be tailored, in agreement with the student's advisor, to meet the candidate's professional goals.

For further details governing the graduate program, access the *Aerospace Engineering Graduate Handbook* at www.ae.gatech.edu/graduate. Graduate students may specialize in the following areas: aerodynamics and fluid mechanics, aeroelasticity and structural dynamics, flight mechanics and control, propulsion and combustion, structural mechanics and materials behavior, and system design and optimization. Further information on these areas of specialization and research can be found at www.ae.gatech.edu/research.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN COMPUTATIONAL SCIENCE AND ENGINEERING

Computational Science and Engineering (CSE) is a discipline concerned with the body of knowledge, skills, and practices associated with the study of computer-based models of natural phenomena and engineered systems. Students will be required to obtain a breadth of knowledge across a set of core areas, depth of knowledge in a specific computational specialization (e.g., numerical computing), and knowledge to apply computational techniques in a domain of application. Students will be expected to integrate principles from mathematics, computing, science, and engineering to be able to create significant computational artifacts, e.g., software, and to complete independent research that advances the state-of-the-art in the CSE discipline.

The CSE M.S. degree program is an interdisciplinary program offered by the College of Computing, the College of Engineering, and the College of Sciences. Upon application students select a desired “home unit” among those academic units that formally participate in the program.

Required coursework includes CSE 6001 (Introduction to Computational Science and Engineering), CSE core courses (twelve hours), a computation specialization (nine hours), and an application specialization (nine hours). To complete the core course requirement, students must complete four of the five courses making up the core curriculum: CSE/Math 6643 (Numerical Linear Algebra), CSE 6140 (Computational Science and Engineering Algorithms), CSE 6730 (Modeling and Simulation: Fundamentals & Implementation), CSE/ISYE 6740 (Computational Data Analysis), and CSE 6220 (High Performance Computing). The computational specialization includes at least nine hours of courses that increase the student’s depth of understanding of computational methods in a specific area, as approved by the student’s academic advisor. These courses must go beyond “using computers” to deepen understanding of computational methods, preferably in the context of some application domain. The application specialization includes at least nine hours of courses that increase depth of understanding in an application field; these need not be computation-focused courses. At least nine hours of Ph.D. courses must be courses that do not carry the CS/CSE course designation. These hours may be taken in the home unit. Hours taken as part of the computation and/or application specialization can be used to fulfill this requirement. Additional requirements may apply depending on the student’s home unit.

A qualifying examination must be attempted by the end of the second year of enrollment in the CSE doctoral program (normally taken after the student completes CSE core coursework). A qualifying examination committee shall be appointed by the CSE program coordinator for each student and is responsible for making an overall recommendation concerning the outcome of the qualifying examination.

Students are required to complete a doctoral thesis reporting the results of independent research that advances the state-of-the-art in the computational science and engineering discipline. The dissertation must be successfully defended to the student's dissertation research committee.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN ROBOTICS

Students pursuing a Ph.D. in Robotics must take thirty-six semester hours of core research and elective courses, pass a comprehensive qualifying exam with written and oral components, and successfully complete, document, and defend a piece of original research culminating in a doctoral thesis. Students select a home school, such as ECE, AE, ME, or CS, and apply for admission to the Ph.D. program in robotics through that home school.

## CERTIFICATE PROGRAM IN REMOTE SENSING

Students completing the master's or doctoral degree requirements of the School may earn a Remote Sensing Certificate. Additional details can be found in this catalog at http://www.catalog.gatech.edu/colleges/cos/eas/grad/certificates.php.

## WALLACE H. COULTER DEPARTMENT OF BIOMEDICAL ENGINEERING AT GEORGIA TECH AND EMORY UNIVERSITY

Established in 1997
Location: U. A. Whitaker Building
Telephone: 404.385.0124
Fax: 404.894.4243
Web site: www.bme.gatech.edu

### GENERAL INFORMATION

Biomedical engineering is the interdisciplinary field of study combining engineering with life sciences. The role of the biomedical engineer is to provide answers to problems arising from the study of living systems by employing the methodology and principles of engineering. This activity may encompass the spectrum from direct clinical applications to long-range fundamental research.

The Wallace H. Coulter Department of Biomedical Engineering at Georgia Tech and Emory University (the Coulter Department) is a unique partnership between a public institution and a private university. The formation of the Department in 1997 was the culmination of collaborative efforts between the two institutions in the field of biomedical engineering that dated back to the 1980s. In 2000, the Department assumed the name of Wallace H. Coulter, recognized as one of the most influential engineers in the twentieth century through his entrepreneurial efforts in shaping the fields of automated cell analysis and hematology.

The Coulter Department has identified six thrust areas in which to focus research and educational programs: cardiovascular biomechanics and biology, cellular and biomolecular engineering, neuroengineering, biomedical imaging and informatics, and biomaterials and tissue engineering, and health systems. Research in these biomedical engineering thrust areas can result in major breakthroughs in medicine, basic science, and applied technology.

The true integration of the life sciences and engineering is essential in educating a substantial percentage of the next generation of biomedical engineers in order to benefit from the biological revolution and its applications to medicine. The Coulter Department offers both undergraduate and graduate degree programs that attract outstanding students who wish to have that integration in their education so that they may be equipped with the tools to be the leaders in this field in the twenty-first century.

## BACHELOR OF SCIENCE IN BIOMEDICAL ENGINEERING ACCREDITATION

The B.S. in Biomedical Engineering program is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012 - telephone: (410) 347-7700.

## FACULTY

**Wallace H. Coulter Chair and Professor**

Larry V. McIntire

**Associate Chair for Research, Wallace H. Coulter Distinguished Faculty Chair, and Regents' Professor**

Ajit P. Yoganathan

**Associate Chair for Graduate Programs and Professor**

Stephen P. DeWeerth

**Associate Chair for Undergraduate Programs and Professor**

Paul J. Benkeser

**Robert A. Milton Chair in Biomedical Engineering and College of Engineering Distinguished Professor**

Gand Bao

**Regents' Professor**

Mark Borodovsky

**Price Gilbert Jr. Chair in Tissue Engineering, Deputy Director, GTEC, and Professor**

Barbara D. Boyan

**Lawrence L. Gellerstedt Jr. Chair in Bioengineering and Georgia Research Alliance Eminent Scholar**
**Dean, College of Engineering, and Professor**

Don P. Giddens

**Georgia Research Alliance Eminent Scholar in Imaging and Professor**

Xiaoping Hu

**Ada Lee and Pete Correll Professor in Biomedical Engineering**

Hanjoong Jo

**Wallace H. Coulter Distinguished Chair and Professor,**

Shuming Nie

**Julian Hightower Professor (Electrical and Computer Engineering and Biomedical Engineering)**

Allen R. Tannenbaum

**Georgia Research Alliance Eminent Scholar in Systems Biology and Professor**

Eberhard O. Voit

**Professors**

Gilda Barabino, Ravi Bellamkonda, Richard Nichols, Brani Vidakovic, W. Robert Taylor, Cheng Zhu ,

**Associate Professors**

Julia Babensee, Michelle LaPlaca, Joseph LeDoux, Steven Potter, Garrett Stanley

**Assistant Professors**

Thomas Barker, Michael Davis, Rudolph Gleason (Joint-Mechanical Engineering), Shella Keilholz, Charles Kemp, Melissa Kemp, Robert Lee, Todd McDevitt, Niren Murthy, John Oshinski, Oskar Skrinjar, Philip Santangelo, Johanna S. Temenoff, Lena Ting, Dongmei "May" Wang, Yadong Wang

**Director, Learning Sciences Research**

Wendy Newstetter

**Director, Instructional Laboratories**

Essy Behravesh

**Director, Design Instruction**

L. Franklin Bost

## BACHELOR OF SCIENCE IN BIOMEDICAL ENGINEERING

The true integration of the life sciences and engineering is essential in educating a substantial percentage of the next generation of biomedical engineers in order to benefit from the biological revolution and its applications to medicine. This degree program attracts outstanding students who wish to have that integration in their undergraduate education, so that they may be equipped with the tools to be leaders in this field in the 21st Century.

The curriculum includes a solid foundation in fundamental engineering, mathematics, and sciences - biology, chemistry, and physics - as well as grounding in humanities, social sciences, and communication skills. A unique aspect of the curriculum is the incorporation of problem-based learning (PBL) methodologies to foster development of both self-directed learning skills and problem-solving skills in a team-based environment.

## PROGRAM OBJECTIVES AND OUTCOMES

### EDUCATIONAL OBJECTIVES

The program strives to produce graduates who are expected to demonstrate the following during the first few years after graduation:

1. mathematics, science, and engineering fundamentals expertise at the interface of engineering and the life sciences which enables them to take leadership roles in the field of biomedical engineering;
2. an ability to use their multidisciplinary background to foster communication across professional and disciplinary boundaries with the highest professional and ethical standards; and
3. the ability to recognize the limits of their knowledge and initiate self-directed learning opportunities to be able to continue to identify and create professional opportunities for themselves in the field of biomedical engineering.

### OUTCOMES

By the time of graduation from the B.S. BMED degree program, the students will have obtained:

1. an ability to identify, formulate and solve authentic biomedical engineering problems by integrating and applying basic principles of mathematics, life sciences, and engineering;
2. an ability to use modern science and engineering techniques, skills, and computational tools to support biomedical engineering analysis and design;
3. an ability to meet the desired needs of a client by designing a biomedical engineering system, component, or process;
4. an ability to design and conduct experiments as well as to measure, analyze, and interpret experimental data from living systems;
5. an ability to communicate effectively in both written reports and oral presentations;
6. an ability to function effectively within multidisciplinary teams;
7. a broad education that enables an understanding of how ethical, social, and professional responsibilities impact the practice of biomedical engineering;
8. an ability to recognize the limits of their knowledge and engage in self-directed learning; and
9. a knowledge of contemporary issues and challenges facing biomedical engineers.

# BACHELOR OF SCIENCE IN BIOMEDICAL ENGINEERING
## 2008 - 2009 DEGREE REQUIREMENTS
### SCHOOL OF BIOMEDICAL ENGINEERING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| MATH 1501 CALCULUS I * ** | 4 |
| CHEM 1310 GENERAL CHEMISTRY * | 4 |
| BIOL 1510 BIOLOGICAL PRINCIPLES * | 4 |
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| BMED 1000 INTRODUCTION TO BIOMEDICAL ENGINEERING | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **18** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| MATH 1502 CALCULUS II * ** | 4 |
| CHEM 1315 SURVEY OF ORGANIC CHEMISTRY * | 3 |
| PHYS 2211 INTRODUCTORY PHYSICS I * | 4 |
| BMED 1300 PROBLEMS IN BIOMEDICAL ENGINEERING I * ** | 3 |
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-FALL | HRS |
|---|---|
| MATH 2401 CALCULUS III ** | 4 |
| CHEM 3511 SURVEY OF BIOCHEMISTRY | 3 |
| PHYS 2212 INTRODUCTORY PHYSICS II * | 4 |
| CS 1371 COMPUTING FOR ENGINEERS | 3 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| MATH 2403 DIFFERENTIAL EQUATIONS ** | 4 |
| BMED 2210 CONSERVATION PRINCIPALS IN BMED * ** | 4 |
| COE 2001 STATICS * | 2 |
| BMED 2300 PROBLEMS IN BIOMEDICAL ENGINEERING II ** | 3 |
| **TOTAL SEMESTER HOURS =** | **13** |

| THIRD YEAR-FALL | HRS |
|---|---|
| BMED 3100 SYSTEMS PHYSIOLOGY ** | 3 |
| BMED 3110 QUANTITATIVE ENGINEERING PHYSIOLOGY LAB I ** | 2 |
| BMED 3400 INTRODUCTION TO BIOMECHANICS ** | 4 |
| ECE 2025 INTRODUCTION TO SIGNAL PROCESSING | 4 |
| CEE / MATH / ISYE 3770 STATISTICS & APPLICATIONS or<br>BMED 2400 INTRODUCTION TO BIOENGINEERING STATISTICS | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| BMED 3510 BIOMEDICAL SYSTEMS & MODELING ** | 4 |
| BMED 3600 PHYSIOLOGY OF CELLULAR AND MOLECULAR SYSTEMS** | 3 |
| BMED 3610 QUANTITATIVE ENGINEERING PHYSIOLOGY LAB II | 2 |
| BMED 3300 BIOTRANSPORT ** | 4 |
| HUMANITIES ELECTIVE | 3 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **18** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| MSE 2001 PRINCIPLES & APPLICATIONS OF ENGINEERING MATERIALS | 3 |
| BMED 4600 SENIOR DESIGN PROJECT I ** | 2 |
| BME TECHNICAL ELECTIVES | 6 |
| HUMANITIES ELECTIVE | 3 |
| FREE ELECTIVE | 2 |

| | |
|---|---|
| **TOTAL SEMESTER HOURS =** | **16** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| BMED 4601 SENIOR DESIGN PROJECT II ** | 3 |
| BME TECHNICAL ELECTIVE | 3 |
| ECON 2100 or 2105 or 2106 | 3 |
| HUMANITIES / SOCIAL SCIENCE ELECTIVES | 6 |
| FREE ELECTIVE | 2 |
| **TOTAL SEMESTER HOURS =** | **17** |

**TOTAL PROGRAM HOURS = 130 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

* A minimum grade of *C* is required.

** An average grade of *C* (as computed using most recent grade for repeated courses) is required.

## ELECTIVES

The biomedical engineering curriculum includes twenty-nine semester hours of electives, subject to the following requirements:

## HUMANITIES/SOCIAL SCIENCES ELECTIVES

ENGL 1101 and 1102 apply toward satisfaction of the twelve-hour humanities requirement. An additional six hours of Institute-approved humanities courses are required to fulfill the twelve-hour humanities requirement. To satisfy the state requirements regarding coursework in the history and constitutions of the United States and Georgia, students must complete one of the following courses: HIST 2111, HIST 2112, POL 1101, PUBP 3000, or INTA 1200. One of these courses, combined with an additional nine hours of Institute-approved social science courses, satisfies the twelve-hour social sciences requirement.

## BME TECHNICAL ELECTIVES

Nine hours of BME technical elective courses are required. The purpose of these electives is to provide students with an opportunity for in-depth learning in within sub-disciplines of biomedical engineering. These electives may be selected from the following list *.

- BMED 4400 Introduction to Neuroengineering
- BMED 4477 Biological Networks and Genomics
- BMED 4500 Cell and Tissue Engineering Laboratory
- BMED 4750 Diagnostic Imaging Physics
- BMED 4751 Introduction to Biomaterials
- BMED 4752 Introductory Neuroscience
- BMED 4757 Biofluid Mechanics
- BMED 4758 Biosolid Mechanics
- BMED 4765 Drug Design, Development and Delivery
- BMED 4783 Introduction to Medical Image Processing
- BMED 4784 Engineering Electrophysiology
- BMED 2699/4699 Undergraduate Research **
- ECE 3710 Circuits & Electronics
- ECE 3741 Instrumentation & Electronics Lab

Students may use these electives to probe more deeply into multiple sub-disciplines, or choose to concentrate all courses within the same sub-discipline. For the latter case, the following combinations of electives are suggested:

- Cardiovascular Systems: BMED 4751, 4757, 4758 and/or 4784
- Biomechanics: BMED 4751, 4757 and 4758
- Biomaterials and Tissue Engineering: BMED 4500, 4751, 4758 and/or 4765
- Neuroengineering: BMED 4400, 4752 and 4784
- Medical Imaging: BMED 4750, 4752 and 4783

*

Engineering courses not included in this list would need to be approved in advance by the BME Associate Chair for Undergraduate Studies. Such courses generally should be at least at the 4000 level and have content that adds depth to an area within the BMED curriculum. Seniors with a grade point average of at least 3.0 may schedule graduate level BMED courses as acceptable alternatives, subject to the approval of the course instructor.

**

Up to six hours of BMED 2699/4699 Undergraduate Research may be used to satisfy BME Technical elective requirements, provided the research was conducted in the same lab over a period of at least two semesters. BMED 2698/4698 can be used to satisfy the two-semester requirement.

## FREE ELECTIVES

Four hours.

## WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement

(HPS 1040 or equivalent).

## BACHELOR OF SCIENCE IN BIOMEDICAL ENGINEERING - COOPERATIVE PLAN

The Georgia Tech Undergrad Co-op Program is a five-year, academic program designed to complement a student's formal education with paid practical work experience directly related to the student's academic major. It is available in all engineering majors, as well as in many majors in other colleges at Georgia Tech.

Co-ops alternate semesters of on-campus study with semesters of full-time employment through their junior year, then continue in school through their senior year. Co-ops are classified as full-time students during each term, regardless of whether they are attending classes on campus or working full-time at an employer location. Most undergrad Co-op students begin the program as freshmen or sophomores. With more than 2,700 students participating, Georgia Tech's program is currently the largest optional co-op program in the United States and has perennially been listed in U.S. News & World Report as one of the "Top Ten" co-op programs in America.

As an integral part of the overall education experience, the co-op program allows students to take on increasing levels of responsibility and to use their job knowledge and classroom learning to make meaningful contributions to the organizations in which they work. Many co-op graduates are hired by their co-op employer, and more than 700 companies or government organizations throughout the United States and abroad currently employ Georgia Tech Undergrad Co-op Program students.

To learn more about Biomedical Engineering Co-op opportunities at Georgia Tech, contact Rob Rogers. Rob is an Assistant Director with the Division of Professional Practice, and the point person for BME students. Rob is located in the Savant Building, Room 103. His phone number is (404) 894-3320.

## BACHELOR OF SCIENCE IN BIOMEDICAL ENGINEERING - INTERNATIONAL PLAN

The International Plan is a challenging and coherent academic program for undergraduates that develops global competence within the context of a student's major. It is a degree-long program that integrates international studies and experiences into any participating major at Georgia Tech. It helps to prepare Georgia Tech graduates professionally and personally for successful lives in the twenty-first century.

The International Plan is not intended to replace current international programs; it supplements them. Existing study abroad opportunities continue to be offered. It is also not intended to be an add-on to the current degree programs. It is intended to be another curriculum path to earn a degree in which international competence is integrated into the program of study. The Plan can be completed within the normal timeframe of four years of undergraduate study.

The overarching model for the International Plan has four components:

1. International coursework: Three courses to include one from each of the following categories:
    1. International relations
    2. Global economics
    3. A course about a specific country or region
2. International experience: Two terms abroad (not less than twenty-six weeks) engaged in any combination of study abroad, research, or internship
3. Second language proficiency: All students in the program are expected to reach at least the proficiency level equivalent to two years of college-level language study. Students who use the language to study, conduct research, or participate in an internship during their international experience are expected to attain a higher level of proficiency. Language proficiency is determined by testing (not course credits).
4. Culminating course: A capstone course in the major designed to tie the international studies and experiences together with the student's major. The senior design project sequence (i.e. BMED 4600/4601) will be used to satisfy this requirement. The design project must incorporate a significant element of the international experience (e.g. foreign client, location of work, project customers, motivation, regulatory issues, etc).

Completion of the International Plan is recognized by a designation on the student's diploma indicating completion of the degree with global competence.

For additional information about the International Plan visit www.oie.gatech.edu/internationalplan.

## BACHELOR OF SCIENCE IN BIOMEDICAL ENGINEERING - RESEARCH OPTION

The Research Option is intended for students who seek a concentrated research experience, culminating in an undergraduate thesis, integrated into their undergraduate studies in biomedical engineering. Students are strongly encouraged at the end of their experience to work with their faculty mentor to develop a journal publication or conference presentation on the research in addition to the actual thesis. Students who complete this option receive a designation on their transcript.

Students may be able to satisfy the additional requirements imposed for the Research Option designation through appropriate choices of electives without additional credit hours to complete the degree. The Research Option designation may be pursued separately, or in combination with the Cooperative Plan and/or the International Plan.

### The Research Option requirements are as follows:

- Complete at least nine credit hours of undergraduate research (i.e. BMED 2698, 2699, 4698, or 4699) spanning typically at least three terms. The research may be for either pay or credit, and at least 6 hours must be on the same research project, broadly defined.
- Complete a research proposal outlining their research topic and project for the thesis which must be approved by a faculty advisor and one other faculty member. The proposal will normally be completed at the end of the student's first semester of research
- Take the class LCC 4700 Writing an Undergraduate Thesis during the thesis-writing semester
- Write an undergraduate thesis or other substantial written report showing results of research. The thesis/report must be approved by two faculty members and will be published in the GT Library

## MINOR IN BIOMEDICAL ENGINEERING

The minor requires the successful completion of at least eighteen hours of coursework selected from lists of approved biomedical engineering and bioscience courses (refer to www.bme.gatech.edu/programs/ugrad_minor.shtml for the current lists of approved courses). The goal of the minor program is to educate students in how to apply engineering fundamentals to solve problems in biology and medicine. The program should be of particular interest to those students who plan to pursue advanced degrees in biomedical engineering and/or medicine.

## DEPARTMENT OF BIOMEDICAL ENGINEERING

The Department of Biomedical Engineering participates in an undergraduate Multidisciplinary Certificate in "Biomaterials".

See www.mse.gatech.edu/Academics/Certificate_Programs/Biomaterials/biomaterials.html for more details.

## M.D. / PH.D. PROGRAM

The Coulter Department of Biomedical Engineering participates with the Emory University School of Medicine and the Medical College of Georgia to offer students an opportunity to combine their M.D. with a Ph.D. in Biomedical Engineering or Bioengineering.

## MASTER OF SCIENCE IN COMPUTATIONAL SCIENCE AND ENGINEERING

Computational Science and Engineering (CSE) is a discipline concerned with the body of knowledge, skills, and practices associated with the study of computer-based models of natural phenomena and engineered systems. Students will be required to obtain a breadth of knowledge across a set of core areas in the CSE discipline, depth of knowledge in a specific computational specialization (e.g., numerical computing), and knowledge to apply computational techniques in a domain of application. Students will be expected to integrate principles from mathematics, computer science, and engineering to be able to create significant computational artifacts, e.g., software.

The CSE M.S. degree program is an interdisciplinary program offered by the College of Computing, the College of Engineering, and the College of Sciences. Upon application, students select a desired “home unit” among those academic units that formally participate in the program.

Students must complete four of the five courses making up the core curriculum: CSE/Math 6643 (Numerical Linear Algebra), CSE 6140 (Computational Science and Engineering Algorithms), CSE 6730 (Modeling and Simulation: Fundamentals & Implementation), CSE/ISYE 6740 (Computational Data Analysis), and CSE 6220 (High Performance Computing). A home unit minor is required consisting of twelve hours of coursework relevant to the CSE discipline that includes one applications area; this must include at least six hours of courses that do not carry the CS/CSE course designation. Finally, students must either complete 6 additional hours of approved coursework (course option) or an M.S. thesis (thesis option) that is defended to the student’s thesis committee who is responsible for overseeing the student’s research. Six hours of thesis credit are required in the thesis option. Additional requirements may apply depending on the student’s home unit. A plan of study must be approved by the CSE program director and the student’s home unit coordinator.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN BIOENGINEERING

This program is interdisciplinary in scope, where advanced courses in engineering specialties, life sciences, and bioengineering are combined with training in biomedical research. The Ph.D. in bioengineering is being offered by the College of Engineering. Students select a home school within the College of Engineering (Aerospace Engineering, Biomedical Engineering, Chemical and Biomolecular Engineering, Civil Engineering, Materials Science and Engineering, Mechanical Engineering, and/or Polymer, Textile and Fiber Engineering). Only students selecting biomedical engineering as their home school are reviewed and admitted by the Department of Biomedical Engineering. High-quality students with engineering or non-engineering backgrounds (degrees in computer science, physics, chemistry, biology, or mathematics, or physicians with undergraduate degrees in engineering or the physical sciences) are eligible to apply to the program.

# DOCTOR OF PHILOSOPHY WITH A MAJOR IN BIOINFORMATICS

## PARTICIPATING SCHOOLS

College of Computing
School of Biology
School of Biomedical Engineering
School of Chemistry and Biochemistry
School of Industrial and Sytems Engineering
School of Mathematics

## OBJECTIVE OF THE PROGRAM

The mission of the Georgia Tech Bioinformatics Ph.D. program is to educate and prepare graduate students to reach the forefront of leadership in the field of bioinformatics and computational biology, and to integrate research and education on the use of information technologies in biology and medicine. Thus, the program leading to a Ph.D. in Bioinformatics is an interdisciplinary program spanning a variety of academic departments at Georgia Tech.

Bioinformatics is a multidisciplinary field in which physical sciences, life sciences, computer science, and engineering are merged to solve both fundamental and applied problems in biology and medicine. The outcomes of bioinformatics and computational biology particularly include:

- new and global perspectives into the organization and function of biological systems (fundamental biology);
- new and novel targets for drug discovery and development; and
- genetic/proteomic profiling for pharmaco-genomics or personalized medicine.

Thus, bioinformatics is emerging as a strategic discipline at the frontier of biology, biochemistry, biomedicine, bioengineering, computer science, and mathematics, impacting fundamental science, medicine, biotechnology, and society.

With its broad mission statement, this program at Georgia Tech has the following strengths and focus areas:

1. Development of software tools, algorithms, and databases for gene identification, protein structural prediction, clustering analysis, and data mining
2. Application of bioinformatics to disease diagnosis, classification, prognosis, and treatment
3. Application of bioinformatics to fundamental biology and systems biology

There is an increasing demand for scientists with advanced training in bioinformatics. Professionals in this area should have a thorough knowledge of molecular biology, mathematics, and statistics, as well as computer science and engineering.

For more information visit www.biology.gatech.edu/bioinformatics/bioinformatics_phd.htm.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN BIOMEDICAL ENGINEERING

The Joint Biomedical Engineering Ph.D. program is offered through the Wallace H. Coulter Department of Biomedical Engineering at Georgia Tech and Emory University. The degree is conferred jointly by both Georgia Tech and Emory. The curriculum is based on an integration of life sciences, engineering, and mathematics. The goal is to enable students to postulate and solve biomedical problems quantitatively and with a systems perspective. Both Georgia Tech and Emory faculty provide an integrative teaching medium for students by team teaching courses.

The curriculum will facilitate individual flexibility and depth of study through coursework selected by the student (and thesis advisor) in specific categories: BME Integrative Core, Engineering/Bioscience Fundamentals, and BME Advanced Graduate Seminar. Other requirements include a bioethics course, a teaching course, a teaching practicum, and a nine-hour minor program of study outside the student's thesis research area. The resulting total minimum number of required hours is 35. It is anticipated (although not required) that students may take other elective coursework to fulfill the requirements of their individual research projects and/or training grants.

After completion of research rotations in either the summer prior to enrollment or during the first semester, students are matched with a thesis advisor based upon mutual interest. After successfully passing the qualifying examination, students submit a request for approval of their Thesis Reading Committee. Upon successful completion of all degree requirements, students will be awarded the Ph.D. degree by the graduate schools of Georgia Tech and Emory.

**Minimum Prerequisites**
B.S. in Engineering or Life Sciences
One year of calculus-based physics
One semester of organic chemistry (two semesters recommended)
Calculus through differential equations

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN COMPUTATIONAL SCIENCE AND ENGINEERING

Computational Science and Engineering (CSE) is a discipline concerned with the body of knowledge, skills, and practices associated with the study of computer-based models of natural phenomena and engineered systems. Students will be required to obtain a breadth of knowledge across a set of core areas, depth of knowledge in a specific computational specialization (e.g., numerical computing), and knowledge to apply computational techniques in a domain of application. Students will be expected to integrate principles from mathematics, computing, science, and engineering to be able to create significant computational artifacts, e.g., software, and to complete independent research that advances the state-of-the-art in the CSE discipline.

The CSE M.S. degree program is an interdisciplinary program offered by the College of Computing, the College of Engineering, and the College of Sciences. Upon application students select a desired “home unit” among those academic units that formally participate in the program.

Required coursework includes CSE 6001 (Introduction to Computational Science and Engineering), CSE core courses (twelve hours), a computation specialization (nine hours), and an application specialization (nine hours). To complete the core course requirement, students must complete four of the five courses making up the core curriculum: CSE/Math 6643 (Numerical Linear Algebra), CSE 6140 (Computational Science and Engineering Algorithms), CSE 6730 (Modeling and Simulation: Fundamentals & Implementation), CSE/ISYE 6740 (Computational Data Analysis), and CSE 6220 (High Performance Computing). The computational specialization includes at least nine hours of courses that increase the student’s depth of understanding of computational methods in a specific area, as approved by the student’s academic advisor. These courses must go beyond “using computers” to deepen understanding of computational methods, preferably in the context of some application domain. The application specialization includes at least nine hours of courses that increase depth of understanding in an application field; these need not be computation-focused courses. At least nine hours of Ph.D. courses must be courses that do not carry the CS/CSE course designation. These hours may be taken in the home unit. Hours taken as part of the computation and/or application specialization can be used to fulfill this requirement. Additional requirements may apply depending on the student’s home unit.

A qualifying examination must be attempted by the end of the second year of enrollment in the CSE doctoral program (normally taken after the student completes CSE core coursework). A qualifying examination committee shall be appointed by the CSE program coordinator for each student and is responsible for making an overall recommendation concerning the outcome of the qualifying examination.

Students are required to complete a doctoral thesis reporting the results of independent research that advances the state-of-the-art in the computational science and engineering discipline. The dissertation must be successfully defended to the student's dissertation research committee.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN ROBOTICS

Students pursuing a Ph.D. in Robotics must take thirty-six semester hours of core research and elective courses, pass a comprehensive qualifying exam with written and oral components, and successfully complete, document, and defend a piece of original research culminating in a doctoral thesis. Students select a home school, such as ECE, AE, ME, or CS, and apply for admission to the Ph.D. program in robotics through that home school.

## M.D. / PH.D. PROGRAM

The Coulter Department of Biomedical Engineering participates with the Emory University School of Medicine and the Medical College of Georgia to offer students an opportunity to combine their M.D. with a Ph.D. in Biomedical Engineering or Bioengineering.

## SCHOOL OF CHEMICAL AND BIOMOLECULAR ENGINEERING

Established in 1901
Location: Ford Environmental Science and Technology Building
Telephone: 404.894.1838
Fax: 404.894.2866
Web site: www.chbe.gatech.edu

### GENERAL INFORMATION

Chemical and Biomolecular Engineering is a discipline whose study prepares students for an enormously varied set of career paths. Graduates have become corporate executives, plant engineers, professors, inventors, lawyers, researchers, bankers, money managers, physicians, consultants, financial officers, and sales engineers. They have found employment with oil, chemical, biomedical, pharmaceutical, microelectronics, environmental, pulp and paper, food, textile, fertilizer, fragrance, and automobile companies, and with academia, government, banks, and brokerages. Chemical and biomolecular engineers have led the development of biomedicine and biotechnology and they have been crucial to the materials revolution, especially in computer chip manufacture, nanotechnology, and plastics and fibers. Additionally, they are essential in addressing the energy needs of the nation. Chemical and biomolecular engineering emphasizes environmentally benign manufacturing and sustainable development.

The chemical and biomolecular engineering undergraduate curriculum leads to a Bachelor of Science in Chemical and Biomolecular Engineering. Chemical and biomolecular engineering principles are taught as the foundation of that degree, but students also are expected to develop an ability to solve all kinds of problems, to view systems in their entirety, and to formulate and test solutions irrespective of the framework of the problem. Completion of the B.S. degree prepares students for entry into the workforce, advanced study in chemical and biomolecular engineering, or countless other graduate programs.

The curriculum has two options. The Standard Program provides the basics of chemical and biomolecular engineering but allows flexibility for the student to do additional study in a variety of areas, including microelectronics, materials, and the environment. The Biotechnology Option is for students who wish to focus their education on the biomolecular aspects of chemical and biomolecular engineering. This option includes the core chemical engineering courses, specialized biomolecular engineering courses, biochemistry, and technical electives focused in the biotechnology area. Special opportunities exist for students wishing to pursue minors or certificates in fields of particular interest, and students are encouraged to explore the frontiers of knowledge through involvement in faculty-directed research.

In addition to the B.S., the School of Chemical and Biomolecular Engineering offers programs leading to the M.S. and the Ph.D. Students should check the School Web site for detailed curriculum information and recent updates.

Georgia Tech’s B.S. degree in Chemical and Biomolecular Engineering is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, Maryland 21202-4012. Telephone: (410) 347-7700.

The Georgia Institute of Technology is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools (SACS) to award bachelor’s, master’s and doctoral degrees. Georgia Tech’s Cooperative Program is accredited by the Accreditation Council for Cooperative Education.

## FACULTY

**Cecil J. "Pete" Silas Chair and School Chair**
Ronald W. Rousseau

**Associate Chair for Undergraduate Studies and Associate Professor**
Pradeep K. Agrawal

**Associate Chair for Graduate Studies and Regents' Professor**
Amyn S. Teja

**Professor and Executive Assistant to the President**
Sue Ann Bidstrup Allen

**J. Erskine Love, Jr. Institute Chair in Engineering**
Charles A. Eckert

**Thomas C. DeLoach, Jr. Chair**
Dennis W. Hess

**Roberto C. Goizueta Chair for Excellence in Chemical Engineering**
William J. Koros

**Hercules Inc./Thomas L. Gossage Chair, Regents' Professor, and Institute Fellow**
Paul A. Kohl

**Wallace H. Coulter Chair in Biomedical Engineering**
Larry V. McIntire

**Joseph M. Pettit Professor and Regents' Professor**
Mark G. Allen

**The Michael E. Tennenbaum Family Chair & GRA Eminent Scholar for Energy Sustainability**
David S. Sholl

**Associate Chair for Research in Biomedical Engineering, the Wallace H. Coulter Distinguished Faculty Chair in Biomedical Engineering, and Regents' Professor**
Ajit Yoganathan

**Regents' Professor**
Charles L. Liotta

**Director of the Parker H. Petit Institute for Bioengineering and Bioscience**
Robert M. Nerem

**Director of the Institute of Paper Science and Technology**
W. James Frederick

**Professors**
Sujit Banerjee, Andreas Bommarius, Rachel Chen, Yulin Deng, Jeff Empie, Thomas Fuller, Jeffrey S. Hsieh, Christopher Jones, Jay H. Lee, Mark R. Prausnitz, Elsa Reichmanis, Athanassios Sambanis

**Professors Emeriti**
William R. Ernst, John D. Muzzy, Gary W. Poehlein, Ronnie S. Roberts, Robert J. Samuels, F. Joseph Schork, A. H. Peter Skelland, Jude T. Sommerfeld, Arnold F. Stancell, Jack Winnick, Mark White

**Associate Professors**
Sven H. Behrens, Larry J. Forney, Clifford L. Henderson, Peter J. Ludovice, J. Carson Meredith, Matthew J. Realff

**Associate Professor Emeriti**
Dan Tedder

**Assistant Professors**
Victor Breedveld, Martha Grover Gallivan, Hang Lu, Sankar Nair, Athanasios Nenes, Lakeshia J. Taite

**Professor of the Practice**
Ronald R. Chance

**Adjunct Professors**
Elliott L. Chaikof, Eric Felner

**Principal Research Engineer**
Kriistina Iisa

**Academic Professional**
Jacqueline Mohalley Snedeker

## BACHELOR OF SCIENCE IN CHEMICAL AND BIOMOLECULAR ENGINEERING ACCREDITATION

The B.S. in Chemical and Biomolecular Engineering program is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012 - telephone: (410) 347-7700.

# UNDERGRADUATE PROGRAM - GENERAL INFORMATION

## PROGRAM OBJECTIVES

The mission
of the School of Chemical and Biomolecular Engineering is to provide students the intellectual basis to be educated citizens, to prepare them for successful professional careers, and to advance the science and technology that form the basis of Chemical and Biomolecular Engineering. In pursuit of this mission, the School has adopted the following:

### Program Educational Objectives

- Graduates will demonstrate proficiency in the principles and methods essential to modern Chemical and Biomolecular Engineering.
- Graduates will demonstrate broadened perspectives regarding social issues and responsibilities, ethics, and professionalism.
- Graduates will be recognized for excellence and leadership and selected for high-quality industrial, academic, government, and other professional positions.
- Graduates will demonstrate an understanding of the global nature of engineering practice and business activities.
- Graduates will understand the importance of further professional growth through continuing education and research.

### Program Outcomes

In pursuit of its educational objectives, the School has adopted the following Program Outcomes:

- Students will demonstrate the ability to apply knowledge of mathematics, science, and engineering.
- Students will demonstrate the ability to design and conduct experiments, as well as to analyze and interpret data.
- Students will demonstrate the ability to design a system, component, product and/or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- Students will demonstrate the ability to lead and function on multidisciplinary teams.
- Students will demonstrate an ability to identify, formulate, and solve engineering problems.
- Students will demonstrate an understanding of professional and ethical responsibility.
- Students will demonstrate the ability to communicate effectively.
- Students will demonstrate a breadth in education that facilitates understanding the impact of engineering solutions in a global, economic, environmental, and societal context.
- Students will demonstrate a recognition of the need for, and an ability to engage in lifelong learning.
- Students will demonstrate a knowledge of contemporary issues, especially as related to chemical engineering practice.
- Students will demonstrate the ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- Students will have an understanding of the chemical engineering profession as obtained through professional organizations, cooperative education, internships, undergraduate research, and/or required laboratory courses.
- Students will have a thorough grounding in the basic sciences including chemistry, physics, and biology appropriate to the program objectives.
- Students will demonstrate knowledge in the applications of these basic sciences to enable graduates to design, analyze, and control physical, chemical, and biological processes consistent with the program educational objectives.

In pursuit of these objectives, the following curriculum is designed to provide coverage of core areas of chemical and biomolecular engineering, and to allow students opportunities to explore the breadth of the discipline. The curriculum requires a total of 132 hours for the B.S. degree. The Biotechnology Option allows the student to focus intensely in this rapidly emerging area of chemical engineering. The Standard Program provides the flexibility to explore other areas of chemical engineering practice while providing an understanding of the biomolecular aspects of modern chemical engineering. The Standard Program will also allow chemical and biomolecular engineering students to tailor their educations to their particular interests and plans for their professional careers. Students are encouraged to use the elective hours to earn a minor or certificate, or at least to focus their electives in an area of particular interest.

Many graduates have found international experience obtained as a student to be valuable later in their careers. The School is developing special initiatives to facilitate such experiences, and it has a longstanding six-week summer program at University College London in which students receive six hours of elective credit and credit for CHBE 4200 (Transport and Unit Operations Laboratory).

Finally, although the focus of the curriculum is development of technical skills, it has elements geared to enhance communication, teamwork, and business skills.

## BACHELOR OF SCIENCE IN CHEMICAL AND BIOMOLECULAR ENGINEERING ACCREDITATION

The B.S. in Chemical and Biomolecular Engineering program is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012 - telephone: (410) 347-7700.

## BACHELOR OF SCIENCE IN CHEMICAL AND BIOMOLECULAR ENGINEERING

The Bachelor of Science in Chemical and Biomolecular Engineering provides the basics of biomolecular engineering but allows flexibility for the student to pursue other areas of chemical engineering such as microelectronics, materials, and the environment.

## PROGRAM OBJECTIVES

The mission of the School of Chemical and Biomolecular Engineering is to provide students the intellectual basis to be educated citizens, to prepare them for successful professional careers, and to advance the science and technology that form the basis of Chemical and Biomolecular Engineering. In pursuit of this mission, the School has adopted the following:

### Program Educational Objectives

- Graduates will demonstrate proficiency in the principles and methods essential to modern Chemical and Biomolecular Engineering.
- Graduates will demonstrate broadened perspectives regarding social issues and responsibilities, ethics, and professionalism.
- Graduates will be recognized for excellence and leadership and selected for high-quality industrial, academic, government, and other professional positions.
- Graduates will demonstrate an understanding of the global nature of engineering practice and business activities.
- Graduates will understand the importance of further professional growth through continuing education and research.

### Program Outcomes

In pursuit of its educational objectives, the School has adopted the following Program Outcomes:

- Students will demonstrate the ability to apply knowledge of mathematics, science, and engineering.
- Students will demonstrate the ability to design and conduct experiments, as well as to analyze and interpret data.
- Students will demonstrate the ability to design a system, component, product and/or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- Students will demonstrate the ability to lead and function on multidisciplinary teams.
- Students will demonstrate an ability to identify, formulate, and solve engineering problems.
- Students will demonstrate an understanding of professional and ethical responsibility.
- Students will demonstrate the ability to communicate effectively.
- Students will demonstrate a breadth in education that facilitates understanding the impact of engineering solutions in a global, economic, environmental, and societal context.
- Students will demonstrate a recognition of the need for, and an ability to engage in lifelong learning.
- Students will demonstrate a knowledge of contemporary issues, especially as related to chemical engineering practice.
- Students will demonstrate the ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- Students will have an understanding of the chemical engineering profession as obtained through professional organizations, cooperative education, internships, undergraduate research, and/or required laboratory courses.
- Students will have a thorough grounding in the basic sciences including chemistry, physics, and biology appropriate to the program objectives.
- Students will demonstrate knowledge in the applications of these basic sciences to enable graduates to design, analyze, and control physical, chemical, and biological processes consistent with the program educational objectives.

## B.S. IN CHEMICAL AND BIOMOLECULAR ENGINEERING
### 2008 - 2009 DEGREE REQUIREMENTS
### SCHOOL OF CHEMICAL & BIOMOLECULAR ENGINEERING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| MATH 1501 CALCULUS I | 4 |
| CHEM 1310 GENERAL CHEMISTRY | 4 |
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| BIOL 1510 BIOLOGICAL PRINCIPLES | 4 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **17** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| MATH 1502 CALCULUS II | 4 |
| CHEM 1311 INORGANIC CHEMISTRY I | 3 |
| CHEM 1312 INORGANIC CHEMISTRY LAB I | 1 |
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1371 COMPUTING FOR ENGINEERS | 3 |
| **TOTAL SEMESTER HOURS =** | **18** |

| SECOND YEAR-FALL | HRS |
|---|---|
| MATH 2401 CALCULUS III | 4 |
| PHYS 2212 INTRODUCTORY PHYSICS II | 4 |
| CHEM 2311 ORGANIC CHEMISTRY I | 3 |
| CHBE 2100 CHEMICAL PROCESS PRINCIPLES | 3 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| MATH 2403 DIFFERENTIAL EQUATIONS | 4 |
| CHEM 2312 ORGANIC CHEMISTRY II | 3 |
| CHEM 3412 PHYSICAL CHEMISTRY II | 3 |
| CHBE 2110 CHEMICAL ENGINEERING THERMODYNAMICS I | 3 |
| CHBE 2120 NUMERICAL METHODS | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| CHBE 3110 CHEMICAL ENGINEERING THERMODYNAMICS II | 3 |
| CHBE 3200 TRANSPORT PROCESS I | 3 |
| CHEM 2380 SYNTHESIS LAB I | 2 |
| MSE 2001 PRINCIPLES & APPLICATIONS OF ENGINEERING MATERIALS | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| ECON 2100 ECONOMIC ANALYSIS & POLICY PROBLEMS | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| CHBE 3210 TRANSPORT PROCESSES II | 3 |
| CHBE 4300 KINETICS & REACTOR DESIGN | 3 |
| CHEM 3281 or CHEM 3511 or CHEM 4511 | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CHBE 3225 SEPERATION PROCESS | 3 |
| CHBE 4400 CHEMICAL PROCESS CONTROL | 4 |
| CHBE 4515 CHEMICAL PROCESS SAFETY | 1 |
| FREE ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |

| | |
|---|---|
| TECHNICAL ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CHBE 4200 TRANSPORTATION PHENOMENA / UNIT OPERATIONS LAB | 3 |
| CHBE 4505 PROCESS DESIGN & ECONOMICS | 3 |
| CHBE ELECTIVE-Choose One:<br>CHBE SPECIAL TOPIC IN BIOPROCESS ENGR or<br>CHBE 4752 or 4770 or 4775 | 3 |
| HUMANITIES ELECTIVE | 3 |
| TECHNICAL ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

**TOTAL PROGRAM HOURS = 130 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

# ELECTIVES

## WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

## HUMANITIES/SOCIAL SCIENCES ELECTIVES

ENGL 1101 and 1102 apply toward satisfaction of the twelve-hour humanities requirement. An additional six hours of Institute-approved humanities courses are required to fulfill the twelve-hour humanities requirement. To satisfy the state requirements regarding coursework in the history and constitutions of the United States and Georgia, students must complete one of the following courses: HIST 2111, HIST 2112, POL 1101, PUBP 3000, or INTA 1200. One of these courses combined with three hours each of economics (ECON 2100) and history/political science, combined with an additional three hours of Institute-approved social science courses, satisfies the twelve-hour social sciences requirement.

## CHEMICAL AND BIOMOLECULAR ENGINEERING ELECTIVES

Both the Chemical Engineering Elective in the Standard Program and the Biotechnology Elective in the Biotechnology Option must be chosen from restricted lists available on the School's Web site (three hours each for the Standard Program and the Biotechnology Option, but from different lists).

## TECHNICAL ELECTIVES-STANDARD PROGRAM

Six hours of technical electives are required for the standard program. To qualify as a technical elective, a course must be chosen from courses in the Colleges of Engineering, Sciences, or Computing, and may include one course at the 2000 or higher level plus the remainder at the 3000 or higher level. Students may count up to six hours of undergraduate research (CHBE 4699) toward fulfilling the technical elective requirements, and research hours in excess of six credits may be used to satisfy free elective requirements.

## TECHNICAL ELECTIVES-BIOTECHNOLOGY OPTION

There are no technical electives for the Biotechnology Option.

## FREE ELECTIVES

Students may count up to six hours of undergraduate research (CHBE 4699) toward fulfilling the technical elective requirement, and research hours in excess of six credits may be used to satisfy the six hours of free electives requirement.

## PASS/FAIL COURSES

Up to nine hours of undesignated humanities, social sciences, or free electives may be taken on a pass/fail basis. All other courses in the chemical and biomolecular engineering curriculum must be taken on a letter-grade basis. Transfer students are restricted to fewer pass/fail hours.

## B.S. CHEMICAL AND BIOMOLECULAR ENGINEERING - BIOTECHNOLOGY OPTION

The Biotechnology Option is for students who wish to focus their education on the biomolecular aspects of chemical and biomolecular engineering. This option includes the core chemical engineering courses, specialized biomolecular engineering courses, biochemistry, and technical electives focused in the biotechnology area.

## BACHELOR OF SCIENCE IN CHEMICAL AND BIOMOLECULAR ENGINEERING - COOPERATIVE OPTION

Since 1912, Georgia Tech has offered a five-year Undergraduate Cooperative Program to those students who wish to combine career-related experience with classroom studies. The program is the fourth oldest of its kind in the world and the largest optional co-op program in the country. Traditionally, 35-40 percent of chemical and biomolecular engineering students participate in the program each year at Georgia Tech.

Students alternate between industrial assignments and classroom studies until they complete four or five semesters of work. Co-op students with chemical and biomolecular engineering majors complete the same coursework on campus that is completed by regular four-year students. Most co-op students begin the program as sophomores and are classified as full-time students regardless whether they are attending classes on campus or are full time at an employer’s location.

Students who participate in the program have the opportunity to develop career interests, become more confident in their career choices, and develop human relation skills through their work experience. Graduates of the program receive a bachelor’s degree with a Cooperative Plan Designation.

## BACHELOR OF SCIENCE IN CHEMICAL AND BIOMOLECULAR ENGINEERING - RESEARCH OPTION

The Chemical and Biomolecular Engineering undergraduate program offers an undergraduate Research Option that allows students to participate in undergraduate research and complete an undergraduate thesis. The words "Research Option" will appear on the transcript of each student completing the requirements to indicate that the student has had substantial, in-depth research experience.

## B.S./M.S. CHEMICAL AND BIOMOLECULAR ENGINEERING

This program seeks to engage undergraduate students who indicate an interest in and ability for additional education beyond the B.S. degree. The key components of such a program are:

1. a meaningful undergraduate research experience (CHBE 4699, Undergraduate Research Project) for those seeking the M.S. degree by coursework; and
2. careful advising and course planning to enable students to begin graduate coursework in the fourth year of study. Students with significant AP credit will be especially well positioned to take full advantage of this opportunity.

Students will be eligible to apply for the program after completion of thirty credit hours at Georgia Tech (i.e., at the end of the freshman year). As a practical matter, students will need to apply before the completion of seventy-five semester credit hours (mid-point of junior year) to include transfer and AP credit. Students must have a Georgia Tech GPA of 3.5 or higher for admission to the program and maintain a GPA of 3.0 or higher to continue in the program.

The program will require thirty credit hours beyond those required for the B.S. degree in Chemical and Biomolecular Engineering. Students participating in the program will be eligible for the six-credit-hour Graduate Course Option.

## MINORS

Special opportunities exist for students wishing to pursue minors or certificates in fields of particular interest, and students are encouraged to explore the frontiers of knowledge through involvement in faculty-directed research.

Please visit our Web site at www.chbe.gatech.edu/current/ugrads/special.php for more information.

## TRANSFER STUDENTS

Due to the sequence of courses and the order in which they must be taken, students who transfer into the school of Chemical and Biomolecular Engineering (CHBE) from another university should expect to be enrolled for a minimum of six terms (a term is a semester or a summer session). If, for financial aid purposes, insurance, etc., students are required to be full-time, they should transfer to Georgia Tech having sufficient non-chemical and biomolecular engineering courses remaining to enroll full-time for six terms. All prerequisites and co-requisites must be followed.

## B.S./M.S. CHEMICAL AND BIOMOLECULAR ENGINEERING

This program seeks to engage undergraduate students who indicate an interest in and ability for additional education beyond the B.S. degree. The key components of such a program are:

1. a meaningful undergraduate research experience (CHBE 4699, Undergraduate Research Project) for those seeking the M.S. degree by coursework; and
2. careful advising and course planning to enable students to begin graduate coursework in the fourth year of study. Students with significant AP credit will be especially well positioned to take full advantage of this opportunity.

Students will be eligible to apply for the program after completion of thirty credit hours at Georgia Tech (i.e., at the end of the freshman year). As a practical matter, students will need to apply before the completion of seventy-five semester credit hours (mid-point of junior year) to include transfer and AP credit. Students must have a Georgia Tech GPA of 3.5 or higher for admission to the program and maintain a GPA of 3.0 or higher to continue in the program.

The program will require thirty credit hours beyond those required for the B.S. degree in Chemical and Biomolecular Engineering. Students participating in the program will be eligible for the six-credit-hour Graduate Course Option.

## MASTER OF SCIENCE IN BIOENGINEERING

The Bioengineering Program offers two options for students interested in pursuing an M.S. degree in bioengineering. There are non-thesis programs based solely on coursework as well as thesis-based programs involving independent research and coursework. In addition to the Bioengineering M.S. degree, several schools award traditional M.S. degrees, which may have a bioengineering topic. See www.bioengineering.gatech.edu/academics/ms.html for more information.

## MASTER OF SCIENCE IN CHEMICAL ENGINEERING

The School of Chemical and Biomolecular Engineering offers graduate programs involving advanced-level coursework and independent research leading to M.S. and Ph.D. degrees in chemical engineering. The M.S. degree may also be obtained by coursework only. Course selection for both the M.S. and doctoral degrees is quite flexible, with individual plans of study developed for each student. Research opportunities exist in a broad range of areas of importance to chemical engineers and society, including air pollution control, biochemical and bioprocess engineering, polymer science, process design and simulation, catalysis, chemical reaction engineering, biomedical engineering, pulp and paper engineering, transport phenom-ena, fine particle technology, thermodynamics, electrochemical engineering, process control, separations, and microelectronics processing. Furthermore, the School of Chemical and Biomolecular Engineering participates with several other schools in offering M.S. and Ph.D. degrees in Bioengineering, Polymers, and Paper Science and Engineering.

## MASTER OF SCIENCE IN PAPER SCIENCE AND ENGINEERING

The Institute of Paper Science and Technology supports the M.S. degree programs offered by the Georgia Institute of Technology. The Paper Science and Engineering (PSE) program provides students with a multidisciplinary graduate education in the science and engineering involved in the production of paper, tissue, and other products from natural fiber and related industries. The processing and consolidation of natural fiber into a paper web involve complex chemical and mechanical processes. The advantages of a multidisciplinary approach in research and education supporting this field have long been recognized. The Georgia Tech PSE program integrates the former Institute of Paper Science and Technology multidisciplinary graduate program with the science and engineering programs available at Georgia Tech.

The M.S. degree in PSE is a unique multidisciplinary degree covering basic engineering and science disciplines involved in the production and consolidation of wood fiber products. Students are enrolled in the participating Georgia Tech school (referred to as the "home school") and, upon completion of degree requirements, the home school recommends the award of its M.S. degree with an emphasis in paper science and engineering. Degrees are being offered by the Schools of Chemical and Biomolecular Engineering, Chemistry and Biochemistry, Mechanical Engineering, and Materials Science and Engineering.

The paper industry continues to evolve through considerable consolidation and reorganization, and the need for innovation in the science and engineering of pulp and paper technology from plant biology to chemical treatment and processes involved in paper production is greater than ever. The PSE program provides research results and equips students with a unique set of skills to lead in this effort.

For more information please visit www.ipst.gatech.edu/degree_progs/index.html.

## MASTER OF SCIENCE IN POLYMERS

The Master of Science in Polymers is offered through the Schools of Materials Science and Engineering, Chemical and Biomolecular Engineering, and Polymer, Textile and Fiber Engineering. The core course requirements for polymer degrees are the same in each school. This core is designed to provide a balanced treatment of the chemistry, physics, and engineering of polymeric materials. At the same time, the wide range of elective courses and research projects permits students to develop an in-depth knowledge of a particular area of polymer science and engineering. This combination of breadth and depth of study is vital for the successful performance of polymer scientists and engineering graduates.

## MASTER OF SCIENCE WITH A MAJOR IN CHEMICAL ENGINEERING

The School of Chemical and Biomolecular Engineering offers graduate programs involving advanced-level coursework and independent research leading to M.S. and Ph.D. degrees in chemical engineering. The M.S. degree may also be obtained by coursework only. Course selection for both the M.S. and doctoral degrees is quite flexible, with individual plans of study developed for each student. Research opportunities exist in a broad range of areas of importance to chemical engineers and society, including air pollution control, biochemical and bioprocess engineering, polymer science, process design and simulation, catalysis, chemical reaction engineering, biomedical engineering, pulp and paper engineering, transport phenom-ena, fine particle technology, thermodynamics, electrochemical engineering, process control, separations, and microelectronics processing. Furthermore, the School of Chemical and Biomolecular Engineering participates with several other schools in offering M.S. and Ph.D. degrees in Bioengineering, Polymers, and Paper Science and Engineering.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN BIOENGINEERING

The Bioengineering Ph.D. degree requires a thesis based on independent study of a bioengineering research topic under the guidance of a bioengineering program faculty member. It also requires thirty six hours of coursework in a mixture of bioscience, mathematics, bioengineering, traditional engineering, and elective classes.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN CHEMICAL ENGINEERING

The School of Chemical and Biomolecular Engineering offers graduate programs involving advanced-level coursework and independent research leading to M.S. and Ph.D. degrees in chemical engineering. The M.S. degree may also be obtained by coursework only. Course selection for both the M.S. and doctoral degrees is quite flexible, with individual plans of study developed for each student. Research opportunities exist in a broad range of areas of importance to chemical engineers and society, including air pollution control, biochemical and bioprocess engineering, polymer science, process design and simulation, catalysis, chemical reaction engineering, biomedical engineering, pulp and paper engineering, transport phenom-ena, fine particle technology, thermodynamics, electrochemical engineering, process control, separations, and microelectronics processing. Furthermore, the School of Chemical and Biomolecular Engineering participates with several other schools in offering M.S. and Ph.D. degrees in Bioengineering, Polymers, and Paper Science and Engineering.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN PAPER SCIENCE AND ENGINEERING

The Institute of Paper Science and Technology supports the Ph.D. degree programs offered by the Georgia Institute of Technology. The Paper Science and Engineering (PSE) program provides students with a multidisciplinary graduate education in the science and engineering involved in the production of paper, tissue, and other products from natural fiber and related industries. The processing and consolidation of natural fiber into a paper web involve complex chemical and mechanical processes. The advantages of a multidisciplinary approach in research and education supporting this field have long been recognized. The Georgia Tech PSE program integrates the former Institute of Paper Science and Technology multidisciplinary graduate program with the science and engineering programs available at Georgia Tech.

The Ph.D. degree in PSE is a unique multidisciplinary degree covering basic engineering and science disciplines involved in the production and consolidation of wood fiber products. Students are enrolled in the participating Georgia Tech school (referred to as the "home school") and, upon completion of degree requirements, the home school recommends the award of its Ph.D. degree with an emphasis in paper science and engineering. Degrees are being offered by the Schools of Chemical and Biomolecular Engineering, Chemistry and Biochemistry, Mechanical Engineering, and Materials Science and Engineering.

The paper industry continues to evolve through considerable consolidation and reorganization, and the need for innovation in the science and engineering of pulp and paper technology from plant biology to chemical treatment and processes involved in paper production is greater than ever. The PSE program provides research results and equips students with a unique set of skills to lead in this effort.

For more information please visit www.ipst.gatech.edu/degree_progs/index.html.

# SCHOOL OF CIVIL AND ENVIRONMENTAL ENGINEERING

Established in 1896
Location: Mason Building
Telephone: 404.894.2201
Fax: 404.894.2278
Web site: www.ce.gatech.edu

## GENERAL INFORMATION

The School of Civil and Environmental Engineering offers courses in civil engineering, environmental engineering, and engineering science and mechanics, as well as programs leading to the degrees Bachelor of Science in Civil Engineering, Bachelor of Science in Environmental Engineering, Master of Science in Civil Engineering, Master of Science in Engineering Science and Mechanics, Master of Science in Environmental Engineering, Master of Science (undesignated), and Doctor of Philosophy. The School also offers a joint program leading to the degrees Master of Science in Civil Engineering and Master of Science (undesignated), with a concentration in transportation engineering, and Master of City Planning.

## FACULTY

**Chair and Professor**
Joseph Hughes

**Associate Dean for Academic Affairs and Professor**
Laurence Jacobs

**Associate Chair and Professor**
Reginald DesRoches

**Associate Dean and Associate Professor**
John Leonard

**Associate Chair for Graduate Studies and Associate Professor**
Kenneth Will

**Associate Chair for Undergraduate Programs and Associate Professor**
Donald Webster

**President and Professor**
G. Wayne Clough

**Associate Provost and Associate Professor**
Nelson Baker

**Director of Georgia Tech-Savannah and Professor**
J. David Frost

**Associate Director for Georgia Tech-Savannah, Associate Chair, and Associate Professor**
Paul Work

**Raymond Allen Jones Chair and Professor**
Bruce Ellingwood

**Georgia Power Distinguished Professor**
Armistead Russell

**Goizueta Foundation Faculty Chair and Professor**
J. Carlos Santamarina

**Carlton Wilder Associate Professor of Environmental Engineering**
Frank Löffler

**Professors**
Mustafa Aral, Leroy Emkin, Aris Georgakakos, Leonid Germanovich, Barry Goodno, Randall Guensler, Lawrence Kahn, Roberto Leon, Paul Mayne, Michael Meyer, Jim Mulholland, Kurt Pennell, Spyros Pavlostathis, Glenn Rix, Philip Roberts, Jim Spain, Terry Sturm, Peter Webster, Donald White, Sotira Yiacoumi, Abdul Hamid Zureick

**Professor Emeritus**
Appiah Amirtharajah, Richard Barksdale, Wilton King, James Lai, Sam Martin, Peter Parsonsons

**Associate Professors**
Adjo Amekudzi, Michael Bergin, Susan Burns, Hermann Fritz, Rami Haj-Ali, Ching-Hua Huang, Kimberly Kurtis, Rafi Muhanna, David Scott, Marc Stieglitz, Yi-Chang Tsai

**Assistant Professors**
Dominic Assimaki, Mulalo Doyoyo, Francesco Fedele, Laurie Garrow, Kevin Haas, Michael Hunter, Haiyang Huang, Jaehong Kim, Kostantinos Kostantinidis, Jorge Laval, Jian Luo, Thorsten Stoesser, Jochen Teizer, Wang Yang, Arash Yavari

**Professor of the Practice**
Stan Lindsay

**Academic Professionals and Other General Faculty**
Mahera Philobos, Lisa Rosenstein

**Adjunct and Other Faculty Affiliates**
John Abraham, John Edwards, John Luh, Christa Peters-Lidard, Jae Ryou, Simon Washington

**Research Engineers, Scientists, and Associates**
Robert Abernathy, Jed Costanza, Rob Dell Ross, Vetri Elango, Maohong Fan, Jiabao Guan, Angshuman Guin, Wonyong Jang, David Key, Shirley Nishino, Mehmet Odman, Feifei Pan, Kirsti Ritalahti, Michael Rodgers, Stacy Stringer, Michael Swanger, Costas Tsouris, Huaming Yao, Hamid Zand, Guangxuan Zhu

## ACCREDITATION

The following undergraduate engineering programs are accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012. Telephone: 410.347.7700:

- Bachelor of Science in Civil Engineering program
- Bachelor of Science in Civil Engineering (Regional Engineering Program offered through Georgia Tech-Savannah)

The following undergraduate engineering program is not currently accredited by the Engineering Accreditation Commission of ABET:

- Bachelor of Science in Environmental Engineering program

## UNDERGRADUATE PROGRAM - GENERAL INFORMATION

The School awards two undergraduate degrees: Bachelor of Science in Civil Engineering (B.S.C.E.) and Bachelor of Science in Environmental Engineering (B.S.Env.E.). A Bachelor of Science in Civil Engineering is also offered through the Regional Engineering Transfer Program at Georgia Tech-Savannah.

## BACHELOR OF SCIENCE IN CIVIL ENGINEERING ACCREDITATION

The B.S. in Civil Engineering program is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012 - telephone: (410) 347-7700.

## BACHELOR OF SCIENCE IN CIVIL ENGINEERING

The four-year curriculum leading to the Bachelor of Science in Civil Engineering (B.S.C.E.) enables the graduate to enter professional practice as an engineer or to continue his or her studies in programs leading to advanced degrees in the following broad fields of specialization: construction engineering and management, environmental engineering, environmental hydraulics, geotechnical engineering, hydrology, materials, structural engineering and mechanics, transportation, and water resources planning and management. The B.S.C.E. degree program is designed to offer depth in course material considered essential for all civil engineers, as well as flexibility in selecting elective courses that offer breadth of topic exposure. Civil engineers contribute to society in numerous ways; thus, the School's philosophy is to provide the student with a range of electives that meet student interests. Civil engineers must not only be technically proficient, but also must be effective in working with people and with professionals in other disciplines.

The course requirements of the B.S.C.E. degree are listed in the Degree Requirements page. Although students are not obligated to take the courses during the semester indicated, they must satisfy all prerequisites for a particular course. In addition to campus-wide academic requirements for graduation with a bachelor's degree, the following are also required for the B.S.C.E. degree:

A *C* or better must have been earned in MATH 1501-1502, PHYS 2211, CHEM 1310, and COE 2001.

The number of quality points earned in CEE courses taken toward the degree must be at least twice the number of credit hours in those courses. If a course is repeated, the latest grade will be included in applying this rule. No CEE course may be repeated for the purpose of satisfying this rule if the original grade was a *C* or higher.

## PROGRAM OBJECTIVES

A. Graduates will be technically competent. This includes having the ability to analyze and solve civil engineering problems by applying basic principles of mathematics, science, and engineering. Graduates will be able to use modern engineering techniques, skills, and tools to identify, formulate, and solve civil engineering problems.

B. Graduates will be able to apply the knowledge and skills from a broad education in order to understand the impact of civil engineering solutions in a global, societal, and environmental context consistent with the principles of sustainable development.

C. Graduates will be prepared for professional practice in civil engineering. Graduates will demonstrate an understanding of ethical, societal, and professional responsibility; will recognize the limits of their knowledge and initiate self-directed learning opportunities; and will be able to function and communicate effectively individually and within multidisciplinary teams.

# BACHELOR OF SCIENCE IN CIVIL ENGINEERING
## 2008 - 2009 DEGREE REQUIREMENTS
### SCHOOL OF CIVIL AND ENVIRONMENTAL ENGINEERING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| MATH 1501 CALCULUS I | 4 |
| CHEM 1310 GENERAL CHEMISTRY | 4 |
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| CS 1371 COMPUTING FOR ENGINEERS | 3 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| MATH 1502 CALCULUS II | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| CEE 1770 ENGINEERING GRAPHICS & VISUALIZATION | 3 |
| HUMANITIES ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-FALL | HRS |
|---|---|
| MATH 2401 CALCULUS III | 4 |
| PHYS 2212 INTRODUCTORY PHYSICS II | 4 |
| CEE 2300 ENVIRONMENTAL ENGINEERING PRINCIPLES | 3 |
| ECON 2100 or 2105 or 2106 | 3 |
| COE 2001 STATICS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| MATH 2403 DIFFERENTIAL EQUATIONS | 4 |
| BIOL 1510 or BIOL1520 or EAS2600 | 4 |
| CEE 2040 DYNAMICS | 2 |
| CEE 3000 CIVIL ENGINEERING SYSTEMS | 3 |
| PST 3105 or 3109 or 3127 (Ethics Elective) | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| CEE 3040 FLUID MECHANICS | 3 |
| CEE 3020 CIVIL ENGINEERING MATERIALS | 3 |
| COE 3001 MECHANICS OF DEFORMABLE BODIES | 3 |
| MSE 3000 or ME 3322 or CHBE 2110 (COE Elective-Group A) | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| CEE 3055 or 4100 or 4200 or 4300 or 4405 or 4600 (Breadth Electives) * | 12 |
| CEE/MATH/ISYE 3770 STATISTICS & APPLICATIONS | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CEE TECHNICAL ELECTIVES | 9 |
| APPROVED ELECTIVE | 3 |
| MSE 2001 or ECE 2025 or (ECE 3710 & 3741)<br>(COE Technical Elective-Group B) | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-SPRING | HRS |
|---|---|
| CEE TECHNICAL ELECTIVES | 6 |
| SOCIAL SCIENCE ELECTIVE (3000 or 4000 Level) | 3 |

| | |
|---|---|
| CEE 4090 CEE CAPSTONE DESIGN | 3 |
| APPROVED ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

**TOTAL PROGRAM HOURS = 126 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

*

at least one of the four courses must include a physical laboratory section, i.e. CEE 4200 and CEE 4405.

## ELECTIVES

### WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

### HUMANITIES/SOCIAL SCIENCES

A total of twelve credit hours of humanities and twelve credit hours of social sciences are required. The humanities requirement consists of ENGL 1101, ENGL 1102, a three-hour humanities elective*, and an ethics course: PST 3105, 3109, or 3127. The social science requirement consists of a United States history/government course, economics (ECON 2100, ECON 2105, or ECON 2106), and six hours of general social science. All courses taken to satisfy humanities and social sciences must be taken on a letter-grade basis. To satisfy the state requirements regarding coursework in the history and constitutions of the United States and Georgia, students must complete one of the following courses: HIST 2111, HIST 2112, POL 1101, INTA 1200, or PUBP 3000.

### BREADTH ELECTIVES

Select four (4) Breadth Elective courses from the following list (at least one of the four courses must include a physical laboratory section, i.e. CEE4200 and CEE4405)

CEE 3055 Structural Analysis
CEE 4100 Construction Engineering and Management
CEE 4200 Hydraulic Engineering
CEE 4300 Environmental Engineering Systems
CEE 4405 Geotechnical Engineering
CEE 4600 Transportation Planning, Operations and Design

### TECHNICAL ELECTIVES

There are fifteen hours of elective credit that students may use to pursue a specific area of interest within civil engineering. A maximum of six hours, with faculty approval, may be chosen from outside the School of Civil Engineering. Select five Technical Elective courses from the following list:

The fifth and sixth courses on the Breadth Elective List (CEE 3055, CEE 4100, CEE 4200, CEE 4300, CEE 4405, or CEE 4600)
CEE 3010 Geomatics
CEE 3340 Environmental Engineering Laboratory
CEE 4110 Construction Planning, Estimating, and Scheduling
CEE 4120 Construction Operations
CEE 4210 Hydrology
CEE 4225 Introduction to Coastal Engineering
CEE 4230 Environmental Transport Modeling
CEE 4310 Water Quality Engineering
CEE 4320 Hazardous Substance Engineering
CEE 4330 Air Pollution Engineering
CEE 4390 Environmental Engineering / Water Resources Design
CEE 4395 Environmental Systems Design
CEE 4410 Geosystems Engineering Design
CEE 4420 Subsurface Characterization
CEE 4430 Environmental Geotechnics
CEE 4510 Structural Steel Design
CEE 4520 Reinforced Concrete Design
CEE 4530 Timber and Masonry Design
CEE 4540 Infrastructure Rehabilitation
CEE 4550 Structural Analysis II
CEE 4610 Multimodal Transportation Planning, Design, and Operations
CEE 4620 Environmental Impact Assessment
CEE 4630 Computer-Aided Site and Roadway Design
CEE 4699 Undergraduate Research
CEE 4791 Mechanical Behavior of Composites
CEE 4793 Composite Materials and Processes
CEE 4794 Composite Materials and Manufacturing
CEE 4795 Ground Water Hydrology
CEE 4900 CEE Honors Research

### APPROVED ELECTIVES

There are six hours of elective credit which may be chosen from either inside or outside the School of

Civil and Environmental Engineering, but they require faculty approval.

## BACHELOR OF SCIENCE IN CIVIL ENGINEERING - COOPERATIVE PLAN

Since 1912, Georgia Tech has offered a five-year Undergraduate Cooperative Program to those students who wish to combine career-related experience with classroom studies. The program is the fourth oldest of its kind in the world and the largest optional co-op program in the country.

Students alternate between work assignments and classroom studies until they complete four or five semesters of work. Co-op students with a civil engineering major complete the same coursework on campus that is completed by regular four-year students. Most co-op students begin the program as freshmen or sophomores and are classified as full time students regardless of whether they are attending classes on campus or are full time at an employer's location.

Students who participate in the program have the opportunity to develop career interests, become more confident in their career choices, and develop human relations skills through their work experience. Graduates of the program receive a bachelor's degree with a Cooperative Plan Designation.

The Undergraduate Professional Internship Program is for civil engineering students who do not participate in the Cooperative Program, but want some career-related experience before graduation. Students generally work for one semester, usually in the summer, with an option for more work experiences. Students must have completed at least thirty hours of coursework at Georgia Tech before they can participate in the program. For more details, see: www.upi.gatech.edu.

In addition, there is a Work Abroad Program (www.workabroad.gatech.edu), which complements a student's formal education with paid international work experience directly related to civil engineering. Participating students typically are juniors and seniors. The international work assignments are designed to include practical training, cross-cultural exposure and learning, and the acquisition of needed skills. This program satisfies requirements for the International Plan, which is available to civil engineering students.

For more information about all of the programs in the Division of Professional Practice, view www.profpractice.gatech.edu.

## BACHELOR OF SCIENCE IN CIVIL ENGINEERING - INTERNATIONAL PLAN

The International Plan is a challenging and coherent academic program for undergraduates that develops global competence within the context of a student's major. It is a degree-long program that integrates international studies and experiences into any participating major at Georgia Tech. It helps to prepare Georgia Tech graduates professionally and personally for successful lives in the twenty-first century.

The International Plan is not intended to replace current international programs; it supplements them. Existing study abroad opportunities continue to be offered. It is also not intended to be an add-on to the current degree programs. It is intended to be another curriculum path to earn a degree in which international competence is integrated into the program of study. The Plan can be completed within the normal timeframe of four years of undergraduate study.

The overarching model for the International Plan has four components:

1. International coursework: Three courses to include one from each of the following categories:
    1. International relations
    2. Global economics
    3. A course about a specific country or region
2. International experience: Two terms abroad (not less than twenty-six weeks) engaged in any combination of study abroad, research, or internship
3. Second language proficiency: All students in the program are expected to reach at least the proficiency level equivalent to two years of college-level language study. Students who use the language to study, conduct research, or participate in an internship during their international experience are expected to attain a higher level of proficiency. Language proficiency is determined by testing (not course credits).
4. Culminating course: A capstone course in the major designed to tie the international studies and experiences together with the student's major

Completion of the International Plan is recognized by a designation on the student's diploma indicating completion of the degree with global competence.

For additional information about the International Plan visit www.oie.gatech.edu/internationalplan.

## BACHELOR OF SCIENCE IN CIVIL ENGINEERING - RESEARCH OPTION

The Research Option is intended for students who seek a concentrated research experience, culminating in an undergraduate thesis, integrated into their undergraduate studies in civil engineering. In order to graduate with a B.S.C.E – Research Option degree, the students must:

Complete at least nine units of undergraduate research (over at least two, preferably three terms). Research may be for either pay (CEE 2698 or CEE 4698) or credit (CEE 2699 or CEE 4699). Research for credit may be used towards the B.S.C.E. approved elective requirements.

Write an undergraduate thesis/report of research on their findings. This is usually done during the graduating term. The thesis will be published in the Georgia Tech Library.

Take the class LCC 4700 “Writing an Undergraduate Thesis” (taken during the thesis-writing semester).

At least six of the nine required hours of research should be on the same topic. A research proposal must be approved by a faculty advisor and one other faculty member. This proposal and at least six hours of research are required for admission to the LCC 4700 undergraduate thesis course. Completion of Research Option is noted on the student’s transcript.

## BACHELOR OF SCIENCE IN ENVIRONMENTAL ENGINEERING ACCREDITATION

The B.S. in Environmental Engineering program is not currently accredited.

## BACHELOR OF SCIENCE IN ENVIRONMENTAL ENGINEERING

The School of Civil and Environmental Engineering (CEE) offers a B.S. degree in Environmental Engineering (B.S.Env.E.). The curriculum is designed to provide students with fundamental knowledge of scientific disciplines and engineering principles that are used to address emerging environmental issues such as sustainable air, water, and land resources; human health; and environmental restoration. In the first and second years, students take courses in physics, chemistry, biology, mathematics, English composition, and introductory engineering. The third year incorporates advanced engineering topics, including solid and fluid mechanics, thermodynamics, and laboratories in engineering materials, hydraulic engineering, and environmental monitoring and process engineering. The fourth year is elective based, allowing students to select courses from specific focus areas, including biological processes, sustainability, air pollution, and water resources, in addition to technical and design electives. A senior-level capstone design course serves to integrate principles from a range of disciplines. The curriculum is intended to provide students with the flexibility to develop tailored sequences of electives to meet individual education and career objectives, while ensuring a comprehensive engineering design experience.

Specific course requirements for the B.S.Env.E. degree are listed in the Degree Requirements page. Although students are not required to take courses during the indicated semester, all prerequisites must be satisfied. In addition to Institute academic requirements for graduation with a B.S. degree, the following requirements must be satisfied for the B.S.Env.E.:

1. A letter grade of *C* or better must be earned in MATH 1501 and 1502, PHYS 2211, CHEM 1310, and COE 2001.
2. The total number of quality points earned in CEE courses used to satisfy degree requirements must be at least twice the number of credit hours in those courses. If a course is repeated, the most recent grade will be used in applying this rule. No CEE courses may be repeated for the purpose of satisfying this rule if the original grade was a *C* or higher.

## PROGRAM OBJECTIVES

A. Graduates will be technically competent. This includes having the ability to analyze and solve environmental engineering problems by applying basic principles of mathematics, science, and engineering. Graduates will be able to use modern engineering techniques, skills, and tools to identify, formulate, and solve environmental engineering problems.

B. Graduates will be able to apply the knowledge and skills from a broad education in order to understand the impact of environmental engineering solutions in a global, societal, and environmental context consistent with the principles of sustainable development.

C. Graduates will be prepared for professional practice in environmental engineering. Graduates will demonstrate an understanding of ethical, societal, and professional responsibility; will recognize the limits of their knowledge and initiate self-directed learning opportunities; and will be able to function and communicate effectively individually and within multidisciplinary teams.

# BACHELOR OF SCIENCE IN ENVIRONMENTAL ENGINEERING
## 2008 - 2009 DEGREE REQUIREMENTS
### SCHOOL OF CIVIL AND ENVIRONMENTAL ENGINEERING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| MATH 1501 CALCULUS I | 4 |
| CHEM 1310 GENERAL CHEMISTRY | 4 |
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| CS 1371 COMPUTING FOR ENGINEERS | 3 |
| HUMANITIES ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| MATH 1502 CALCULUS II | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| CHEM 1315 SURVEY OF ORGANIC CHEMISTRY | 3 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| MATH 2401 CALCULUS III | 4 |
| PHYS 2212 INTRODUCTORY PHYSICS II | 4 |
| CEE 2300 ENVIRONMENTAL ENGINEERING PRINCIPLES | 3 |
| BIOL 1510 BIOLOGICAL PRINCIPLES | 4 |
| COE 2001 STATICS | 2 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| MATH 2403 DIFFERENTIAL EQUATIONS | 4 |
| EAS 2600 EARTH PROCESSES | 4 |
| CEE 2040 DYNAMICS | 2 |
| CEE 3000 CIVIL ENGINEERING SYSTEMS | 3 |
| ECON 2100 ECONOMIC ANALYSIS | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| CEE 3040 FLUID MECHANICS | 3 |
| CEE 3020 CIVIL ENGINEERING MATERIALS | 3 |
| COE 3001 MECHANICS OF DEFORMABLE BODIES | 3 |
| CEE 4300 ENVIRONMENTAL ENGINEERING SYSTEMS | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| CEE 4200 HYDRAULIC ENGINEERING | 3 |
| CEE 3340 ENVIRONMENTAL ENGINEERING LAB | 3 |
| PHYSICAL CHEMISTRY/THERMODYNAMICS ELECTIVE | 3 |
| CEE / MATH / ISYE 3770 STATISTICS & APPLICATIONS | 3 |
| FOCUS AREA ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| FOCUS AREA ELECTIVES | 6 |
| APPROVED ELECTIVE | 3 |
| CEE 4XXX ENVE TECHNICAL ELECTIVE | 3 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| PST ETHICS ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **18** |

| FOURTH YEAR-SPRING | HRS |
|---|---|
| FOCUS AREA ELECTIVE | 3 |
| CEE 4XXX ENVE DESIGN ELECTIVE | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| CEE 4090 CAPSTONE DESIGN | 3 |
| APPROVED ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

**TOTAL PROGRAM HOURS = 127 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

# ELECTIVES

## WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

## HUMANITIES/SOCIAL SCIENCES

A total of twelve credit hours of humanities and twelve credit hours of social sciences are required. The humanities requirement consists of ENGL 1101, ENGL 1102, a three-hour humanities elective*, and an ethics course: PST 4176 (recommended), PST 3105, 3109, or 3127. The social science requirement consists of a United States history/government course, economics (ECON 2100, ECON 2105, or ECON 2106), and six hours of general social science. All courses taken to satisfy humanities and social sciences must be taken on a letter-grade basis. To satisfy the state requirements regarding coursework in the history and constitutions of the United States and Georgia, students must complete one of the following courses: HIST 2111, HIST 2112, POL 1101, INTA 1200, or PUBP 3000.

## PHYSICAL CHEMISTRY/THERMODYNAMICS ELECTIVE

One course is to be chosen from the following:

CHBE 2110 Chemical Engineering Thermodynamics I
CHEM 3411 Physical Chemistry I
EAS 3603 Thermodynamics-Earth Systems

## ENVIRONMENTAL ENGINEERING TECHNICAL ELECTIVE

Three hours of elective credit are described as environmental engineering technical content. One course is to be chosen from the following:

CEE 4210 Hydrology
CEE 4405 Geotechnical Engineering
CEE 4620 Environmental Impact Assessment
CEE 4795 Ground Water Hydrology

## ENVIRONMENTAL ENGINEERING DESIGN ELECTIVE

Three hours of elective credit are described as environmental engineering design content. One course is to be chosen from the following:

CEE 4310 Water Quality Engineering
CEE 4320 Hazardous Substance Engineering
CEE 4330 Air Pollution Engineering
CEE 4395 Environmental Systems Design Project

## FOCUS AREA ELECTIVES

There are twelve hours of focus area elective credit. Students may use these electives to pursue a specific area of interest within environmental engineering.

BIOL 2335 General Ecology
BIOL 3380 Introductory Microbiology
BIOL 4010 Aquatic Ecology
BIOL 4430 Environmental Sustainability
BMED 3400 Introduction to Biomechanics
BMED 4757 Biofluid Mechanics
BMED 4758 Biosolid Mechanics
CEE 3010 Geomatics
CEE 4100 Construction Engineering and Management
CEE 4210 Hydrology
CEE 4230 Environmental Transport Modeling
CEE 4310 Water Quality Engineering
CEE 4320 Hazardous Substance Engineering
CEE 4330 Air Pollution Engineering
CEE 4405 Geotechnical Engineering
CEE 4420 Subsurface Characterization
CEE 4600 Transportation Planning, Operation and Design
CEE 4620 Environmental Impact Assessment
CEE 4795 Ground Water Hydrology
CHBE 3200 Transport Processes I

CHEM 3281 Instrumental Analysis for Engineers
CHEM 3511 Survey of Biochemistry
CHEM 4740 Atmospheric Chemistry
CP 4210 Environmental Planning and Impact Assessment
CP 4510 Fundamentals of GIS
EAS 4420 Environmental Field Methods
EAS 4430 Remote Sensing and Data Analysis
EAS 4610 Earth Systems Modeling
EAS 4740 Atmospheric Chemistry
ECE 3710 Circuits and Electronics
ECE 3741 Instrumentation and Electronics Lab
ME 4171 Environmentally Conscious Design and Manufacturing
ME 4172 Designing Sustainable Engineering Systems
ME 4782 Biosystems Analysis

## BACHELOR OF SCIENCE IN ENVIRONMENTAL ENGINEERING - COOPERATIVE PLAN

Since 1912, Georgia Tech has offered a five-year Undergraduate Cooperative Program to those students who wish to combine career-related experience with classroom studies. The program is the fourth oldest of its kind in the world and the largest optional co-op program in the country.

Students alternate between work assignments and classroom studies until they complete four or five semesters of work. Co-op students with an environmental engineering major complete the same coursework on campus that is completed by regular four-year students. Most co-op students begin the program as freshmen or sophomores and are classified as full time students regardless of whether they are attending classes on campus or are full time at an employer's location.

Students who participate in the program have the opportunity to develop career interests, become more confident in their career choices, and develop human relations skills through their work experience. Graduates of the program receive a bachelor's degree with a Cooperative Plan Designation.

The Undergraduate Professional Internship Program is for environmental engineering students who do not participate in the Cooperative Program, but want some career-related experience before graduation. Students generally work for one semester, usually in the summer, with an option for more work experiences. Students must have completed at least thirty hours of coursework at Georgia Tech before they can participate in the program. For more details, see: www.upi.gatech.edu.

In addition, there is a Work Abroad Program (www.workabroad.gatech.edu), which complements a student's formal education with paid international work experience directly related to environmental engineering. Participating students typically are juniors and seniors. The international work assignments are designed to include practical training, cross-cultural exposure and learning, and the acquisition of needed skills. This program satisfies requirements for the International Plan, which is available to environmental engineering students.

For more information about all of the programs in the Division of Professional Practice, view www.profpractice.gatech.edu.

## BACHELOR OF SCIENCE IN ENVIRONMENTAL ENGINEERING - INTERNATIONAL PLAN

The International Plan is a challenging and coherent academic program for undergraduates that develops global competence within the context of a student's major. It is a degree-long program that integrates international studies and experiences into any participating major at Georgia Tech. It helps to prepare Georgia Tech graduates professionally and personally for successful lives in the twenty-first century.

The International Plan is not intended to replace current international programs; it supplements them. Existing study abroad opportunities continue to be offered. It is also not intended to be an add-on to the current degree programs. It is intended to be another curriculum path to earn a degree in which international competence is integrated into the program of study. The Plan can be completed within the normal timeframe of four years of undergraduate study.

The overarching model for the International Plan has four components:

1. International coursework: Three courses to include one from each of the following categories:
    1. International relations
    2. Global economics
    3. A course about a specific country or region
2. International experience: Two terms abroad (not less than twenty-six weeks) engaged in any combination of study abroad, research, or internship
3. Second language proficiency: All students in the program are expected to reach at least the proficiency level equivalent to two years of college-level language study. Students who use the language to study, conduct research, or participate in an internship during their international experience are expected to attain a higher level of proficiency. Language proficiency is determined by testing (not course credits).
4. Culminating course: A capstone course in the major designed to tie the international studies and experiences together with the student's major

Completion of the International Plan is recognized by a designation on the student's diploma indicating completion of the degree with global competence.

For additional information about the International Plan visit www.oie.gatech.edu/internationalplan.

## BACHELOR OF SCIENCE IN ENVIRONMENTAL ENGINEERING - RESEARCH OPTION

The Research Option is intended for students who seek a concentrated research experience, culminating in an undergraduate thesis, integrated into their undergraduate studies in environmental engineering. In order to graduate with a B.S.Env.E.– Research Option degree, the students must:

Complete at least nine units of undergraduate research (over at least two, preferably three terms). Research may be for either pay (CEE 2698 or CEE 4698) or credit (CEE 2699 or CEE 4699). Research for credit may be used towards the B.S.Env.E. approved elective requirements. Write an undergraduate thesis/report of research on their findings. This is usually done during the graduating term. The thesis will be published in the Georgia Tech Library.

Take the class LCC 4700 “Writing an Undergraduate Thesis” (taken during the thesis-writing semester).

At least six of the nine required hours of research should be on the same topic. A research proposal must be approved by a faculty advisor and one other faculty member. This proposal and at least six hours of research are required for admission to the LCC 4700 undergraduate thesis course. Completion of Research Option is noted on the student’s transcript.

## JOINT B.S./M.S. DEGREE PROGRAM

The American Society of Civil Engineers has adopted a policy of urging students to obtain a master's degree as the entry-level degree in the profession. The faculty of the School of Civil and Environmental Engineering has concluded that in many civil engineering program areas, a master's degree is necessary for students to have sufficient background to be successful professionally.

The joint five-year B.S./M.S. program is designed to attract the best-of-the-best undergraduate students and is especially intended for students who demonstrate an interest in, and ability for, additional education beyond the bachelor's degree.

Students are eligible to apply for the program after they have completed thirty semester credit hours at Georgia Tech, typically at the end of the freshman year, and they have shown appropriate progress in their degree program. A grade point average of 3.5 or higher is needed for admission to the five-year B.S./M.S. honors program. Students must apply to the program before the completion of seventy-five semester credit hours, including transfer and advanced placement credits, typically at the mid-point of the junior year.

The key components of this program are intense interaction among students and faculty, including mentoring and undergraduate research, and careful advising and course planning to enable students to begin challenging coursework in their fourth year of study.

Students in the joint B.S./M.S. program remain undergraduates until they meet the requirements for the bachelor's degree, at which point they will receive the B.S.C.E. degree. They will then be changed to graduate status. Graduate school application fees and the GRE requirements are waived.

Once admitted, a GPA of at least 3.0 must be maintained to remain in the program. Additionally, students in the B.S./M.S. program are eligible to use the Graduate Course Option (described above) even if their cumulative grade point average is below 3.5 at the time they complete their bachelor's degree.

## JOINT B.S./M.S. DEGREE PROGRAM

The American Society of Civil Engineers has adopted a policy of urging students to obtain a master's degree as the entry-level degree in the profession. The faculty of the School of Civil and Environmental Engineering has concluded that in many civil engineering program areas, a master's degree is necessary for students to have sufficient background to be successful professionally.

The joint five-year B.S./M.S. program is designed to attract the best-of-the-best undergraduate students and is especially intended for students who demonstrate an interest in, and ability for, additional education beyond the bachelor's degree.

Students are eligible to apply for the program after they have completed thirty semester credit hours at Georgia Tech, typically at the end of the freshman year, and they have shown appropriate progress in their degree program. A grade point average of 3.5 or higher is needed for admission to the five-year B.S./M.S. honors program. Students must apply to the program before the completion of seventy-five semester credit hours, including transfer and advanced placement credits, typically at the mid-point of the junior year.

The key components of this program are intense interaction among students and faculty, including mentoring and undergraduate research, and careful advising and course planning to enable students to begin challenging coursework in their fourth year of study.

Students in the joint B.S./M.S. program remain undergraduates until they meet the requirements for the bachelor's degree, at which point they will receive the B.S.C.E. degree. They will then be changed to graduate status. Graduate school application fees and the GRE requirements are waived.

Once admitted, a GPA of at least 3.0 must be maintained to remain in the program. Additionally, students in the B.S./M.S. program are eligible to use the Graduate Course Option (described above) even if their cumulative grade point average is below 3.5 at the time they complete their bachelor's degree.

## MASTER OF SCIENCE IN BIOENGINEERING

This program is interdisciplinary in scope, where advanced courses in engineering specialties, life sciences, and bioengineering are combined with training in biomedical research. Both the M.S. and Ph.D. in bioengineering are being offered by the College of Engineering. Students select a home school within the College of Engineering (Aerospace Engineering, Civil and Environmental Engineering,Chemical and Biomolecular Engineering, Materials Science and Engineering, Mechanical Engineering, and/or Polymer, Textile and Fiber Engineering). Only students selecting biomedical engineering as their home school are reviewed and admitted by the Department of Biomedical Engineering. High-quality students with engineering or non-engineering backgrounds (degrees in computer science, physics, chemistry, biology, or mathematics, or physicians with undergraduate degrees in engineering or the physical sciences) are eligible to apply to the program.

## MASTER OF SCIENCE IN CIVIL ENGINEERING

Students seeking this degree must have previously earned a B.S. CE or its equivalent.

a. **Course Option**
   Required Courses in Major Area of Specialization 18 (Construction Management, Environmental, Geosystems, Structures Mechanics and Materials, Transportation, Environmental Fluid Mechanics and Water Resources)
   Approved Electives 12
   Semester Hours 30*****

b. **Thesis Option**
   Required Courses in Major Area of Specialization 12 (Construction Management, Environmental, Geosystems, Structures Mechanics and Materials, Transportation, Environmental Fluid Mechanics and Water Resources)
   Approved Electives 12
   Thesis 6
   Semester Hours 30******

*21 of the 30 hours of coursework must be at the 6000 level or higher
** 12 of the 24 hours of coursework must be at the 6000 level or higher

## MASTER OF SCIENCE IN COMPUTATIONAL SCIENCE AND ENGINEERING

Computational Science and Engineering (CSE) is a discipline concerned with the body of knowledge, skills, and practices associated with the study of computer-based models of natural phenomena and engineered systems. Students will be required to obtain a breadth of knowledge across a set of core areas in the CSE discipline, depth of knowledge in a specific computational specialization (e.g., numerical computing), and knowledge to apply computational techniques in a domain of application. Students will be expected to integrate principles from mathematics, computer science, and engineering to be able to create significant computational artifacts, e.g., software.

The CSE M.S. degree program is an interdisciplinary program offered by the College of Computing, the College of Engineering, and the College of Sciences. Upon application, students select a desired "home unit" among those academic units that formally participate in the program.

Students must complete four of the five courses making up the core curriculum: CSE/Math 6643 (Numerical Linear Algebra), CSE 6140 (Computational Science and Engineering Algorithms), CSE 6730 (Modeling and Simulation: Fundamentals & Implementation), CSE/ISYE 6740 (Computational Data Analysis), and CSE 6220 (High Performance Computing). A home unit minor is required consisting of twelve hours of coursework relevant to the CSE discipline that includes one applications area; this must include at least six hours of courses that do not carry the CS/CSE course designation. Finally, students must either complete 6 additional hours of approved coursework (course option) or an M.S. thesis (thesis option) that is defended to the student's thesis committee who is responsible for overseeing the student's research. Six hours of thesis credit are required in the thesis option. Additional requirements may apply depending on the student's home unit. A plan of study must be approved by the CSE program director and the student's home unit coordinator.

## MASTER OF SCIENCE IN ENGINEERING SCIENCE AND MECHANICS

Students seeking this degree must have a B.S. in engineering or the physical sciences.

a. **Course Option**
   Required Courses in Mechanics 18
   Mathematics 6
   Approved Electives 6
   Semester Hours 30*****
b. **Thesis Option**
   Required Courses in Mechanics 12
   Mathematics 6
   Approved Electives 6
   Thesis 6
   Semester Hours 30******

*****21 of the 30 hours of coursework must be at the 6000 level or higher
******12 of the 24 hours of coursework must be at the 6000 level or higher

## MASTER OF SCIENCE WITH A MAJOR IN ENVIRONMENTAL ENGINEERING

Students seeking this degree must have an engineering undergraduate degree.

a. **a. Non-Thesis Option**
   Env.E. Core 12
   Environmental Engineering Core classes 15
   Approved Electives 15
   Semester Hours 30*****
b. **Thesis Option**
   Environmental Engineering Core classes 15
   Approved Electives 9
   Thesis 6
   Semester Hours 30*****

*****21 of the total hours must be at the 6000 level or higher

## MASTER OF SCIENCE (UNDESIGNATED)

Students who do not meet the undergraduate degree requirements above but satisfy all the other requirements in their M.S. area of specialization receive the undesignated Master of Science degree.

a. **Course Option**
   Required Courses in Major Area of Specialization 18
   (Construction Management, Environmental, Geosystems, Structures Mechanics and Materials, Transportation, Environmental Fluid Mechanics and Water Resources)
   Approved Electives 12
   Semester Hours 30*

b. **Thesis Option**
   Required Courses in Major Area of Specialization 12
   (Construction Management, Environmental, Geosystems, Structures Mechanics and Materials, Transportation, Environmental Fluid Mechanics and Water Resources)
   Approved Electives 12
   Thesis 6
   Semester Hours 30**

*21 of the 30 hours of coursework must be at the 6000 level or higher
** 12 of the 24 hours of coursework must be at the 6000 level or higher

## GRADUATE COURSE OPTION

Students who complete both the bachelor's and any of the master's degrees in the School of Civil and Environmental Engineering may use up to six credit hours of graduate-level coursework (CEE 6000 or higher) in the major discipline for both degrees. In order to qualify for this option, the student must complete the undergraduate degree with a cumulative grade point average of 3.5 or higher and complete the master's degree within two years after the awarding of the bachelor's degree.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN BIOENGINEERING

The School of Civil and Environmental Engineering (CEE) participates in Georgia Tech's interdisciplinary bioengineering Ph.D. program. The program enrolls students in a participating school (referred to as the "home school" which is CEE in this case) and upon completion of the degree requirements, the home school recommends the award of the degree. Bioengineering research focuses on the development of new or improved physical and mathematical concepts and techniques that may be applied to problems in medicine and biology. The curriculum provides the flexibility to concentrate in special areas so that the training is both multidisciplinary and integrated.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN CIVIL ENGINEERING

The Ph.D. program is offered to students with an excellent academic background and a capacity for independent research. Doctoral students tailor a highly individualized program of study directed toward completion of a dissertation that is expected to make an important contribution in their selected area.

Doctoral degrees are offered in civil engineering, environmental engineering, and engineering science and mechanics.

After consultation with the appropriate specialty group, the associate chair for graduate programs may grant the applicant admission to the appropriate doctoral program within the School. Applicants must have received an acceptable undergraduate or master's degree in engineering, mathematics, computer science, or the physical sciences from a recognized institution.

Students currently pursuing a master's degree who wish to continue studies toward the Ph.D. degree must get written approval from the head of the appropriate specialty group. Admission to the Ph.D. program does not constitute admission to candidacy for the Ph.D. degree.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN COMPUTATIONAL SCIENCE AND ENGINEERING

Computational Science and Engineering (CSE) is a discipline concerned with the body of knowledge, skills, and practices associated with the study of computer-based models of natural phenomena and engineered systems. Students will be required to obtain a breadth of knowledge across a set of core areas, depth of knowledge in a specific computational specialization (e.g., numerical computing), and knowledge to apply computational techniques in a domain of application. Students will be expected to integrate principles from mathematics, computing, science, and engineering to be able to create significant computational artifacts, e.g., software, and to complete independent research that advances the state-of-the-art in the CSE discipline.

The CSE M.S. degree program is an interdisciplinary program offered by the College of Computing, the College of Engineering, and the College of Sciences. Upon application students select a desired “home unit” among those academic units that formally participate in the program.

Required coursework includes CSE 6001 (Introduction to Computational Science and Engineering), CSE core courses (twelve hours), a computation specialization (nine hours), and an application specialization (nine hours). To complete the core course requirement, students must complete four of the five courses making up the core curriculum: CSE/Math 6643 (Numerical Linear Algebra), CSE 6140 (Computational Science and Engineering Algorithms), CSE 6730 (Modeling and Simulation: Fundamentals & Implementation), CSE/ISYE 6740 (Computational Data Analysis), and CSE 6220 (High Performance Computing). The computational specialization includes at least nine hours of courses that increase the student’s depth of understanding of computational methods in a specific area, as approved by the student’s academic advisor. These courses must go beyond “using computers” to deepen understanding of computational methods, preferably in the context of some application domain. The application specialization includes at least nine hours of courses that increase depth of understanding in an application field; these need not be computation-focused courses. At least nine hours of Ph.D. courses must be courses that do not carry the CS/CSE course designation. These hours may be taken in the home unit. Hours taken as part of the computation and/or application specialization can be used to fulfill this requirement. Additional requirements may apply depending on the student’s home unit.

A qualifying examination must be attempted by the end of the second year of enrollment in the CSE doctoral program (normally taken after the student completes CSE core coursework). A qualifying examination committee shall be appointed by the CSE program coordinator for each student and is responsible for making an overall recommendation concerning the outcome of the qualifying examination.

Students are required to complete a doctoral thesis reporting the results of independent research that advances the state-of-the-art in the computational science and engineering discipline. The dissertation must be successfully defended to the student's dissertation research committee.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN ENGINEERING SCIENCE AND MECHANICS

The Ph.D. program is offered to students with an excellent academic background and a capacity for independent research. Doctoral students tailor a highly individualized program of study directed toward completion of a dissertation that is expected to make an important contribution in their selected area.

Doctoral degrees are offered in civil engineering, environmental engineering, and engineering science and mechanics.

After consultation with the appropriate specialty group, the associate chair for graduate programs may grant the applicant admission to the appropriate doctoral program within the School. Applicants must have received an acceptable undergraduate or master's degree in engineering, mathematics, computer science, or the physical sciences from a recognized institution.

Students currently pursuing a master's degree who wish to continue studies toward the Ph.D. degree must get written approval from the head of the appropriate specialty group. Admission to the Ph.D. program does not constitute admission to candidacy for the Ph.D. degree.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN ENVIRONMENTAL ENGINEERING

The Ph.D. program is offered to students with an excellent academic background and a capacity for independent research. Doctoral students tailor a highly individualized program of study directed toward completion of a dissertation that is expected to make an important contribution in their selected area.

Doctoral degrees are offered in civil engineering, environmental engineering, and engineering science and mechanics.

After consultation with the appropriate specialty group, the associate chair for graduate programs may grant the applicant admission to the appropriate doctoral program within the School. Applicants must have received an acceptable undergraduate or master's degree in engineering, mathematics, computer science, or the physical sciences from a recognized institution.

Students currently pursuing a master's degree who wish to continue studies toward the Ph.D. degree must get written approval from the head of the appropriate specialty group. Admission to the Ph.D. program does not constitute admission to candidacy for the Ph.D. degree.

## REQUIREMENTS FOR THE DEGREE

a. A program of study must be approved by the student's Guidance Committee and the associate chair of graduate studies. There are no fixed course requirements for the Ph.D. degree. The student must have a major and minor field. The minor field is preferably outside the School of Civil and Environmental Engineering and must include at least nine hours of coursework. The minor field must be approved by the Office of Graduate Studies.
b. Pass a Ph.D. comprehensive (qualifying) examination consisting of written and oral portions.
c. Complete a Ph.D. dissertation.
d. Pass the final doctoral examination.

## SPECIALTY GROUPS

Applicants are encouraged to pursue interdisciplinary programs of study and research. For admission to the Ph.D. program, students must select one specialty group from the following:

- Construction Engineering and Management
- Environmental Engineering
- Environmental Fluid Mechanics and Water Resources
- Geosystems
- Structural Engineering, Mechanics, and Materials
- Transportation

If the student wishes to change from one specialty to another, he or she must obtain written permission from both specialty groups.

## CERTIFICATE PROGRAM IN REMOTE SENSING

Students completing the master's or doctoral degree requirements of the School may earn a Remote Sensing Certificate. Additional details can be found in this catalog at http://www.catalog.gatech.edu/colleges/cos/eas/grad/certificates.php.

## DISTANCE LEARNING AND PROFESSIONAL EDUCATION

The School of Civil and Environmental Engineering offers working professionals the opportunity to enroll in graduate courses in environmental engineering through video technologies. Qualified individuals may complete the requirements for the master's program in environmental engineering utilizing the video-based delivery system.

# SCHOOL OF ELECTRICAL AND COMPUTER ENGINEERING

Established in 1896
Principal location: Van Leer Building
Telephone: 404.894.2901
Fax: 404.894.4641
Web site: www.ece.gatech.edu

## GENERAL INFORMATION

Electrical engineers have defined, shaped, and driven the information technology revolution that we are experiencing today. Building on the fundamental cornerstones of electrical engineering - the control of information and electric power - electrical engineers have been responsible for innovations and technological breakthroughs that have altered the fabric and face of modern life. Cell phones, iPods, modern hearing aids, the Internet, digital cameras, global positioning systems, and hybrid cars all are based on electrical engineering. Georgia Tech's School of Electrical and Computer Engineering (ECE) is consistently ranked nationally among the top ten of all electrical engineering programs, and its graduates are pioneering such life-altering innovations as biomedical devices that save lives and that improve everyday living for disabled people, as well as environmentally-friendly technologies such as solar energy and wind power. The electrical engineering program encompasses all major areas of this dynamic field, including analog electronics, bioengineering, digital signal processing, electric power, electromagnetics, microelectronics and microsystems, nanosystems, optics and photonics, systems and controls, and telecommunications.

Combining the study of computer systems with traditional aspects of electrical engineering, computer engineering is one of the fastest growing fields in the country, with projected demand over the next decade expected to grow by as much as 150 percent. The computer engineering program in ECE is at the forefront of this new and dynamic field, with national rankings consistently in the top ten. Rapid advances in underlying technologies have resulted in ever smaller, less costly, and higher-performance computer systems, making computers omnipresent in our everyday lives and fueling exciting developments in areas like robotics, wired and wireless networking, embedded processing, network security, and data storage. It is this ever-expanding capacity of computers that empowers us to communicate, learn, transact business, receive medical treatment, and explore space in new ways.

The School of Electrical and Computer Engineering (ECE) provides undergraduate and graduate programs that prepare students to participate in a broad range of career opportunities. Modern facilities and laboratories support experimental and theoretical programs of instruction and research. Additional information about the School is available at www.ece.gatech.edu or upon request by calling 404.894.2900.

## FACULTY

**Steve W. Chaddick School Chair and Professor**
Gary S. May

**Senior Associate Chair and Professor**
Joseph L. A. Hughes

**Associate Chair for Faculty Development and Professor**
Andrew F. Peterson

**Associate Chair for Graduate Affairs and Professor**
Bonnie H. Ferri

**Associate Chair for Undergraduate Affairs and Professor**
Douglas B. Williams

**Associate Chair for Research and Professor**
Paul G. Steffes

**Associate Chair for ECE at Georgia Tech-Savannah and Professor**
Monson H. Hayes III

**Associate Chair for Operations and Professor Emeritus**
Jay H. Schlag

**Assistant to the Chair for Computer Services**
David S. Webb

**Julius Brown Chair Professor and Regents' Professor**
Thomas K. Gaylord

**Joseph M. Pettit Professor, Regents' Professor, and Senior Vice Provost for Research and Innovation**
Mark G. Allen

**Joseph M. Pettit Professor and Regents' Professor**
Russell M. Mersereau

**Georgia Power Distinguished Professor and Regents' Professor**
Ajeet Rohatgi

**John Pippin Chair in Electromagnetics and Regents' Professor**
Glenn S. Smith

**Byers Professor**
Ian F. Akyildiz

**Director, GTRI Electro-Optical Systems Laboratory, and Professor**
Gisele Bennett

**Byers Endowed Professor in Optical Networking and GRA Eminent Scholar**
Gee-Kung Chang

**John H. Weitnauer Jr. Technology Transfer Chair and GRA Eminent Scholar**
John A. Copeland

**Arbutus Chair in Distributed Engineering Education and GRA Eminent Scholar**
Edward J. Coyle

**Byers Professor**
John D. Cressler

**Steve W. Chaddick Endowed Chair in Electro-Optics and GRA Eminent Scholar**
Russell D. Dupuis

**ON Semiconductor Junior Professor**
Maysam Ghovanloo

**Duke Power Company Distinguished Professor**
Ronald G. Harley

**ADVANCE Professor of Engineering**
Mary Ann Ingram

**John Pippin Chair in Wireless Systems and GRA Eminent Scholar**
Nikil S. Jayant

**Motorola Foundation Chair Professor and GRA Eminent Scholar**
Biing-Hwang (Fred) Juang

**Motorola Foundation Professor**
Kevin T. Kornegay

**Schlumberger Chair in Microelectronics**
Joy Laskar

**Georgia Power Distinguished Professor**
A.P. Sakis Meliopoulos

**John and Marilu McCarty Chair of Electrical Engineering and Professor**
James H. McClellan

**Byers Professor and Vice Provost for International Initiatives**
Steven W. McLaughlin

**Joseph M. Pettit Chair in Microelectronics and Professor**
James D. Meindl

**Julian T. Hightower Chair in Systems and Controls and Professor**
Jeff S. Shamma

**Joseph M. Pettit Professor**
Gordon L. Stüber

**Joseph M. Pettit Professor**
Madhavan Swaminathan

**Julian Hightower Professor**
Allen Tannenbaum

**Joseph M. Pettit Chair in Electronics Packaging and GRA Eminent Scholar**
Rao R. Tummala

**Goizueta Foundation Junior Faculty Rotating Professorship**
Patricio A. Vela

**Demetrius T. Paris Professor**
Paul L. Voss*

**Rhesa "Ray" Farmer Jr. Distinguished Chair in Embedded Computing Systems, GRA Eminent Scholar, and Professor**
Wayne H. Wolf

**Joseph M. Pettit Professor**
Sudhakar Yalamanchili

**Regents' Professors Emeriti**
John W. Hooper, George P. Rodrigue, Ronald W. Schafer, Kendall L. Su

**Professors**
John R. Barry, Miroslav M. Begovic, Douglas M. Blough, John A. Buck, Abhijit Chatterjee, David S. Citrin, Mark A. Clements, Stephen P. DeWeerth, Deepak Divan, John F. Dorsey, Ian T. Ferguson, A. Bruno Frazier, Thomas G. Habetler, James O. Hamblen, William D. Hunt, David C. Keezer, Bernard Kippelen, W. Marshall Leach Jr., Chin-Hui Lee, Ye (Geoffrey) Li, Vijay K. Madisetti, Abdallah Ougazzaden*, Henry L. Owen, John B. Peatman, Stephen E. Ralph, Waymond R. Scott Jr., David G. Taylor, Erik I. Verriest, Yorai Y. Wardi, D. Scott Wills, G. Tong Zhou

**Professors Emeriti**
Cecil O. Alford, Phillip E. Allen, Thomas P. Barnwell III, Henry C. Bourne, Aubrey M. Bush, W. Russell Callen Jr., J. Alvin Connelly, Robert K. Feeney, Joseph L. Hammond, David R. Hertling, Richard J. Higgins, Edward B. Joy, Edward W. Kamen, Hans B. Püttgen, Dale C. Ray, George J. Vachtsevanos, Roger P. Webb

**Associate Professors**
Ali Adibi, Yucel Altunbasak, David V. Anderson, Farrokh Ayazi, Christopher Barnes**, Oliver Brand, Robert J. Butera Jr., Jeffrey A. Davis, W. Alan Doolittle, Magnus Egerstedt, Faramarz Fekri, Paul E. Hasler, Ayanna Howard, Aaron D. Lanterman, Sung Kyu Lim, Chuanyi Ji, J. Stevenson Kenney, Arthur J. Koblasz, Aaron D. Lanterman, Jennifer E. Michaels, Thomas E. Michaels, Linda S. Milor, Vincent J. Mooney III, Ioannis (John) Papapolymerou, George F. Riley, Gabriel A. Rincon-Mora, David E. Schimmel, Raghupathy Sivakumar, Emmanouil M. Tentzeris, Linda M. Wills, Anthony J. Yezzi Jr., P. Douglas Yoder**

**Associate Professor Emeritus**
Mohamed F. Moad

**Assistant Professors**
Randal Abler**, Ghassan Al-Regib**, Pamela T. Bhatti, Gregory D. Durgin, Jongman Kim**, Benjamin D. B. Klein**, Hsien-Hsin (Sean) Lee, Xiaoli Ma, Elliot Moore**, Saibal Mukhopadhyay, Justin K. Romberg, Shyh-Chiang Shen, Hongwei Wu**, Fumin Zhang**, Ying Zhang**

**Laboratory Manager II**
Thomas E. Brewer

**Laboratory Manager II**
Allen Robinson

**Lecturers/Instructors**
Catherine Bass, Christina Bourgeois, Giorgio Casinovi, Thomas R. Collins, Frank C. Lambert, Michael Laughter, Jerome Meisel, Gail O. Palmer, Mark Richards, W. Whitfield Smith

### Adjunct Faculty

Emmanuel Anemogiannis, Muhannad S. Bakir, Raheem Beyah, Dale Blair, David E. Bockelman, Bertrand Boussert, Catherine Brechignac, Martin A. Brooke, Marijn Brummer, Giorgio Casinovi, Donald D. Davis, Richard DeMillo, Robert Eisner, Irfan Essa, Daniel P. Foty, Gary G. Gimmestad, Jean-Pierre Goedgebuer, Nile F. Hartman, Xiaoping Hu, Nan Marie Jokerst, Lance Kaplan, Chang-Ho Lee, Peter Manolios, Jerome Meisel, William L. Melvin, Stephen C. Mettler, Umakishore Ramachandran, William T. Rhodes, Karsten Schwan, Oskar Skrinjar, Christopher Summers, Lena Ting, Kwan K. Truong, Yi-Chang (James) Tsai, May D. Wang, Jianjun Yu, Zhiping (James) Zhou

*GTRI

**Georgia Tech-Savannah

## ACCREDITATION

The following undergraduate engineering programs are accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012. Telephone: 410.347.7700:

- Bachelor of Science in Computer Engineering
- Bachelor of Science in Computer Engineering - Regional Engineering Program (offered through Georgia Tech-Savannah)
- Bachelor of Science in Electrical Engineering

The following undergraduate engineering program is not currently accredited by the Engineering Accreditation Commission of ABET:

- Bachelor of Science in Electrical Engineering - Regional Engineering Program (offered through Georgia Tech-Savannah)

Additional information about program accreditation and assessment for all of the School's programs is available on the ECE Web site.

## BACHELOR OF SCIENCE IN COMPUTER ENGINEERING ACCREDITATION

The following undergraduate engineering programs are accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012 - Telephone number: (410) 347-7700:

- Bachelor of Science in Computer Engineering
- Bachelor of Science in Computer Engineering - Regional Engineering Program (offered through Georgia Tech-Savannah)

Additional information about program accreditation and assessment for all of the School's programs is available on the ECE Web site.

## BACHELOR OF SCIENCE IN COMPUTER ENGINEERING

The School of Electrical and Computer Engineering offers two undergraduate degree programs: electrical engineering (EE) and computer engineering (CmpE). Both programs include elective hours, enabling students to individually tailor their programs to provide emphasis in a particular specialization or exposure to a broad range of subjects. Engineering analysis and design concepts are integrated throughout both programs, culminating in a common major design experience involving a broad range of issues including economic and societal considerations.

The field of computer engineering is centered in digital design, computer architecture, computer networks and internetworking, and computer applications. The B.S. CmpE program offers elective courses in a wide variety of specializations, including computer architecture; embedded systems and software; design tools, test, and verification; computer networks and internetworking; distributed systems and software; and VLSI design. Additionally, students may elect to take advanced courses in other EE specializations, computer science, or programs, such as mathematics, physics, or management. As an alternative to the B.S. CmpE degree, students may choose a computer engineering specialization within the B.S. EE degree program.

## PROGRAM OBJECTIVES

The School of Electrical and Computer Engineering has established the following student educational objectives for its undergraduate programs:

A. Graduates will be successful in the professional practice of engineering or other related fields. They will obtain employment appropriate to their background, interests, and education and will advance in their career field.

B. Graduates will engage in life-long learning; e.g., advanced education/degrees, professional development activities, and/or other career-appropriate options.

C. Graduates who are employed within engineering fields will demonstrate technical competence, such as identifying, formulating, analyzing, and creating engineering solutions using appropriate current engineering techniques, skills, and tools.

D. As appropriate to their professional or educational positions, graduates will (i) effectively communicate technical information in multiple formats, (ii) function effectively on teams, and (iii) develop and apply electrical/computer engineering solutions within global, societal, and environmental contexts.

Additional information about program assessment for all of the School's programs is available on the ECE Web site.

# BACHELOR OF SCIENCE IN COMPUTER ENGINEERING
## 2008 - 2009 DEGREE REQUIREMENTS
### SCHOOL OF ELECTRICAL AND COMPUTER ENGINEERING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| MATH 1501 CALCULUS I | 4 |
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| CHEM 1310 GENERAL CHEMISTRY | 4 |
| CS 1371 COMPUTING FOR ENGINEERS | 3 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| MATH 1502 CALCULUS II | 4 |
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1372 PROGRAM DESIGN FOR ENGINEERS | 3 |
| ECE 2030 INTRODUCTION TO COMPUTER ENGINEERING | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-FALL | HRS |
|---|---|
| ECE 2025 INTRODUCTION TO SIGNAL PROCESSING | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| MATH 2401 CALCULUS III | 4 |
| PHYS 2212 INTRODUCTORY PHYSICS II | 4 |
| HUMANITIES ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **18** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| ECE 2031 DIGITAL DESIGN LAB | 2 |
| ECE 2040 CIRCUIT ANALYSIS | 3 |
| MATH 2403 DIFFERENTIAL EQUATIONS | 4 |
| SCIENCE ELECTIVE (CHEM, PHYS, BIOL, EAS) | 3 |
| ECE 3035 MECHANISMS FOR COMPUTING SYSTEMS | 4 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| ECE 3040 MICROELECTRONIC CIRCUITS | 4 |
| ECE 3041 INSTRUMENTATION & CIRCUITS LAB | 2 |
| ECE 3055 COMPUTER ARCHITECTURE & OPERATING SYSTEMS | 4 |
| ECON 2100 or 2101 or 2105 or 2106 | 3 |
| DISCRETE MATH ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| ECE 3042 MICROELECTRONIC CIRCUITS LAB | 2 |
| ECE 3060 VLSI & ADVANCED DIGITAL DESIGN | 4 |
| ECE 3025 ELECTROMAGNETICS | 3 |
| ENGINEERING ELECTIVE | 3 |
| APPROVED ELECTIVE | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **18** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| ECE 4001 ENGINEERING PRACTICE AND PROFESSIONALISM | 2 |
| ECE / CS ELECTIVE | 3 |
| ENGINEERING ELECTIVE | 3 |
| APPROVED ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **14** |

| FOURTH YEAR-SPRING | HRS |
| --- | --- |
| ECE 4007 ECE CULMINATING DESIGN PROJECT | 4 |
| ECE / CS ELECTIVES | 7 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| APPROVED ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

**TOTAL PROGRAM HOURS = 130 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

## ELECTIVES

The computer engineering curriculum includes forty-nine semester hours of electives, subject to the following requirements:

### HUMANITIES/SOCIAL SCIENCES ELECTIVES

ENGL 1101 and 1102 apply toward satisfaction of the twelve-hour humanities requirement. An additional six hours of Institute-approved humanities courses are required to fulfill the twelve-hour humanities requirement. To satisfy the state requirements regarding coursework in the history and constitutions of the United States and Georgia, students must complete one of the following courses: HIST 2111, HIST 2112, POL 1101, PUBP 3000, or INTA 1200. Students must complete one of the following economics courses: ECON 2100, 2101, 2105, or 2106. The history/constitution and economics courses, combined with an additional six hours of Institute-approved social science courses, satisfy the twelve-hour social sciences requirement.

### ETHICS

CS 4001, CS 4002, HTS 2084, HTS 3032, INTA 2030, LCC 3318, PST 3105, PST 3109, PST 3127, PST 4176, or PUBP 3600. This course is commonly taken as part of either the humanities or social science electives.

### WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

### SCIENCES

Three hours: APPH/BIOL 3751, BIOL 1510, BIOL 1520, CHEM 1311, CHEM 1315, EAS 1600, EAS 1601, EAS 2601, PHYS 2022, PHYS 2213, PHYS 3225, or course(s) approved by the School

### DISCRETE MATHEMATICS

Three hours: MATH 2602, MATH 3012, or course(s) approved by the School; course must be taken on a letter-grade basis.

### ENGINEERING ELECTIVES

Six hours, must include (a) thermodynamics: AE 3450, ME 3322, or ME 3720; and (b) probability/statistics: CEE/ISYE/MATH 3770 or ISYE 2027. All other courses must be approved by the School.

### ECE/CS ELECTIVES

Ten hours: 3000 level or above in ECE or CS, at least six hours at the 4000 level or above.

### APPROVED (FREE)

Nine hours: ECE, other engineering, mathematics, sciences, management, humanities, social sciences, or ROTC; all other courses subject to School approval.

## BACHELOR OF SCIENCE IN COMPUTER ENGINEERING - COOPERATIVE PLAN

The Georgia Tech Undergraduate Cooperative Education Program allows students to combine classroom study with paid practical work experience directly related to the academic major. Co-ops alternate semesters of on-campus study with semesters of full-time employment, normally beginning the program as freshmen or sophomores. Over 30 percent of ECE undergraduates participate in the co-op program.

The degree requirements for students in the co-op program are the same as those for other students in the major. The Cooperative Plan designation may be pursued separately or in combination with the International Plan and/or the Research Option.

Begun in 1912, Georgia Tech's program is currently the largest optional co-op program in the United States and has perennially been listed in U.S. News & World Report as one of the top ten co-op programs in America. As an integral part of the overall education experience, the co-op program allows students to take on increasing levels of responsibility and to use their job knowledge and classroom learning to make meaningful contributions to the organizations in which they work. Many co-op graduates are hired by their co-op employer, and more than 700 companies or government organizations throughout the United States and abroad currently employ Georgia Tech Undergrad Co-op Program students.

Because the School of ECE in Atlanta offers a wide range of electives and almost all required courses every term, including summer, co-op students have substantial flexibility in completing their degree requirements. Many students continue their co-op work assignments through the senior year. Additionally, co-op students working in the Atlanta area may be able to take certain ECE courses, particularly laboratories offered in the evening, during the work term.

In addition to the co-op program, the Division of Professional Practice also offers the Undergraduate Professional Internship and Work Abroad programs. These programs also provide opportunities for students to gain practical work experience, without the long-term commitment of the co-op program.

## BACHELOR OF SCIENCE IN COMPUTER ENGINEERING - INTERNATIONAL PLAN

The International Plan is intended for students who seek an intensive international experience integrated into their undergraduate studies in computer engineering. The International Plan develops global competence through a combination of coursework, language study, and residential overseas experience. Students who complete this option receive a designation on their transcript and diploma.

The computer engineering aspects of the B.S. CmpE - International Plan degree requirements are identical to those for the regular B.S. CmpE . Please refer to the B.S. CmpE catalog description for general information about the degree program. Students may be able to satisfy the additional requirements imposed for the International Plan designation through appropriate choices of electives without additional credit hours to complete the degree. The International Plan designation may be pursued separately, or in combination with the Cooperative Plan and/or the Research Option.

The School of Electrical and Computer Engineering offers a junior-year program at the Georgia Tech-Lorraine campus in Metz, France, that is designed to facilitate participation in the International Plan. However, computer engineering majors are not restricted to this option and may complete any allowable courses, languages, and overseas experiences that satisfy the International Plan requirements.

## BACHELOR OF SCIENCE IN COMPUTER ENGINEERING - RESEARCH OPTION

The Research Option is intended for students who seek a concentrated research experience, culminating in an undergraduate thesis, integrated into their undergraduate studies in computer engineering. This option includes three or four semesters of structured research and provides an open evaluation of a student's research capabilities, viewable by the public via a required Web-based research portfolio. Students who complete this option receive a designation on their transcript.

The computer engineering aspects of the B.S. CmpE-Research Option degree requirements are identical to those for the regular B.S. CmpE . Please refer to the B.S. CmpE catalog description for general information about the degree program. Students may be able to satisfy the additional requirements imposed for the Research Option designation through appropriate choices of electives without additional credit hours to complete the degree. The Research Option designation may be pursued separately, or in combination with the Cooperative Plan and/or the International Plan.

The School of Electrical and Computer Engineering (ECE) offers a two-semester Undergraduate Research Opportunity Program (UROP), which may be completed to provide a less-intensive research experience or as the initial phase of the Research Option. Contact the ECE Academic Office for additional information about the Research Option, including specific Institute and ECE requirements, and assistance in planning your schedule to allow participation in this program.

## BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING ACCREDITATION

The following undergraduate engineering programs are accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012 - Telephone number: (410) 347-7700:

- Bachelor of Science in Electrical Engineering

The following undergraduate engineering programs are not currently accredited by the Engineering Accreditation Commission of ABET:

- Bachelor of Science in Electrical Engineering - Regional Engineering Program (offered through Georgia Tech-Savannah)

Additional information about program accreditation and assessment for all of the School's programs is available on the ECE Web site.

## BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING

The School of Electrical and Computer Engineering offers two undergraduate degree programs: electrical engineering (EE) and computer engineering (CmpE). Both programs include elective hours, enabling students to individually tailor their programs to provide emphasis in a particular specialization or exposure to a broad range of subjects. Engineering analysis and design concepts are integrated throughout both programs, culminating in a common major design experience involving a broad range of issues including economic and societal considerations.

The EE program offers elective courses in a wide variety of specializations including analog electronics, bioengineering, computer engineering, systems and controls, microsystems and nanosystems, electronics packaging, digital signal processing, optics and photonics, electric power, energy processing, electromagnetics, and telecommunications. Additionally, students may elect to take advanced courses in other programs such as computer science, mathematics, physics, or management.

## PROGRAM OBJECTIVES

The School of Electrical and Computer Engineering has established the following student educational objectives for its undergraduate programs:

A. Graduates will be successful in the professional practice of engineering or other related fields. They will obtain employment appropriate to their background, interests, and education and will advance in their career field.

B. Graduates will engage in life-long learning; e.g., advanced education/degrees, professional development activities, and/or other career-appropriate options.

C. Graduates who are employed within engineering fields will demonstrate technical competence, such as identifying, formulating, analyzing, and creating engineering solutions using appropriate current engineering techniques, skills, and tools.

D. As appropriate to their professional or educational positions, graduates will (i) effectively communicate technical information in multiple formats, (ii) function effectively on teams, and (iii) develop and apply electrical/computer engineering solutions within global, societal, and environmental contexts.

Additional information about program assessment for all of the School's programs is available on the ECE Web site.

# BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING
## 2008 - 2009 DEGREE REQUIREMENTS
### SCHOOL OF ELECTRICAL AND COMPUTER ENGINEERING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| MATH 1501 CALCULUS I | 4 |
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| CHEM 1310 GENERAL CHEMISTRY | 4 |
| CS 1371 COMPUTING FOR ENGINEERS | 3 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| MATH 1502 CALCULUS II | 4 |
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1372 PROGRAM DESIGN FOR ENGINEERS | 3 |
| ECE 2030 INTRODUCTION TO COMPUTER ENGINEERING | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-FALL | HRS |
|---|---|
| ECE 2025 INTRODUCTION TO SIGNAL PROCESSING | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2401 CALCULUS III | 4 |
| PHYS 2212 INTRODUCTORY PHYSICS II | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| **TOTAL SEMESTER HOURS =** | **18** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| ECE 2031 DIGITAL DESIGN LAB | 2 |
| ECE 2040 CIRCUIT ANALYSIS | 3 |
| MATH 2403 DIFFERENTIAL EQUATIONS | 4 |
| SCIENCE ELECTIVE (CHEM, PHYS, BIOL, EAS) | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-FALL | HRS |
|---|---|
| ECE 3025 ELECTROMAGNETICS | 3 |
| ECE 3040 MICROELECTRONIC CIRCUITS | 4 |
| ECE 3041 INSTRUMENTATION & CIRCUITS LAB | 2 |
| ECON 2100 or 2101 or 2105 or 2106 | 3 |
| HUMANITIES ELECTIVE | 3 |
| APPROVED ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **18** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| ECE 3042 MICROELECTRONIC CIRCUITS LAB | 2 |
| ECE BREADTH ELECTIVES | 9 |
| APPROVED ELECTIVE | 3 |
| ENGINEERING ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| ECE 4001 ENGINEERING PRACTICE AND PROFESSIONALISM | 2 |
| ECE ELECTIVES | 4 |
| ENGINEERING ELECTIVE | 3 |
| APPROVED ELECTIVE | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-SPRING | HRS |
| --- | --- |
| ECE 4007 ECE CULMINATING DESIGN PROJECT | 4 |
| ECE ELECTIVES | 7 |
| ENGINEERING ELECTIVE | 2 |
| APPROVED ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

**TOTAL PROGRAM HOURS = 130 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

## ELECTIVES

The electrical engineering curriculum includes sixty-one semester hours of electives, subject to the following requirements:

### HUMANITIES/SOCIAL SCIENCES ELECTIVES

ENGL 1101 and 1102 apply toward satisfaction of the twelve-hour humanities requirement. An additional six hours of Institute-approved humanities courses are required to fulfill the twelve-hour humanities requirement. To satisfy the state requirements regarding coursework in the history and constitutions of the United States and Georgia, students must complete one of the following courses: HIST 2111, HIST 2112, POL 1101, PUBP 3000, or INTA 1200. Students must complete one of the following economics courses: ECON 2100, 2101, 2105, or 2106. The history/constitution and economics courses, combined with an additional six hours of Institute-approved social science courses, satisfy the twelve-hour social sciences requirement.

### ETHICS

CS 4001, CS 4002, HTS 2084, HTS 3032, INTA 2030, LCC 3318, PST 3105, PST 3109, PST 3127, PST 4176, or PUBP 3600. This course is commonly taken as part of either the humanities or social science electives.

### WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

### SCIENCES

Three hours: APPH/BIOL 3751, BIOL 1510, BIOL 1520, CHEM 1311, CHEM 1315, EAS 1600, EAS 1601, EAS 2601, PHYS 2022, PHYS 2213, PHYS 3225, or course(s) approved by the School.

### ENGINEERING ELECTIVES

Eight hours, must include (a) thermodynamics: AE 3450, ME 3322, or ME 3720; (b) probability/statistics: CEE/ISYE/MATH 3770 or ISYE 2027; and (c) AE 2120, BMED 3400, CEE 2020, COE 2001, ME 2211, MSE 2001, or a course at the 3000 level or above in the College of Engineering, outside ECE. All other courses must be approved by the School.

### ECE ELECTIVES

Twenty hours: 3000 level or above in ECE, at least six hours at the 4000 level or above; must include three of the following course options: ECE 3050, (ECE 3055 or 3060), ECE 3065, (ECE 3070 or 3071), (ECE 3075 or 3076), ECE 3080, ECE 3085, or ECE 3090.

### APPROVED (FREE)

Twelve hours: ECE, other engineering, mathematics, sciences, computing, management, humanities, social sciences, or ROTC; all other courses subject to School approval.

## BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING - COOPERATIVE PLAN

The Georgia Tech Undergraduate Cooperative Education Program allows students to combine classroom study with paid practical work experience directly related to the academic major. Co-ops alternate semesters of on-campus study with semesters of full-time employment, normally beginning the program as freshmen or sophomores. Over 30 percent of ECE undergraduates participate in the co-op program.

The degree requirements for students in the co-op program are the same as those for other students in the major. The Cooperative Plan designation may be pursued separately or in combination with the International Plan and/or the Research Option.

Begun in 1912, Georgia Tech's program is currently the largest optional co-op program in the United States and has perennially been listed in U.S. News & World Report as one of the top ten co-op programs in America. As an integral part of the overall education experience, the co-op program allows students to take on increasing levels of responsibility and to use their job knowledge and classroom learning to make meaningful contributions to the organizations in which they work. Many co-op graduates are hired by their co-op employer, and more than 700 companies or government organizations throughout the United States and abroad currently employ Georgia Tech Undergrad Co-op Program students.

Because the School of ECE in Atlanta offers a wide range of electives and almost all required courses every term, including summer, co-op students have substantial flexibility in completing their degree requirements. Many students continue their co-op work assignments through the senior year. Additionally, co-op students working in the Atlanta area may be able to take certain ECE courses, particularly laboratories offered in the evening, during the work term.

In addition to the co-op program, the Division of Professional Practice also offers the Undergraduate Professional Internship and Work Abroad programs. These programs also provide opportunities for students to gain practical work experience, without the long-term commitment of the co-op program.

## BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING - INTERNATIONAL PLAN

The International Plan is intended for students who seek an intensive international experience integrated into their undergraduate studies in electrical engineering. The International Plan develops global competence through a combination of coursework, language study, and residential overseas experience. Students who complete this option receive a designation on their transcript and diploma.

The electrical engineering aspects of the B.S. EE - International Plan degree requirements are identical to those for the regular B.S. EE. Please refer to the B.S. EE catalog description for general information about the degree program. Students may be able to satisfy the additional requirements imposed for the International Plan designation through appropriate choices of electives without additional credit hours to complete the degree. The International Plan designation may be pursued separately or in combination with the Cooperative Plan and/or the Research Option.

The School of Electrical and Computer Engineering offers a junior-year program at the Georgia Tech-Lorraine campus in Metz, France, that is designed to facilitate participation in the International Plan. However, electrical engineering majors are not restricted to this option and may complete any allowable courses, languages, and overseas experiences that satisfy the International Plan requirements.

## BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING - RESEARCH OPTION

The Research Option is intended for students who seek a concentrated research experience, culminating in an undergraduate thesis, integrated into their undergraduate studies in electrical engineering. This option includes three or four semesters of structured research and provides an open evaluation of a student's research capabilities, viewable by the public via a required Web-based research portfolio. Students who complete this option receive a designation on their transcript.

The electrical engineering aspects of the B.S. EE - Research Option degree requirements are identical to those for the regular B.S. EE. Please refer to the B.S. EE catalog description for general information about the degree program. Students may be able to satisfy the additional requirements imposed for the Research Option designation through appropriate choices of electives without additional credit hours to complete the degree. The Research Option designation may be pursued separately, or in combination with the Cooperative Plan and/or the International Plan.

The School of Electrical and Computer Engineering (ECE) offers a two-semester Undergraduate Research Opportunity Program (UROP), which may be completed to provide a less-intensive research experience or as the initial phase of the Research Option. Contact the ECE Academic Office for additional information about the Research Option, including specific Institute and ECE requirements, and assistance in planning your schedule to allow participation in this program.

## B.S./M.S. ELECTRICAL AND COMPUTER ENGINEERING - FIVE-YEAR

This five-year program allows highly qualified students to receive the Bachelor of Science in either Electrical Engineering or Computer Engineering and a master's degree in Electrical and Computer Engineering within a five-year time frame. The joint B.S./M.S. degree program affords undergraduate electrical or computer engineering majors the opportunity to broaden their studies and improve their career prospects.

Eligible Georgia Tech undergraduates normally apply for this program during their junior year. Contact the Electrical and Computer Engineering Graduate Affairs Office for program information, eligibility requirements, and applications.

## MASTER OF SCIENCE IN ELECTRICAL AND COMPUTER ENGINEERING

The master's degree allows students to pursue advanced work in Electrical and Computer Engineering technical interest areas including bioengineering, computer engineering, digital signal processing, electric power, electromagnetics, electronic design and applications, microsystems, optics and photonics, systems and controls, and telecommunications.

The master's degree program requires thirty semester credit hours beyond the bachelor's degree, including a minor outside ECE. Both thesis and non-thesis options are available. Courses are offered all three terms; however, full-time students planning to complete the M.S. degree in twelve months should start their programs in the fall semester.

In order to receive the designated M.S.E.C.E. degree, a student must either (a) have an undergraduate degree from an ABET-accredited Electrical, Electronic(s), Computer or similarly-named engineering program, or its equivalent, or (b) complete additional coursework to satisfy the ABET General and Program Criteria for such a degree prior to receiving the M.S.E.C.E. Students who do not meet these requirements may pursue the undesignated M.S. degree with a major in Electrical and Computer Engineering.

## MASTER OF SCIENCE IN BIOENGINEERING

The School of Electrical and Computer Engineering (ECE) participates in the Bioengineering Program. This interdisciplinary graduate program offers advanced courses in bioengineering, engineering specialties, and life sciences combined with training in cutting-edge bioengineering research. Bioengineering research focuses on the development of new or improved physical and mathematical concepts and techniques that may be applied to problems in medicine and biology, including the fundamental study of biological phenomena and development of new medical devices.

The Bioengineering Program offers master's and doctoral degrees through participating schools in the College of Engineering and the College of Computing. The curriculum involves engineering and life sciences coursework and provides flexibility to concentrate in specific areas to develop a multidisciplinary and integrated training. Interested applicants with an electrical and/or computer engineering background apply for admission in the Bioengineering Program through ECE. Once admitted, students follow the Bioengineering Program's degree requirements and curriculum.

Additional information on the Bioengineering Program, including how to apply and a comparison between the Bioengineering Program and traditional engineering programs, can be found at www.bioengineering.gatech.edu.

Students with an interest in bioengineering with a more traditional engineering approach, should apply directly to the ECE graduate program. Students with this focus would follow ECE's degree requirements and could possibly include up to five bioengineering-related classes in their program of study.

## MASTER OF SCIENCE WITH A MAJOR IN ELECTRICAL & COMPUTER ENGINEERING

The undesignated M.S. degree with a major in Electrical and Computer Engineering (ECE) has the same requirements as the designated M.S.E.C.E. degree. It is offered to accommodate students who do not meet the additional eligibility requirements of the designated degree.

The master's degree allows students to pursue advanced work in Electrical and Computer Engineering technical interest areas including bioengineering, computer engineering, digital signal processing, electric power, electromagnetics, electronic design and applications, microsystems, optics and photonics, systems and controls, and telecommunications.

The master's degree program requires thirty semester credit hours beyond the bachelor's degree, including a minor outside ECE. Both thesis and non-thesis options are available. Courses are offered all three terms; however, full-time students planning to complete the M.S. degree in twelve months should start their programs in the fall semester.

## DUAL M.S. PROGRAM IN ECE GT LORRAINE AND EUROPEAN PARTNER UNIVERSITIES

Georgia Tech offers several dual master's degree programs for students interested in a global educational experience. Each program leads to two MS degrees, one from Georgia Tech and the other from a partner school.

Programs coordinated by Georgia Tech-Lorraine include partner schools in France such as Supelec, ENSEEIHT, Institut d'Electronique de Microélectronique et de Nanotechnologies, and Groupe des Ecoles des Mines and a partner school in Germany, TU-Munich. These programs typically entail three semesters of coursework and a required internship in an industrial setting.

## DUAL M.S. PROGRAM IN ECE WITH THE POLITECNICO DI TORINO (ITALY)

Georgia Tech offers several dual master's degree programs for students interested in a global educational experience. Each program leads to two MS degrees, one from Georgia Tech and the other from a partner school.

The Politecnico di Torino is Georgia Tech's newest European Dual Master's Degree partner. Students from Georgia Tech and from the Politecnico di Torino can pursue dual master's degrees from both institutions: a non-thesis master's degree from the School of Electrical and Computer Engineering at Georgia Tech and a thesis master's degree from the School of Information Technologies at the Politecnico di Torino located in Torino, Italy. Both degrees can be earned in two years with two semesters spent at Georgia Tech.

## DUAL M.S. PROGRAM IN ECE WITH SHANGHAI JIAO TONG UNIVERSITY

Georgia Tech offers several dual master's degree programs for students interested in a global educational experience. Each program leads to two M.S. degrees, one from Georgia Tech and the other from a partner school.

Georgia Tech-Shanghai coordinates a dual M.S. program with Shanghai Jiao Tong University (SJTU), located in Shanghai, China. Students enrolled at SJTU can pursue dual master's degrees from both institutions: a non-thesis master's degree from the School of Electrical and Computer Engineering at Georgia Tech and a thesis master's degree from a closely related discipline at SJTU.

## B.S./M.S. ELECTRICAL AND COMPUTER ENGINEERING - FIVE-YEAR

This five-year program allows highly qualified students to receive the Bachelor of Science in either Electrical Engineering or Computer Engineering and a master's degree in Electrical and Computer Engineering within a five-year time frame. The joint B.S./M.S. degree program affords undergraduate electrical or computer engineering majors the opportunity to broaden their studies and improve their career prospects.

Eligible Georgia Tech undergraduates normally apply for this program during their junior year. Contact the Electrical and Computer Engineering Graduate Affairs Office for program information, eligibility requirements, and applications.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN BIOENGINEERING

The Bioengineering Ph.D. degree requires a thesis based on independent study of a bioengineering research topic under the guidance of a bioengineering program faculty member. It also requires thirty-six hours of coursework in a mixture of bioscience, mathematics, bioengineering, traditional engineering, and elective classes.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN ELECTRICAL AND COMPUTER ENGINEERING

Programs leading to the master's and doctoral degrees in Electrical and Computer Engineering are provided by the School. Technical interest areas include bioengineering, computer engineering, digital signal processing, electric power, electromagnetics, electronic design and applications, microsystems, optics and photonics, systems and controls, and telecommunications.

The doctoral degree program is research-oriented and highly individualized. Typically, at least four years of study beyond the bachelor's degree are required to complete the doctoral program.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN ROBOTICS

Students pursuing a Ph.D. in Robotics must take thirty-six semester hours of core research and elective courses, pass a comprehensive qualifying exam with written and oral components, and successfully complete, document, and defend a piece of original research culminating in a doctoral thesis. Students select a home school, such as ECE, AE, ME, or CS, and apply for admission to the Ph.D. program in robotics through that home school.

## CERTIFICATE PROGRAM IN REMOTE SENSING

Students completing the master's or doctoral degree requirements of the School may earn a Remote Sensing Certificate. Additional details can be found in this catalog at http://www.catalog.gatech.edu/colleges/cos/eas/grad/certificates.php.

## GEORGIA TECH-LORRAINE

Students may choose to pursue graduate degrees in Electrical and Computer Engineering at Georgia Tech-Lorraine, the European campus of the Georgia Institute of Technology, located in Metz, France. Undergraduate programs are also offered in the fall, spring, and summer terms at Georgia Tech-Lorraine. In addition to courses taught in English by regular Georgia Tech faculty, students also may participate in courses and academic programs offered by partner French universities.

## GEORGIA TECH SHANGHAI

Students may pursue an MSECE degree at Georgia Tech Shanghai, China, through a partnership with Shanghai Jiao Tong University. SJTU is a leading engineering university comprised of several campuses, with over 2,800 faculty and nearly 38,000 full-time students. Selected Georgia Tech graduate courses are taught at SJTU by Georgia Tech faculty during the summer and fall semesters each year. Students may pursue dual MS degrees from Georgia Tech and from SJTU.

In addition to the MS program, the Georgia Tech Shanghai Summer Program, initiated in 2005, is a summer study abroad program for undergraduate students from all over the United States.

## SCHOOL OF INDUSTRIAL AND SYSTEMS ENGINEERING

School established in 1945,
Department established in 1924
Location: Groseclose Building
Telephone: 404.894.2300
Fax: 404.894.2301
Web site: www.isye.gatech.edu

### GENERAL INFORMATION

Industrial and systems engineering is a branch of engineering that deals with the description, evaluation, design, modification, control, and improvement of the performance of complex systems. The field is unique in its identification of human beings as central contributors to the inherent complexity of such systems, but also as the primary targets and benefactors of their analysis and anticipated improvement. Students in the program are typically interested in obtaining a fundamental engineering background as a basis for the subsequent professional specialization in the various activities associated with the field. Among these are operations research, systems analysis, distribution and logistics, production, manufacturing, planning, quality control, economic and financial modeling, and others. Graduates can be found in a host of settings including transportation, telecommunications, hospitals, banking and finance, environmental systems, retailing, and consulting.

## FACULTY

### H. Milton and Carolyn J. Stewart School Chair and Professor

Chelsea C. White III

### Associate Chair for Graduate Studies and Professor

R. Gary Parker

### Associate Chair for Undergraduate Studies and Associate Professor

Chen Zhou

### Coca-Cola Associate Professor

Shabbir Ahmed

### Manhattan Associates Chair and Professor

John J. Bartholdi III

### Chandler Family Chair and Professor

William J. Cook

### Edenfield Professor

Jim Dai

### Coca-Cola Chair and Professor

Ellis L. Johnson

### Eugene C. Gwaltney Jr. Chair in Manufacturing Systems and Professor

L. F. McGinnis Jr.

### A. Russell Chandler III Chair and Institute Professor

George L. Nemhauser

### John Hunter Chair and Professor

Arkadi Nemirovski

### UPS and Regents' Professor

H. Donald Ratliff

### Schneider Professor

Martin Savelsbergh

### Carolyn J. Stewart Chair and Professor

Jan Shi

### Anderson Interface Associate Professor of Natural Systems

Valerie Thomas

### Georgia Freight Bureau Chair in Transportation and Logistics and Professor

Chelsea C. White III

### Coca-Cola Chair of Engineering Statistics and Professor

Jeff Wu

### Professors

Faiz Al-Khayyal, Jane Ammons, Sigrun Andradottir, Stephen Cross, Augustine O. Esogbue, Robert D. Foley, David M. Goldsman, Paul Griffin, Paul Kvam, Jack R. Lohmann, Jye-Chi Lu, Christine M. Mitchell, Renato Monteiro, William B. Rouse, Alexander Shapiro, Craig A. Tovey, Kwok-Leung Tsui, John H. VandeVate, Branislav Vidakovic

### Professors Emeriti

Jerry Banks, Earl Barnes, Mokhtar Bazaraa, Leslie G. Callahan, David E. Fyffe, William W. Hines, John J. Jarvis (director emeritus), Cecil G. Johnson, Lynwood A. Johnson, Robert N. Lehrer (director emeritus), Justin Myrick, Alan L. Porter, Nelson K. Rogers, Richard F. Serfozo, C. M. Shetty, Michael Thomas (director emeritus), Gerald J. Thuesen, Harrison M. Wadsworth

### Associate Professors

Christos Alexopoulos, Hayriye Ayhan, Shijie Deng, Alan Erera, Ozlem Ergun, Marc Goetschalckx, Steven T. Hackman, Xiaoming Huo, Pinar Keskinocak, Seong-Hee Kim, Anton J. Kleywegt, Eva Lee, Loren K. Platzman (adjunct), Amy Prichett, Spiridon A. Reveliotis, Gunter P. Sharp, Joel Sokol, Julie Swann, Roshan Joseph Vengazhiyil, Bert Zwart

### Associate Professor Emeritus

Willard R. Fey

### Assistant Professors

Ronald Billings, Nagi Gebraeel, Yajun Mei, Nicoleta Serban, Joseph Wu, Ming Yuan

### Courtesy Faculty Appointments

Terry Blum, dean and Tedd Munchak Professor; Stephen E. Cross , director of GTRI; Narayanan Jayaraman, associate professor, College of Management; Robin Thomas, professor, School of Mathematics; Marie C. Thursby, professor of Strategic Management and Hal and John Smith Chair in Entrepreneurship, College of Management.

### Director, Professional Education (TLI)

Carole Bennet

### Director, The Logistics Institute (TLI)

Harvey M. Donaldson

### Director, Executive Master's in International Logistics (EMIL)

Terri Herod

### Director of Information Technology

Mark Iken

### Director of Supply Chain Executive Programs

C. John Langley Jr.

### Director of Workplace and Academic Communication

Judith Norback

### Director of Development

Nancy Sandlin

### Research Engineers

Douglas Bodner

## VISITING SCHOLAR / PRACTITIONER OFFERINGS

Occasionally, the School brings to campus selected individuals of unique accomplishment for course offerings built around their special areas of activity, thus making available a broader range of course materials than regularly provided. Prominent in this regard is the James C. Edenfield Executive-in-Residence program, which brings highly successful executives to the School. Participating much like visiting faculty, these executives bring to a classroom setting, both graduate and undergraduate, the benefit of their work experiences as they support the ISYE curriculum.

## BACHELOR OF SCIENCE IN INDUSTRIAL ENGINEERING ACCREDITATION

The B.S. in Industrial Engineering program is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012 - telephone: (410) 347-7700.

## BACHELOR OF SCIENCE IN INDUSTRIAL ENGINEERING ACCREDITATION

The B.S. in Industrial Engineering program is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012 - telephone: (410) 347-7700.

# BACHELOR OF SCIENCE IN INDUSTRIAL ENGINEERING

The principal strength of the academic program leading to the Bachelor of Science in Industrial Engineering (B.S.I.E.) is its blend of fundamental topics in mathematics and the physical and engineering sciences that are common to all engineering disciplines coupled with specialized study in subject areas such as optimization, probability and statistics, computing, economics, and psychology. It is precisely this blend that produces the flexibility that is inherent in the field of industrial and systems engineering and that affords B.S. IE graduates a wide array of career options.

## EDUCATIONAL OBJECTIVES FOR THE BACHELOR OF SCIENCE

The School of Industrial and Systems Engineering has four educational objectives for students receive the B.S. IE students will:

- To prepare students to function effectively and provide leadership within an organization as an IE professional;
- To provide students a comprehensive education including methodological and computational skills with which to operate effectively within the IE problem domain, through training in problem representation, abstraction, and validation;
- To prepare students to effectively present and sell their solutions and to do so in the context of written, oral, and electronic media; and
- To prepare students for lifelong growth within the field/profession of industrial and systems engineering.

## PROGRAM OBJECTIVES

A. To prepare students to function effectively and provide leadership within an organization as an IE professional.

B. To provide students a comprehensive education including methodological and computational skills with which to operate effectively within the IE problem domain, through training in problem representation, abstraction, and validation.

C. To prepare students to effectively present and sell their solutions and to do so in the context of written, oral, and electronic media.

D. To prepare students for lifelong growth within the field/profession of industrial and systems engineering.

# BACHELOR OF SCIENCE IN INDUSTRIAL ENGINEERING
## 2008 - 2009 DEGREE REQUIREMENTS
### SCHOOL OF INDUSTRIAL & SYSTEMS ENGINEERING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| MATH 1501 CALCULUS I | 4 |
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| PSYC 1101 GENERAL PSYCHOLOGY | 3 |
| LAB SCIENCE (Biol, Chem, Eas) | 4 |
| **TOTAL SEMESTER HOURS =** | **14** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| MATH 1502 CALCULUS II | 4 |
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1371 COMPUTING FOR ENGINEERS | 3 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| MATH 2401 CALCULUS III | 4 |
| PHYS 2212 INTRODUCTORY PHYSICS II | 4 |
| CS 1316 REPRESENTING STRUCTURE & BEHAVIOR | 3 |
| ISYE 2027 PROBABILITY WITH APPLICATIONS | 3 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| MATH 2602 LINEAR & DISCRETE MATHEMATICS | 4 |
| ECON 2100 ECONOMIC ANALYSIS & POLICY PROBLEMS | 3 |
| FREE ELECTIVE | 3 |
| ISYE 2028 BASIC STATISTICAL METHODS | 3 |
| LAB SCIENCE (BIOL, CHEM, EAS, PHYS) | 4 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-FALL | HRS |
|---|---|
| ISYE 3025 ESSENTIALS OF ENGINEERING ECONOMY | 1 |
| ISYE 3133 ENGINEERING OPTIMIZATION | 3 |
| ENGINEERING ELECTIVE | 3 |
| ISYE 3232 STOCHASTIC MFG & SERVICE SYSTEMS | 3 |
| CS 4400 INTRODUCTION TO DATABASE SYSTEMS | 3 |
| ACCT 2101 or MGT 3000 or MGT 3150 | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| ISYE 3044 SIMULATION ANALYSIS & DESIGN | 3 |
| ISYE ELECTIVES | 6 |
| HUMANITIES ELECTIVE | 3 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| ENGINEERING ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| ISYE ELECTIVES | 6 |
| ENGINEERING ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-SPRING | HRS |
| --- | --- |
| ISYE 4106 SENIOR DESIGN | 4 |
| ISYE ELECTIVES | 6 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

**TOTAL PROGRAM HOURS = 126 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

## BACHELOR OF SCIENCE IN INDUSTRIAL ENGINEERING CURRICULUM TRACKS

Starting in Spring 2006, ISyE began offering tracks. The tracks give students flexibility in ISyE topics as well as broaden the set of topics offered.

a. General Industrial and Systems Engineering Track
b. Economic Design Analysis Track (Economic/Financial modeling)
c. Supply Chain Logistics Track
d. Manufacturing Systems Track
e. Operations Research and Statistics Track
f. Quality Engineering Track

The General Track provides a broader coverage that includes one major course in each track. The other track system includes three courses related to the track, in which one or two are required, depending on the track. The overall requirements are:

a. Complete six courses (eighteen hours) at the 3000 level or higher from the track elective lists, at least four must be from engineering
b. Breadth: Complete at least three ISyE core electives (defined in bold in the track details below) from at least three different tracks
c. Depth: Satisfy the requirements of at least one track

## ELECTIVES

### WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

### SCIENCE ELECTIVES I AND II

Selected from courses in physics, chemistry, biology, and/or earth and atmospheric sciences.

### ENGINEERING SCIENCE ELECTIVES

Are taken from (thermodynamics, statics, dynamics, circuits, DSP, junior/senior-level courses for other engineering schools).

### ENVIRONMENT REQUIREMENT

Among all science and free electives, at least one course must be on the environment.

### HUMANITIES/SOCIAL SCIENCES ELECTIVES

ENGL 1101 and 1102 apply toward satisfaction of the twelve-hour humanities requirement. An additional six hours of Institute-approved humanities courses are required to fulfill the twelve-hour humanities requirement. To satisfy the state requirements regarding coursework in the history and constitutions of the United States and Georgia, students must complete one of the following courses: HIST 2111, HIST 2112, POL 1101, PUBP 3000, or INTA 1200. One of these courses, combined with an additional nine hours of Institute-approved social science courses, satisfies the twelve-hour social sciences requirement.

### ISYE ELECTIVES

#### General Industrial and Systems Engineering Track

Complete four courses from the following list:

1. **ISYE 3103 (Supply Chain Logistics)**
2. **ISYE 3104 (Manufacturing Systems)**
3. **ISYE 3039 (Statistical Methods for QC)** - or
   **ISYE4803 (Advanced Regression and Forecasting)**
4. **ISYE 4803 (Economics and Supply Chains)** - or
   **ISYE 4803 (Advanced Engineering Economy)**
5. **ISYE 4803 (Advanced Optimization)** - or
   **ISYE 4803 (Advanced Stochastics)** - or
   **ISYE 4803 (Advanced Simulation)**
6. **ISYE 4009 (Human-Integrated Systems)**

Complete two additional ISYE electives

- **One** ISYE-numbered electives **in bold** from any track listing
- **One** elective from any track electives

#### Economic Design Analysis Track (Economic/Financial modeling)

Complete both core electives:

1. **ISYE 4803 (Economics and Supply Chains)**
2. **ISYE 4803 (Advanced Engineering Economy)**

Complete one additional track elective from the following list:

1. ECON 3150 (Econ. and Financial Modeling)
2. MGMT 3078 (Finance and Investments)
3. MGMT 3084 (Derivative Securities)
4. MGMT 4070 (International Finance)
5. ECON 4340 (Industrial Organization)
6. ECON 4350 (International Economics)

Complete three additional ISYE electives

- **Two** ISYE-numbered electives **in bold** from any track listing
- **One** elective from any track electives

### Supply Chain Logistics Track

Complete the core elective:

1. **ISYE 3103 (Supply Chain Logistics)**

Complete two additional track electives from the following list:

1. ISYE 4803 (Advanced SC Logistics)
2. ISYE 3104 (Manufacturing)
3. MGMT 4360 (Global Ops. and Supply Chain)
4. ECON 4430 (Transportation Economics)
5. CEE 4600 (Transport Planning & Design)
6. CEE 4610 (Multimodal Transport)

Complete three additional ISYE electives

- **Two** ISYE-numbered electives **in bold** from any track listing
- **One** elective from any track electives

### Manufacturing Systems Track

Complete the core elective:

1. **ISYE 3104 (Manufacturing)**

Complete two additional track electives from the following list:

1. ISYE 4803 (Advanced Manufacturing)
2. ISYE 3039 (Statistical Methods for QC)
3. ME 4171 (Environ. Conscious Des & Manufacturing)
4. ME 4172 (Sustainable Engineering Systems)
5. ME 4210 (Manufacturing. Processes and Engineering)
6. ECE 4761 (Industrial Controls and Manufacturing)

Complete three additional ISYE electives

- **Two** ISYE-numbered electives **in bold** from any track listing
- **One** elective from any track electives

### Operations Research and Statistics Track

Complete at least one core elective:

1. **ISYE 4803 (Advanced Optimization)**
2. **ISYE 4803 (Advanced Stochastics)**
3. **ISYE 4803 (Advanced Simulation)**
4. **ISYE 4803 (Advanced Statistics)**

Complete two additional track electives from the following list:

1. ISYE 4803 (Advanced Optimization)
2. ISYE 4803 (Advanced Stochastics)
3. ISYE 4803 (Advanced Statistics)
4. ISYE 4803 (Advanced Simulation)
5. MATH 3012 (Applied Combinatorics)
6. MATH 4022 (Graph Theory)
7. MATH 4305 (Linear Algebra)
8. MATH 4360 (Real Analysis)

Complete three additional ISYE electives

- **Two** ISYE-numbered electives **in bold** from any track listing
- **One** elective from any track electives

### Quality Engineering Track

Complete both core electives:

1. **ISYE 3039 (Statistical Methods for QC)**
2. **ISYE 4803 (Advanced Regression and Forecasting)**

Complete one additional track elective from the following list:

1. ISYE 3104 (Manufacturing)
2. ISYE 3103 (Supply Chain Logistics)
3. MGT 3501 (Operations Management)

Complete three additional ISYE electives

- **Two** ISYE-numbered electives **in bold** from any track listing
- **One** elective from any track electives

## BACHELOR OF SCIENCE IN INDUSTRIAL ENGINEERING - COOPERATIVE PLAN

- Co-op courses are designated in the schedule of classes as COOP. Internship courses are designated in the schedule of classes as INTN.
- All students interested in registering for this course(s) must have been accepted into the Co-op Program or Undergraduate Professional Internship (or UPI) Program.
- Students must have met with their co-op/UPI advisor to be issued a permit to register for restricted course(s).
- Students must register for the a COOP or INTN course every semester they are at work in order to receive credit for the work term.
- Co-ops (U.S. citizens and Permanent Residents) returning to work should automatically receive a permit; but they are advised to remain in close contact with the co-op advisor.
- International students must receive work authorization from the Office of International Education prior to each work term before a course registration permit will be issued.
- Neither Co-op or Internship courses count for credit towards the Industrial Engineering degree, however successful completion of the Co-op program leads to a degree designator.

## BACHELOR OF SCIENCE IN INDUSTRIAL ENGINEERING - INTERNATIONAL PLAN

The Georgia Tech International Plan is an intensive program designed to prepare graduates professionally and personally for successful lives in the twenty-first century. The primary purpose of the International Plan is to offer a challenging and coherent academic program for highly capable students that develops global competence within the context of ISYE. A secondary purpose is to offer a unique international program to differentiate Georgia Tech from its academic competitors so as to attract more highly capable students, and top companies to recruit them.

For more details of the International Plan, including application materials, visit the Office of International Education Web site.

The course requirements are as follows:

1. at least one course focused on international relations historically and theoretically;
2. at least one course that provides a historical and theoretical understanding of the global economy;
3. at least one course that provides familiarity with an area of the world or a country that allows them to make systematic comparisons with their own society and culture; and
4. a culminating academic experience, occurring either at the end of, or after, the international experience that integrates knowledge of the discipline and the international experience in a global context.

In addition, students must demonstrate (through testing or other approved means) competency in a language other than English at an appropriate level. The language requirement may be satisfied in a student's native language if it is not English.

Finally, two terms of residential foreign experience for a total of at least twenty-six weeks are required. The experience must be characterized by living among and immersed within the local foreign academic, research, or work community. The two terms may consist of two terms of study, one term of study and one term of internship or research, or two terms of internship or research.

## EXCEPTIONAL STUDENTS OPTIONS

Program activities and options are available to encourage and reward students with superior records and abilities. Participation in these programs requires demonstrated scholastic excellence and prior arrangement with the student's advisor and/or the associate chair for Undergraduate Studies.

## GRADUATE-LEVEL COURSES

Students with a cumulative grade point average of 3.3 or above may schedule up to nine credit hours of approved graduate-level courses. Some of these credits, when approved by the associate chair for Graduate Studies, may apply subsequently toward a graduate degree. Specific details regarding the latter are available in the Office of Academic Programs.

## HONORS COURSES

When faculty resources permit, the School offers honors versions of some of the required courses for the B.S. IE Students with a cumulative grade point average of at least 3.3 are allowed to enroll in these courses and use them as replacements for the analogous course requirements in the curriculum.

## MASTER OF SCIENCE IN COMPUTATIONAL SCIENCE AND ENGINEERING

Computational Science and Engineering (CSE) is a discipline concerned with the body of knowledge, skills, and practices associated with the study of computer-based models of natural phenomena and engineered systems. Students will be required to obtain a breadth of knowledge across a set of core areas in the CSE discipline, depth of knowledge in a specific computational specialization (e.g., numerical computing), and knowledge to apply computational techniques in a domain of application. Students will be expected to integrate principles from mathematics, computer science, and engineering to be able to create significant computational artifacts, e.g., software.

The CSE M.S. degree program is an interdisciplinary program offered by the College of Computing, the College of Engineering, and the College of Sciences. Upon application, students select a desired “home unit” among those academic units that formally participate in the program.

Students must complete four of the five courses making up the core curriculum: CSE/Math 6643 (Numerical Linear Algebra), CSE 6140 (Computational Science and Engineering Algorithms), CSE 6730 (Modeling and Simulation: Fundamentals & Implementation), CSE/ISYE 6740 (Computational Data Analysis), and CSE 6220 (High Performance Computing). A home unit minor is required consisting of twelve hours of coursework relevant to the CSE discipline that includes one applications area; this must include at least six hours of courses that do not carry the CS/CSE course designation. Finally, students must either complete 6 additional hours of approved coursework (course option) or an M.S. thesis (thesis option) that is defended to the student’s thesis committee who is responsible for overseeing the student’s research. Six hours of thesis credit are required in the thesis option. Additional requirements may apply depending on the student’s home unit. A plan of study must be approved by the CSE program director and the student’s home unit coordinator.

## MASTER OF SCIENCE IN HEALTH SYSTEMS

The focus of the Health Systems is to develop, apply, and disseminate new knowledge with respect to the analysis, planning, implementation, demonstration, and evaluation of operational and managerial systems for the delivery of healthcare services to the public.

## MASTER OF SCIENCE IN INDUSTRIAL ENGINEERING - HUMAN-INTEGRATED SYSTEMS TRACK

The School of Industrial and Systems Engineering offers seven master's degrees: the Master of Science in Industrial Engineering (M.S.I.E.); the Master of Science in Operations Research (M.S.O.R.); the Master of Science in Statistics (M.S.S.); the Master of Science in Health Systems (M.S.H.S.); the Master of Science in Quantitative and Computational Finance (M.S.Q.C.F.); the Executive Master of Science in International Logistics (E.M.I.L. ); and the undesignated Master of Science (M.S.).

The M.S.I.E. program is available to students with an industrial engineering background and to other engineers who satisfy requirements covering the principal subject matter of the current B.S. IE curriculum. The other master's programs are available for students holding the B.S. in engineering, mathematics, or science. Requisites include work in probability, statistics, linear algebra, calculus, and optimization, as well as selected application area work. The student may satisfy these requirements after enrollment; however, such coursework may not apply toward fulfillment of the degree requirements. The undesignated M.S. program is typically for those students who wish to work in the area of human-integrated systems.

All proposed master's degree programs require thirty semester hours with the exception of E.M.I.L. and the M.S.Q.C.F., both of which require thirty-six hours; one option, the undesignated M.S. in Human-Integrated Systems, requires a thesis. In addition, the M.S.I.E. allows a choice of two tracks. One of these accommodates advanced study in modern manufacturing, warehousing, and logistics while the second allows for a concentration in human-integrated systems analysis.

## MASTER OF SCIENCE IN INDUSTRIAL ENGINEERING - MANUFACTURING AND LOGISTICS TRACK

The School of Industrial and Systems Engineering offers seven master's degrees: the Master of Science in Industrial Engineering (M.S.I.E.); the Master of Science in Operations Research (M.S.O.R.); the Master of Science in Statistics (M.S.S.); the Master of Science in Health Systems (M.S.H.S.); the Master of Science in Quantitative and Computational Finance (M.S.Q.C.F.); the Executive Master of Science in International Logistics (E.M.I.L. ); and the undesignated Master of Science (M.S.).

The M.S.I.E. program is available to students with an industrial engineering background and to other engineers who satisfy requirements covering the principal subject matter of the current B.S. IE curriculum. The other master's programs are available for students holding the B.S. in engineering, mathematics, or science. Requisites include work in probability, statistics, linear algebra, calculus, and optimization, as well as selected application area work. The student may satisfy these requirements after enrollment; however, such coursework may not apply toward fulfillment of the degree requirements. The undesignated M.S. program is typically for those students who wish to work in the area of human-integrated systems.

All proposed master's degree programs require thirty semester hours with the exception of E.M.I.L. and the M.S.Q.C.F., both of which require thirty-six hours; one option, the undesignated M.S. in Human-Integrated Systems, requires a thesis. In addition, the M.S.I.E. allows a choice of two tracks. One of these accommodates advanced study in modern manufacturing, warehousing, and logistics while the second allows for a concentration in human-integrated systems analysis.

## MASTER OF SCIENCE IN INTERNATIONAL LOGISTICS

The School of Industrial and Systems Engineering offers seven master's degrees: the Master of Science in Industrial Engineering (M.S.I.E.); the Master of Science in Operations Research (M.S.O.R.); the Master of Science in Statistics (M.S.S.); the Master of Science in Health Systems (M.S.H.S.); the Master of Science in Quantitative and Computational Finance (M.S.Q.C.F.); the Executive Master of Science in International Logistics (E.M.I.L. ); and the undesignated Master of Science (M.S.).

The M.S.I.E. program is available to students with an industrial engineering background and to other engineers who satisfy requirements covering the principal subject matter of the current B.S. IE curriculum. The other master's programs are available for students holding the B.S. in engineering, mathematics, or science. Requisites include work in probability, statistics, linear algebra, calculus, and optimization, as well as selected application area work. The student may satisfy these requirements after enrollment; however, such coursework may not apply toward fulfillment of the degree requirements. The undesignated M.S. program is typically for those students who wish to work in the area of human-integrated systems.

All proposed master's degree programs require thirty semester hours with the exception of E.M.I.L. and the M.S.Q.C.F., both of which require thirty-six hours; one option, the undesignated M.S. in Human-Integrated Systems, requires a thesis. In addition, the M.S.I.E. allows a choice of two tracks. One of these accommodates advanced study in modern manufacturing, warehousing, and logistics while the second allows for a concentration in human-integrated systems analysis.

## MASTER OF SCIENCE IN OPERATIONS RESEARCH

The School of Industrial and Systems Engineering offers seven master's degrees: the Master of Science in Industrial Engineering (M.S.I.E.); the Master of Science in Operations Research (M.S.O.R.); the Master of Science in Statistics (M.S.S.); the Master of Science in Health Systems (M.S.H.S.); the Master of Science in Quantitative and Computational Finance (M.S.Q.C.F.); the Executive Master of Science in International Logistics (E.M.I.L. ); and the undesignated Master of Science (M.S.).

The M.S.I.E. program is available to students with an industrial engineering background and to other engineers who satisfy requirements covering the principal subject matter of the current B.S. IE curriculum. The other master's programs are available for students holding the B.S. in engineering, mathematics, or science. Requisites include work in probability, statistics, linear algebra, calculus, and optimization, as well as selected application area work. The student may satisfy these requirements after enrollment; however, such coursework may not apply toward fulfillment of the degree requirements. The undesignated M.S. program is typically for those students who wish to work in the area of human-integrated systems.

All proposed master's degree programs require thirty semester hours with the exception of E.M.I.L. and the M.S.Q.C.F., both of which require thirty-six hours; one option, the undesignated M.S. in Human-Integrated Systems, requires a thesis. In addition, the M.S.I.E. allows a choice of two tracks. One of these accommodates advanced study in modern manufacturing, warehousing, and logistics while the second allows for a concentration in human-integrated systems analysis.

## MASTER OF SCIENCE IN QUANTITATIVE AND COMPUTATIONAL FINANCE

The School of Industrial and Systems Engineering offers seven master's degrees: the Master of Science in Industrial Engineering (M.S.I.E.); the Master of Science in Operations Research (M.S.O.R.); the Master of Science in Statistics (M.S.S.); the Master of Science in Health Systems (M.S.H.S.); the Master of Science in Quantitative and Computational Finance (M.S.Q.C.F.); the Executive Master of Science in International Logistics (E.M.I.L. ); and the undesignated Master of Science (M.S.).

The M.S.I.E. program is available to students with an industrial engineering background and to other engineers who satisfy requirements covering the principal subject matter of the current B.S. IE curriculum. The other master's programs are available for students holding the B.S. in engineering, mathematics, or science. Requisites include work in probability, statistics, linear algebra, calculus, and optimization, as well as selected application area work. The student may satisfy these requirements after enrollment; however, such coursework may not apply toward fulfillment of the degree requirements. The undesignated M.S. program is typically for those students who wish to work in the area of human-integrated systems.

All proposed master's degree programs require thirty semester hours with the exception of E.M.I.L. and the M.S.Q.C.F., both of which require thirty-six hours; one option, the undesignated M.S. in Human-Integrated Systems, requires a thesis. In addition, the M.S.I.E. allows a choice of two tracks. One of these accommodates advanced study in modern manufacturing, warehousing, and logistics while the second allows for a concentration in human-integrated systems analysis.

## MASTER OF SCIENCE IN STATISTICS

The School of Industrial and Systems Engineering offers seven master's degrees: the Master of Science in Industrial Engineering (M.S.I.E.); the Master of Science in Operations Research (M.S.O.R.); the Master of Science in Statistics (M.S.S.); the Master of Science in Health Systems (M.S.H.S.); the Master of Science in Quantitative and Computational Finance (M.S.Q.C.F.); the Executive Master of Science in International Logistics (E.M.I.L. ); and the undesignated Master of Science (M.S.).

The M.S.I.E. program is available to students with an industrial engineering background and to other engineers who satisfy requirements covering the principal subject matter of the current B.S. IE curriculum. The other master's programs are available for students holding the B.S. in engineering, mathematics, or science. Requisites include work in probability, statistics, linear algebra, calculus, and optimization, as well as selected application area work. The student may satisfy these requirements after enrollment; however, such coursework may not apply toward fulfillment of the degree requirements. The undesignated M.S. program is typically for those students who wish to work in the area of human-integrated systems.

All proposed master's degree programs require thirty semester hours with the exception of E.M.I.L. and the M.S.Q.C.F., both of which require thirty-six hours; one option, the undesignated M.S. in Human-Integrated Systems, requires a thesis. In addition, the M.S.I.E. allows a choice of two tracks. One of these accommodates advanced study in modern manufacturing, warehousing, and logistics while the second allows for a concentration in human-integrated systems analysis.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN INDUSTRIAL ENGINEERING

The Ph.D. Program in Industrial Engineering is intended for qualified individuals for whom past accomplishments and evaluation indicate a high potential for successful completion of the program requirements and a subsequent creative intellectual contribution to the field. Admitted students may pursue their work in various concentrations related to common themes associated with industrial engineering: supply chain logistics and manufacturing, economic decision analysis, applied statistics, and human-integrated systems. Admission is dependent upon student qualification rather than educational background in any specified discipline. Consideration for admission is based largely upon performance in prior academic work, the Graduate Record Examination (GRE), and credible letters of reference.

## FINANCIAL AID FOR PH.D

Financial aid for Ph.D. study is available in the form of traineeships, fellowships, sponsored externships, and research and teaching assistantships.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN ALGORITHMS, COMBINATORICS, OPTIMIZATION

The Ph.D. program in algorithms, combinatorics, and optimization (ACO) is a multidisciplinary graduate program sponsored jointly by the School of Industrial and Systems Engineering, the College of Computing, and the School of Mathematics. The program is arranged to bring together the study of discrete structures and the design and analysis of algorithms in areas such as graph theory, integer programming, combinatorial optimization, network flows, and polyhedral theory. It is intended for students possessing a strong mathematical perspective and background in one or more of the fields represented by the sponsoring units.

Students in the program will have a single home department chosen from among the participating units, all of which contribute courses for the program. Students may apply to the ACO program at Georgia Tech through any one of these three units.

# DOCTOR OF PHILOSOPHY WITH A MAJOR IN BIOINFORMATICS

## PARTICIPATING SCHOOLS

College of Computing
School of Biology
School of Biomedical Engineering
School of Chemistry and Biochemistry
School of Industrial and Sytems Engineering
School of Mathematics

## OBJECTIVE OF THE PROGRAM

The mission of the Georgia Tech Bioinformatics Ph.D. program is to educate and prepare graduate students to reach the forefront of leadership in the field of bioinformatics and computational biology, and to integrate research and education on the use of information technologies in biology and medicine. Thus, the program leading to a Ph.D. in Bioinformatics is an interdisciplinary program spanning a variety of academic departments at Georgia Tech.

Bioinformatics is a multidisciplinary field in which physical sciences, life sciences, computer science, and engineering are merged to solve both fundamental and applied problems in biology and medicine. The outcomes of bioinformatics and computational biology particularly include:

- new and global perspectives into the organization and function of biological systems (fundamental biology);
- new and novel targets for drug discovery and development; and
- genetic/proteomic profiling for pharmaco-genomics or personalized medicine.

Thus, bioinformatics is emerging as a strategic discipline at the frontier of biology, biochemistry, biomedicine, bioengineering, computer science, and mathematics, impacting fundamental science, medicine, biotechnology, and society.

With its broad mission statement, this program at Georgia Tech has the following strengths and focus areas:

1. Development of software tools, algorithms, and databases for gene identification, protein structural prediction, clustering analysis, and data mining
2. Application of bioinformatics to disease diagnosis, classification, prognosis, and treatment
3. Application of bioinformatics to fundamental biology and systems biology

There is an increasing demand for scientists with advanced training in bioinformatics. Professionals in this area should have a thorough knowledge of molecular biology, mathematics, and statistics, as well as computer science and engineering.

For more information visit www.biology.gatech.edu/bioinformatics/bioinformatics_phd.htm.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN COMPUTATIONAL SCIENCE AND ENGINEERING

Computational Science and Engineering (CSE) is a discipline concerned with the body of knowledge, skills, and practices associated with the study of computer-based models of natural phenomena and engineered systems. Students will be required to obtain a breadth of knowledge across a set of core areas, depth of knowledge in a specific computational specialization (e.g., numerical computing), and knowledge to apply computational techniques in a domain of application. Students will be expected to integrate principles from mathematics, computing, science, and engineering to be able to create significant computational artifacts, e.g., software, and to complete independent research that advances the state-of-the-art in the CSE discipline.

The CSE M.S. degree program is an interdisciplinary program offered by the College of Computing, the College of Engineering, and the College of Sciences. Upon application students select a desired “home unit” among those academic units that formally participate in the program.

Required coursework includes CSE 6001 (Introduction to Computational Science and Engineering), CSE core courses (twelve hours), a computation specialization (nine hours), and an application specialization (nine hours). To complete the core course requirement, students must complete four of the five courses making up the core curriculum: CSE/Math 6643 (Numerical Linear Algebra), CSE 6140 (Computational Science and Engineering Algorithms), CSE 6730 (Modeling and Simulation: Fundamentals & Implementation), CSE/ISYE 6740 (Computational Data Analysis), and CSE 6220 (High Performance Computing). The computational specialization includes at least nine hours of courses that increase the student’s depth of understanding of computational methods in a specific area, as approved by the student’s academic advisor. These courses must go beyond “using computers” to deepen understanding of computational methods, preferably in the context of some application domain. The application specialization includes at least nine hours of courses that increase depth of understanding in an application field; these need not be computation-focused courses. At least nine hours of Ph.D. courses must be courses that do not carry the CS/CSE course designation. These hours may be taken in the home unit. Hours taken as part of the computation and/or application specialization can be used to fulfill this requirement. Additional requirements may apply depending on the student’s home unit.

A qualifying examination must be attempted by the end of the second year of enrollment in the CSE doctoral program (normally taken after the student completes CSE core coursework). A qualifying examination committee shall be appointed by the CSE program coordinator for each student and is responsible for making an overall recommendation concerning the outcome of the qualifying examination.

Students are required to complete a doctoral thesis reporting the results of independent research that advances the state-of-the-art in the computational science and engineering discipline. The dissertation must be successfully defended to the student's dissertation research committee.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN INDUSTRIAL ENGINEERING
## APPLIED STATISTICS TRACK

The emphasis in this track is on the use of statistics as a science that is employed in a technological environment. Within this context, a student takes fundamental coursework in mathematics, probability and statistics suitable to conduct advanced work and research in a variety of application domains. Among these are quality systems, manufacturing, production, and simulation.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN INDUSTRIAL ENGINEERING ECONOMIC DECISION ANALYSIS TRACK

Engineering economic decision analysis is a broad-based area of study that concentrates on both theoretical approaches and the applied methodologies in various decision-making domains within an economic environment. Typical settings that attract students to this program include multicriteria decision-making, capital budgeting, auctions, portfolio analysis and selection, economic forecasting, utility theory, and quantitative finance.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN INDUSTRIAL ENGINEERING
## HUMAN-INTEGRATED SYSTEMS TRACK

The program in human-machine systems addresses the segment of engineering design that attempts to ensure that expensive and flexible human resources are most effectively used. Human-integrated systems analysis seeks to understand, describe, and prescribe activities characterizing the interface between humans and the variety of complex systems with which they are likely to deal.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN INDUSTRIAL ENGINEERING MANUFACTURING/LOGISTICS TRACK

This program focuses on the design and analysis of manufacturing, distribution, and transportation systems. Students take fundamental coursework in optimization, stochastics, and statistics in order to build a firm base from which to deal with the myriad of issues that arise in settings involving modern supply chain systems modeling and analysis: production and inventory systems, vehicle routing and scheduling, warehousing, and logistics.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN INDUSTRIAL ENGINEERING OPTIMIZATION TRACK

The Ph.D. Program in Operations Research is intended for qualified individuals with strong mathematical/quantitative skills who are interested in the theory and application of complex mathematical and/or simulation models to solve problems involving operational systems. The Program encompasses fundamental methodological coursework in subjects that include mathematical optimization, stochastic and probabilistic methods, statistical modeling and analysis, design and analysis of algorithms, computational and numerical methods, and others. Admission is based largely on prior academic accomplishments/records, GRE scores, and credible letters of reference.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN INDUSTRIAL ENGINEERING
## STOCHASTIC SYSTEMS TRACK

The stochastic systems track is aimed at students interested in the advanced study of those complex systems where the attribute of randomness predominates. A firm grounding in probability and stochastics processes influence the program of study. Topics that arise in coursework and research contexts that motivate this program include the theory of queues, telecommunication networks, reliability, portfolio selection, random graphs and networks, and the probabilistic analysis of algorithms among others.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN OPERATIONS RESEARCH

The Ph.D. Program in Operations Research is intended for qualified individuals with strong mathematical/quantitative skills who are interested in the theory and application of complex mathematical and/or simulation models to solve problems involving operational systems. The Program encompasses fundamental methodological coursework in subjects that include mathematical optimization, stochastic and probabilistic methods, statistical modeling and analysis, design and analysis of algorithms, computational and numerical methods, and others. Admission is based largely on prior academic accomplishments/records, GRE scores, and credible letters of reference.

## DISTANCE LEARNING AND PROFESSIONAL EDUCATION

The School of Industrial and Systems Engineering offers off-campus working professionals the opportunity to enroll in many of its graduate courses through video technologies. Qualified individuals can complete the requirements for the M.S.I.E. or M.S.O.R. utilizing the video-based delivery system. Admission as a degree-seeking student in the video program is based upon the same criteria as for regular students. See Distance Learning and Professional Education for more information.

# SCHOOL OF MATERIALS SCIENCE AND ENGINEERING

Established in 1985
School of Ceramic Engineering established in 1924
Location: J. Erskine Love Jr. Manufacturing Building
Telephone: 404.894.2888
Fax: 404.894.9140
Web site: www.mse.gatech.edu

## GENERAL INFORMATION

The School of Materials Science and Engineering provides high-quality academic programs focused on developing a fundamental understanding of materials and the creation of new materials for the next generation of engineering applications. A discipline on the forefront of innovations in both science and engineering, it views biomaterials, nanomaterials, ceramics, metals, polymers, electronic materials and composites from a fundamental point of view, emphasizing the relationships between the atomic and micro-structure as well as the properties, processing, and performance of the materials.

Completion of the B.S. degree prepares students for entry into the workforce, advanced study in materials science and engineering, or other graduate programs. Materials engineers have many career options available, including employment in industries such as aerospace, automotive, biomedical, chemical, electronic, materials processing, and recreational equipment, as well as employment in universities and government laboratories.

Research and instruction in the School of Materials Science and Engineering at Georgia Tech spans the following areas:

- synthesis and processing focusing on development of advanced materials with novel compositions and tailored microstructures;
- characterization and evaluation of structure and properties using advanced techniques and state-of-the-art instrumentation; and
- modeling of structure-property-performance relationships emphasizing correlation of properties with the structure across nano-, micro-, meso-, and macro-length scales.

MSE faculty participate in collaborative research projects with faculty from other schools in the Colleges of Engineering and Sciences, and the Georgia Tech Research Institute. Several interdisciplinary centers are led by MSE faculty. The external funding brought in by the faculty in the School of Materials Science and Engineering exceeds $16 million per year and comes from a wide variety of sources including industry, private foundations, and federal funding agencies. A significant number of materials specialists are required to meet the present and future opportunities and challenges of this field.

The School offers a Bachelor of Science in Materials Science and Engineering degree. An undergraduate minor in materials science and engineering is available for non-MSE majors. Graduate degrees (M.S. and Ph.D.) are offered in materials science and engineering, paper science and engineering, and in polymers.

## FACULTY

**School Chair and Professor**
Robert L. Snyder

**Associate Chair and Professor**
Naresh N. Thadhani

**Carter N. Paden Jr. Distinguished Chair in Metals Processing**
David L. McDowell

**Joseph M. Petit Chair in Electronic Packaging and GRA Eminent Chair**
Rao Tummala

**Charles Smithgall Institute Endowed Chair**
C. P. Wong

**Regents' Professors**
Thomas H. Sanders, Zhong Lin Wang,

**Professors**
Hamid Garmestani, Rosario Gerhardt, Arun M. Gokhale, W. Steven Johnson, Meilin Liu, William S. Rees, Kenneth Sandhage, Robert F. Speyer, Christopher J. Summers

**Associate Professors**
W. Brent Carter, Kenneth Gall, Mo Li, Preet Singh, Rina Tannenbaum

**Assistant Professors**
Nils Kröger, Valeria T. Milam

**Professors Emeriti**
James F. Benzel, Joe K. Cochran, Robert F. Hochman

**Senior Research Scientist Emeritus**
D. Norman Hill

**Adjunct Professors**
Stephen D. Antolovich, Janet Hampikian, James Wuifu Lee, Rajesh Naik, William J. Ready, Ashok Saxena

**Principal Research Engineer Emeritus**
Kathryn V. Logan

**Courtesy Faculty Appointments**
Barbara Boyan (BME), David Bucknall (PTFE), Russell D. Dupuis (ECE), Ian Ferguson (ECE), James Frederick, Jr. (IPST), Seth Marder (CHM), Rick Neu (ME), Meisha Shofner (PTFE), Jonathan W. Simons, (Winship Cancer Institute of Emory University), Angus Wilkinson (CHM), Min Zhou (ME)

## B.S. IN MATERIALS SCIENCE AND ENGINEERING ACCREDITATION

The B.S. in Materials Science and Engineering program is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012 - telephone: (410) 347-7700.

## B.S. IN MATERIALS SCIENCE AND ENGINEERING ACCREDITATION

The B.S. in Materials Science and Engineering program is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012 - telephone: (410) 347-7700.

# BACHELOR OF SCIENCE IN MATERIALS SCIENCE AND ENGINEERING

The materials science and engineering undergraduate program offers a B.S. degree in Materials Science and Engineering. This versatile degree combines traditional instruction in ceramic engineering, metallurgy, and polymer science with modern materials, including nanomaterials, biomaterials, composite materials, electronic materials, and optical and magnetic materials. Freshmen and sophomores study basic chemistry, physics, mathematics, and engineering science and are introduced to the basic aspects of materials. Two English courses taken in the freshman year provide the foundation for further instruction in communications that is integrated throughout the curriculum. Juniors and seniors take courses in the science of materials and in the details of materials processing, structure, and properties. The curriculum culminates in a two-course senior design sequence in which students work in teams to design a material, component, or process using previously learned skills and knowledge. Two technical electives, an MSE elective, and one free elective provide flexibility that allows students to specialize in a particular area of materials or to pursue other interests. Courses in the humanities/fine arts and social sciences ensure that graduates understand the role of engineering in today's global society.

## BACHELOR OF SCIENCE IN MATERIALS SCIENCE AND ENGINEERING MISSION STATEMENT

The mission of the Bachelor of Science in Materials Science and Engineering program is to produce graduates well-rounded in the fundamentals of materials science and engineering who are prepared to meet the related needs of industry and government, and prepared for advanced academic study in materials related disciplines. This will be accomplished by providing students with up-to-date knowledge and skills through coursework, modern laboratories, opportunities to conduct cutting edge research with distinguished faculty mentors, and opportunities to participate in leadership and service activities.

## PROGRAM EDUCATIONAL OBJECTIVES

The general educational objective of the Materials Science and Engineering undergraduate program is to provide its graduates with the fundamental knowledge to function effectively in materials-related positions in industry, government, and academics. The following specific Program Educational Objectives were established to ensure the attainment of this general objective consistent with the visions and missions of Georgia Tech and the College of Engineering, and ABET Criteria for Evaluating Engineering Programs:

1. To produce graduates with the fundamental knowledge and skills to function effectively in materials science and engineering related positions in industry and government, or to successfully pursue advanced study.
2. To produce graduates who advance in their chosen fields.
3. To produce graduates who function effectively in the global arena.

## PROGRAM EDUCATIONAL OBJECTIVES

The following Program Educational Objectives were established to assist in attaining the visions and missions of the Georgia Institute of Technology and its College of Engineering, and to be consistent with ABET Criteria for Accrediting Engineering Programs.

The Program Educational Objectives of the Bachelor of Science in Materials Science and Engineering program are:

1. To produce graduates with the fundamental knowledge and skills to function effectively in materials science and engineering related positions in industry and government, or to successfully pursue advanced study.
2. To produce graduates who advance in their chosen fields.
3. To produce graduates who function effectively in the global arena.

# BACHELOR OF SCIENCE IN MATERIALS SCIENCE AND ENGINEERING
## 2008 - 2009 DEGREE REQUIREMENTS
### SCHOOL OF MATERIALS SCIENCE AND ENGINEERING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| MATH 1501 CALCULUS I | 4 |
| CHEM 1310 GENERAL CHEMISTRY | 4 |
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| CS 1371 COMPUTING FOR ENGINEERS | 3 |
| MSE 1001 INTRODUCTION TO ENGINEERING | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **17** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| MATH 1502 CALCULUS II | 4 |
| CHEM 1311 INORGANIC CHEMISTRY I | 3 |
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-FALL | HRS |
|---|---|
| MATH 2401 CALCULUS III | 4 |
| PHYS 2212 INTRODUCTORY PHYSICS II | 4 |
| CHEM 2311 ORGANIC CHEMISTRY I | 3 |
| MSE 2001 PRINCIPLES & APPLICATIONS OF ENGINEERING MATERIALS | 3 |
| HUMANITIES ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| MATH 2403 DIFFERENTIAL EQUATIONS | 4 |
| MSE 2020 CHARACTERIZATION OF MATERIALS | 4 |
| COE 2001 STATICS | 2 |
| ECON 2100 or 2105 or 2106 | 3 |
| HUMANITIES ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| MSE 3000 CHEMICAL THERMODYNAMICS OF MATERIALS | 4 |
| MSE 3003 MECHANICAL BEHAVIOR OF MATERIALS | 4 |
| ISYE 3025 ESSENTIALS OF ENGINEERING ECONOMY | 1 |
| ECE 3710 CIRCUITS & ELECTRONICS | 2 |
| MSE 3025 STATISTICS & NUMERICAL METHODS IN MATERIALS SCIENCE & ENGINEERING | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| MSE 3002 STRUCTURAL TRANSFORMATIONS | 3 |
| MSE 3012 THERMAL & TRANSPORT PROPERTIES OF MATERIALS | 3 |
| MSE 3015 ELECTRICAL, OPTICAL & MAGNETIC PROPERTIES | 3 |
| MSE 3021 MATERIALS LAB I | 2 |
| ECE 3741 INSTRUMENTATION & ELECTRONICS LAB | 1 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| MSE 4002 CERAMIC MATERIALS | 3 |
| MSE ELECTIVE | 3 |
| MSE 4020 DESIGNING WITH MATERIALS I | 1 |
| MSE 4022 MATERIALS LAB II | 2 |

| | |
|---|---|
| MSE 4777 INTRODUCTION TO POLYMERS | 3 |
| TECHNICAL ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| MSE 4010 ENVIRONMENTAL DEGRADATION | 3 |
| MSE 4021 DESIGNING WITH MATERIALS II | 2 |
| MSE 4006 PROCESSING & APPLICATIONS OF ENGINEERING ALLOYS | 3 |
| TECHNICAL ELECTIVE | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **14** |

**TOTAL PROGRAM HOURS = 126 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

**A GRADE OF “C” OR HIGHER REQUIRED IN ALL MATH, SCIENCE, AND ENGINEERING COURSES SPECIFIED BY NAME AND NUMBER.**

# ELECTIVES

## WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

## HUMANITIES/SOCIAL SCIENCES ELECTIVES

ENGL 1101 and 1102 apply toward satisfaction of the twelve-hour humanities requirement. An additional six hours of Institute-approved humanities courses are required to fulfill the twelve-hour humanities requirement. To satisfy the state requirements regarding coursework in the history and constitutions of the United States and Georgia, students must complete one of the following courses: HIST 2111, HIST 2112, POL 1101, PUBP 3000, or INTA 1200. This course, along with either ECON 2100, 2105, or 2106, satisfies half of the social science obligation. An additional six hours of Institute-approved social science courses, satisfies the twelve-hour social sciences requirement.

## TECHNICAL ELECTIVES

Technical electives may be any MSE course that is not required by number or most other engineering, science, or mathematics courses, including those in the list below. Students desiring to use courses not listed here should contact the Associate Chair for Undergraduate Programs in the School of Materials Science and Engineering for approval.

AE/ME/CE 1770 (2-3-3) Introduction to Engineering Graphics & Visualization
AE 2020 (3-0-3) Low-speed Aerodynamics
AE 2220 (3-0-3) Dynamics
BIOL 1510 (3-3-4) Biological Principles
BIOL 1520 (3-3-4) Introduction to Organismal Biology
BIOL 2334 (3-4-4) Genetics
BMED 1300 (1-6-3) Problems in BME I
BMED 2300 (1-6-3) Problems in BME II
CEE 3020 (2-3-3) Civil Engineering Materials
CEE 3030 (3-0-3) Strength of Materials
CHE 2100 (3-0-3) Chemical Process Principles
CHE 2110 (3-0-3) Chemical Engineering Thermodynamics I
CHEM 2312 (3-0-3) Organic Chemistry II
CHEM 3411 (3-0-3) Physical Chemistry I
CHEM 3412 (3-0-3) Physical Chemistry II
CS 1331 (3-0-3) Object-Oriented Programming
ECE 2025 (3-3-4) Introduction to Signal Processing
ECE 2030 (3-0-3) Introduction to Computer Engineering
ISYE 2027 (3-0-3) Probability with Applications
MATH 2602 (4-0-4) Linear and Discrete Mathematics
ME 2016 (3-0-3) Computing Techniques
ME 2110 (2-3-3) Creative Decisions and Design
ME 2202 (3-0-3) Dynamics of Rigid Bodies
PHYS 2213 (3-0-3) Introduction to Modern Physics
PTFE 2001 (3-0-3) Introduction to Fiber Science

## MSE ELECTIVES (EACH MAY BE CHOSEN AS A TECHNICAL ELECTIVE ALSO)

MSE 4004 Materials in Electronic Applications (Offered Spring)
MSE 4325 Thin Films Materials Science (Offered Fall of Even Years)
MSE 4803A Nanomaterials (Offered Fall)
MSE 4803B Advanced Nanomaterials (Offered Spring)
MSE/BME 4751 Introduction to Biomaterials (Offered Fall and Spring)
MSE 4754 Electronic Packaging Assembly, Reliability, Thermal Management and Test (Offered Spring)

## FREE ELECTIVE

Any course(s), with the exception of courses such as MATH 1113, may be used to satisfy the free elective. Students can strengthen their program of study with an appropriate selection of this elective.

## BACHELOR OF SCIENCE IN MATERIALS SCIENCE & ENGINEERING - COOPERATIVE PLAN

Since 1912, Georgia Tech has offered a five-year Undergraduate Cooperative Program to those students who wish to combine career-related work experience with classroom studies. The program is the fourth oldest of its kind in the world and the largest optional co-op program in the country.

Students typically alternate between industrial assignments and classroom studies until they complete four or five semesters of work. Co-op students complete the same coursework on campus that is completed by regular four-year students. Most co-op students begin the program as freshman or sophomores and are classified as full-time students regardless whether they are attending classes on campus or are full-time at an employer's location.

Participants have the opportunity to develop career interests, gain hands-on work experience, develop human relation skills and earn a paycheck. Graduates of the program receive a bachelor's degree with a Cooperative Plan Designation.

Students can also complete work assignments in a foreign country as part of the International Cooperative Program. This program is a great opportunity to utilize foreign language skills, gain a global perspective, and experience a diverse culture. Proficiency in a foreign language is necessary to earn the International Cooperative Plan degree designation. For more information on the Cooperative Program, go to www.coop.gatech.edu.

### INTERNSHIPS

The Undergraduate Professional Internship Program is students who do not participate in the Cooperative Program, but want some career-related work experience before graduation. Students generally work for one semester, usually in the summer, with an option for more work. Students must have completed at least thirty hours of coursework at Georgia Tech before they can participate in the program. For more details, see: www.upi.gatech.edu.

In addition, there is a Work Abroad Program (www.workabroad.gatech.edu), which complements a student's formal education with paid international work experience directly related to Materials Science and Engineering. Participating students typically include juniors and seniors. The international work assignments are designed to include practical training, cross-cultural exposure and learning, and the acquisition of professional skills.

For more information about all of the programs in the Division of Professional Practice, go to www.profpractice.gatech.edu.

## BACHELOR OF SCIENCE IN MATERIALS SCIENCE & ENGINEERING - RESEARCH OPTION

The materials science and engineering undergraduate program offers a Research Option that allows students to participate in undergraduate research in faculty laboratories. The words **“Research Option”** will appear on the transcript of each student completing the requirements to indicate that the student has had a substantial, in-depth, research experience.

The requirements for the **“Research Option”** in Materials Science and Engineering are:

1. Selection of a faculty advisor and research topic in conjunction with the faculty advisor. The topic and expected scope of the project must be approved in advance by the MSE Undergraduate Curriculum Committee. A key criterion will be whether the research may lead to a publishable paper.
2. Completion of nine units (see 3 below) of supervised research, over a period of at least two, but preferably three, terms. Research may be either for pay or credit. At least six credit hours must involve work on a single research project.
3. Registration in nine hours of undergraduate research courses MSE 2698 and 4698 (for pay), or MSE 2699 and 4699 (for credit). Up to ten hours of MSE 2699 or 4699 can be used to satisfy the technical, MSE, and free elective requirements of the BS degree in MSE. Courses taken for credit must be passed with a grade of C or higher.
4. Preparation of a research proposal under the supervision of the faculty advisor and its approval by the MSE Undergraduate Curriculum Committee.
5. Completion of LCC 4700 “Writing an Undergraduate Thesis,” with a grade of C or higher. This two hour course may be used to partially satisfy the three hour free elective requirement of the BS MSE degree. Item (4) must be completed before registering for LCC 4700.
6. Preparation of a research thesis, which may be in the form of a co-authored research paper or a substantial report, and approval by the faculty advisor and one other faculty member, appointed by the MSE Undergraduate Curriculum Committee. The thesis will be evaluated on the basis of publishability, originality, creativity, and clarity. The MSE Undergraduate Curriculum Committee must approve each **“Research Option”** awarded under the B.S. MSE program.

## B.S./M.S. MATERIALS SCIENCE AND ENGINEERING - FIVE-YEAR

The School of Materials Science and Engineering (MSE) offers a five-year B.S./M.S. program for outstanding students who want to obtain a graduate degree in addition to their B.S. degree. The advanced degree provides the additional knowledge and specialization needed to further facilitate a technical career. As a participant in this program, students have an opportunity to work with individual faculty members on projects in one of the traditional or innovative research areas in MSE. See www.mse.gatech.edu for more details.

## GRADE REQUIREMENTS

In order to encourage students to explore subjects of personal or professional interest without jeopardizing their GPA, the Institute has a limited pass/fail option. The policy of the School of Materials Science and Engineering regarding the use of pass/fail hours for credit is as follows: no course specifically required by name and number by the materials science and engineering curriculum may be taken on a pass/fail basis and used toward graduation, unless the course is offered only on that basis.

In addition to the Institute scholastic requirements, the School of Materials Science and Engineering MSE requires a C
or better in all math, science and engineering courses required by name and number with the following caveat - a single D
in a required MSE course may be tested out of if it is in a course that is not offered between its reception and graduation. The test is given just before graduation - after final term grades are in. The re-examination will be graded S (satisfactory) or U (unsatisfactory) with a C or better performance required for an S. The previously assigned D will remain unchanged but the Associate Chair for Undergraduate Programs will approve its use toward graduation if the re-examination grade assigned is an S and if the following conditions are met.

1. The student must not receive any F grades in courses required for graduation for the graduation term;
2. The D must not have been received in a laboratory or design course;
3. The D must not have been the result of academic dishonesty.

The re-examination results of a student who does not satisfy condition 1) above will be moot, i.e., the deficiency intended to be removed by the re-examination will remain.

In cases of deficiencies obtained for the intended graduation term, refer to Section VII (on Deficiencies) of the Rules and Regulations published in the on-line General Catalog. Note that a deficiency (e.g., a single D deficiency) obtained the intended graduation term will delay graduation by at least one term.

## MINOR IN MATERIALS SCIENCE AND ENGINEERING

The School of Materials Science and Engineering offers an undergraduate minor in Materials Science and Engineering for non-MSE majors. The purpose of the minor is to broaden the materials background of non-materials science and engineering students and to introduce them to a materials approach to problem solving that is different from that provided by their major.

A requirement for earning a minor in Materials Science and Engineering is to complete eighteen semester hours of MSE coursework, of which twelve semester hours must be at the 3000 level or higher and all of which must be at the 2000 level or higher. Courses required for the major (excluding electives) may not be applied toward the minor. Many students will be able to complete a considerable portion of the minor requirements by scheduling MSE courses as electives required by their major.

Non-MSE undergraduate majors are encouraged to participate in this program provided they have the appropriate prerequisites and approval of their home school academic advisor. To participate or for additional information, contact the associate chair for Undergraduate Programs in the School of Materials Science and Engineering.

## CERTIFICATES

The School of Materials Science and Engineering offers certificates in biomaterials, composites, and nanotechnology. Students may fulfill the certificate requirements by taking twelve credit hours* of approved courses. By appropriate choice of technical and free electives, only one course outside of those required for the B.S. MSE degree is required for any certificate. Contact the director of undergraduate programs in MSE or go to www.mse.gatech.edu/Academics/Certificate_Programs/certificate_programs.html for eligibility requirements and an updated list of approved courses.

*BIOL 1510 is required for the Biomaterials certificate. Since this is a four-credit hour course, thirteen hours are often taken by MSE students who obtain this certificate.

## TRANSFER STUDENTS

Students transferring into Materials Science and Engineering from another university or program of study should meet with the associate chair for Undergraduate Programs to discuss possible course substitutions and plan their remaining coursework.

## GRADUATE PROGRAMS

Materials graduates are essential to the economic growth of the country. They contribute to the development, selection, and use of materials in all engineering and scientific applications. Master's and doctoral degrees in materials science and engineering are offered. An excellent selection of undergraduate courses is also offered in preparation and support of graduate studies. Course offerings and research activities cover a diversity of subjects in the broad field of materials. Subjects include biomaterials, nanotechnolgy, computational materials science, physical metallurgy, mechanical properties, fracture mechanics, corrosion phenomena, processing, thermodynamics and phase equilibria, non-destructive testing, X-ray analysis, phase transformations, glass science, electronic/technical ceramics, thin-film semiconductors, electronic and optical microscopy, dispersions and rheology, refractories, surface analysis, fiber science, polymerization reaction engineering, polymer process simulation, mechanical properties of polymers, and process-structure-property characterization of polymers. For a listing of approved polymer courses, also see the listings in the Schools of Chemical Engineering and Polymer, Textile and Fiber Engineering. State-of-the-art research facilities in the School of Materials Science and Engineering contribute to the strength of the program.

MSE graduates find employment with manufacturing firms in light and heavy industry, in research laboratories of private firms and federal agencies, and in academic institutions. Several recent graduates have filled positions of high responsibility in these areas and have been instrumental in advancing the level of materials engineering practice in the United States. The MSE faculty participate in numerous multidisciplinary programs including manufacturing engineering, surface science technology, microelectronics, electronic packaging, polymers, and composites.

## FINANCIAL AID

A number of fellowships and research assistantships from outside sources and industry are available to provide financial assistance for qualified graduate students. In addition, a limited number of presidential fellowships, as well as teaching and research assistantships, are available from the Institute. Further information can be obtained by contacting the director of graduate programs in the School of Materials Science and Engineering.

## COMPOSITES EDUCATION AND RESEARCH CENTER

The Composites Education and Research Center (CERC) is another interdisciplinary center similar to MPRL, providing students with the opportunity to participate in interdisciplinary coursework and research projects in the area of composites. An undergraduate-level certificate program is available to students of materials science and engineering in composites.

## MECHANICAL PROPERTIES RESEARCH LABORATORY

The Mechanical Properties Research Laboratory (MPRL) is an interdisciplinary laboratory that supports education and research programs in structural materials. Its principal activities are directed toward the measurement and modeling of the mechanical properties of engineering materials, primarily related to deformation, fatigue, and fracture. Graduate students participating in the MPRL benefit from the association with students and faculty from other departments in the interdisciplinary setting. In its role as an interdisciplinary umbrella organization for experimental research in mechanical properties of materials, MPRL provides a degree of coordination of equipment usage, training, and maintenance with the College of Engineering.

## THE MASTER'S DEGREE

MSE offers graduate work leading to the degrees of Master of Science in Materials Science and Engineering, Master of Science in Paper Science and Engineering, and Master of Science with a major in materials engineering. The student admitted for graduate work will normally have completed an undergraduate program in materials, ceramics, metallurgy, or polymers. However, students with undergraduate degrees or backgrounds in other fields (e.g., physics, chemistry, geology, and chemical, mechanical, nuclear, or geological engineering) may qualify by taking certain minimum prerequisites during the early part of their graduate studies. To assure a smooth transition into the graduate program, the student should select appropriate electives during his or her undergraduate studies.

Students in the M.S. program must complete a core of graduate materials courses and prepare an individualized program of study for this degree in consultation with their graduate advisors. The proposed program must receive the approval of the graduate coordinator and the School chair. Thesis, nonthesis, and industrial internship options are available. The minimum credit hour requirements for the M.S. degree include nineteen credit hours of courses and a minimum of eleven credit hours of thesis research, or thirty-one credit hours of courses, or twenty-five hours of courses and six hours of project work conducted as part of an industrial internship. A total of twelve course hours must be in the major, and twelve course hours must be at the 6000 level or higher. A minimum GPA of 3.0 is required for graduation.

## MASTER OF SCIENCE IN MATERIALS, SCIENCE, AND ENGINEERING

The School of Materials Science and Engineering provides an array of options to both the Undergraduate and Graduate students. The Graduate degrees offered include a M.S. in Materials Science and Engineering with three program options (thesis, non-thesis, and industrial internship).

## MASTER OF SCIENCE IN BIOENGINEERING

The School of Materials Science and Engineering participates in the interdisciplinary program leading to a Master of Science and Ph.D. in Bioengineering and Biomedical Engineering. The program curriculum was developed by a broadly based faculty group with research activities in bioengineering and the life sciences. Students in the program are enrolled in a participating school, such as the School of Materials Science and Engineering, as their home department. The program is directed toward engineering graduates who wish to pursue a graduate degree in bioengineering or biomedical engineering rather than in a traditional field of engineering.

## MASTER OF SCIENCE IN PAPER SCIENCE AND ENGINEERING

The School of Materials Science and Engineering offers a Master of Science and Ph.D. in Paper Science and Engineering. The multidiscipinary degree covers engineering and science disciplines involved in the production of paper, tissue, and other products from natural fiber. Degree requirements include completion of all MSE core courses and degree requirements for the appropriate degree. In addition to satisfying curriculum requirements as set forth in the PSE curriculum, Ph.D. students take the qualifying examination in MSE. Individual programs of study are reviewed at the school level.

## MASTER OF SCIENCE IN POLYMERS

The Master of Science in Polymers is offered through the Schools of Materials, Chemical & Biomolecular, and Polymer, Textile and Fiber Engineering. The core course requirements for polymer degrees are the same in each school. This core is designed to provide a balanced treatment of the chemistry, physics, and engineering of polymeric materials. At the same time, the wide range of elective courses and research projects permits students to develop an in-depth knowledge of a particular area of polymer science and engineering. This combination of breadth and depth of study is vital for the successful performance of polymer scientists and engineering graduates.

## MASTER OF SCIENCE WITH A MAJOR IN MSE

The School of Materials Science and Engineering offers M.S. degrees in MSE. An undesignated M.S. degree is also available for students with special interests. The degree requirements vary somewhat with the option being pursued.

## B.S./M.S. MATERIALS SCIENCE AND ENGINEERING - FIVE-YEAR

The School of Materials Science and Engineering (MSE) offers a five-year B.S./M.S. program for outstanding students who want to obtain a graduate degree in addition to their B.S. degree. The advanced degree provides the additional knowledge and specialization needed to further facilitate a technical career. As a participant in this program, students have an opportunity to work with individual faculty members on projects in one of the traditional or innovative research areas in MSE. See www.mse.gatech.edu for more details.

## THE DOCTORAL DEGREE

The Doctor of Philosophy degree is directed to attain proficiency in the pursuit of independent scholarly work. The degree comprises coursework in the general principles of materials, with emphasis on metallurgy, polymers, ceramics, paper science and engineering, or electronic materials. Additional requirements include specialized courses both in the area of the doctoral thesis and in one or two other areas, passing comprehensive examinations, and an independent research investigation.

Candidates for the doctoral degree are required to complete at least twenty-two credit hours of graduate-level coursework beyond the M.S. degree, with a minimum GPA of 3.0, and pass the course-based and oral parts of the Ph.D. qualification examination. Each student must also earn nine credit hours in a coherent minor field, chosen in consultation with the advisor, to satisfy the School's core course requirements. Students should commence participation in the School's research programs early in their graduate careers.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN BIOENGINEERING

The School of Materials Science and Engineering participates in the interdisciplinary program leading to a Master of Science and Ph.D. in Bioengineering and Biomedical Engineering. The program curriculum was developed by a broadly based faculty group with research activities in bioengineering and the life sciences. Students in the program are enrolled in a participating school, such as the School of Materials Science and Engineering, as their home department. The program is directed toward engineering graduates who wish to pursue a graduate degree in bioengineering or biomedical engineering rather than in a traditional field of engineering.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN MATERIALS SCIENCE AND ENGINEERING

The School of Materials Science and Engineering offers a Master of Science and Ph.D. in Paper Science and Engineering. The multidiscipinary degree covers engineering and science disciplines involved in the production of paper, tissue, and other products from natural fiber. Degree requirements include completion of all MSE core courses and degree requirements for the appropriate degree. In addition to satisfying curriculum requirements as set forth in the MSE curriculum, Ph.D. students take the qualifying examination in MSE. Individual programs of study are reviewed at the school level.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN PAPER SCIENCE AND ENGINEERING

The School of Materials Science and Engineering offers a Master of Science and Ph.D. in Paper Science and Engineering. The multidiscipinary degree covers engineering and science disciplines involved in the production of paper, tissue, and other products from natural fiber. Degree requirements include completion of all MSE core courses and degree requirements for the appropriate degree. In addition to satisfying curriculum requirements as set forth in the PSE curriculum, Ph.D. students take the qualifying examination in MSE. Individual programs of study are reviewed at the school level.

## MINOR IN MATERIALS SCIENCE AND ENGINEERING

For qualified Ph.D. students in other programs, a sequence of cross listed courses in MSE (MSE 6795, 6796, and 6797) is available to introduce non-MSE students to advanced topics covering the broad field of materials. One or more of these courses along with other MSE courses can be used to satisfy the nine-credit-hour Institute minor requirement in other programs. Students wishing to participate in the MSE minor program must check with their advisor in their home school as to the appropriateness of the selected courses.

## WOODRUFF SCHOOL OF MECHANICAL ENGINEERING

Established in 1885
Location: Manufacturing Related Disciplines Complex (MRDC)
Administrative Office: 404.894.3200
Undergraduate Office: 404.894.3203
Graduate Office: 404.894.3204
Fax: 404.385.4545
Web site: www.me.gatech.edu

### GENERAL INFORMATION

Mechanical engineering (ME) was the first academic program established at Georgia Tech. On September 20, 1985, the School of Mechanical Engineering celebrated its centennial by assuming the name of one of its most distinguished alumni, Atlanta businessman and philanthropist George W. Woodruff (Class of 1917). Today, the Woodruff School offers undergraduate degrees in mechanial engineering and nuclear and radiological engineering and graduate degrees in mechanical engineering, nuclear and radiological engineering, medical physics, bioengineering, and paper science and engineering.

Mechanical engineering traditionally deals with diverse engineering problems. Because of its general nature, mechanical engineering encourages a number of multidisciplinary activities to be conveniently organized within it. Mechanical engineering embraces the generation, conversion, transmission, and utilization of thermal and mechanical energy; the design and production of tools and machines and their products; the consideration of fundamental characteristics of materials as applied to design; and the synthesis and analysis of mechanical, thermal, and fluid systems, including the automation of such systems. Design, production, manufacture, operation, administration, economics, and research are functional aspects of mechanical engineering.

Nuclear and radiological engineering and medical physics are based on a symbiotic group of related areas of knowledge of a common set of science, engineering, and mathematical disciplines and their applications to the development of nuclear power and the utilization of radiation in industry and medicine. Nuclear engineering encompasses the disciplines of applied nuclear, neutron and plasma physics, radiation transport and interaction with matter, applied mathematics and computations, thermal and materials sciences, chemical processing, etc. and their applications to nuclear reactor development, operation, safety and fuel cycle, and to fusion reactor plasma research and technology development. Radiological engineering encompasses radiation production, transport, interaction with matter, detection, shielding and protection in nuclear power plants, industry and medicine.

Medical physics encompasses the therapeutic and diagnostic applications of radiation in medicine. It involves the application of physical principles to medicine, particularly in the diagnosis and treatment of human diseases. Medical physics includes diagnostic radiology, the diagnosis of disease with X-rays, ultrasound, and magnetic resonance imaging; health physics, the study of radiation hazards and radiation protection; nuclear medicine, the diagnosis and treatment of diseases with injected radio-pharmaceuticals; and radiation oncology, the treatment of cancer by ionizing radiation.

## FACULTY

**Chair, Eugene C. Gwaltney Jr. School Chair and Professor**

William J. Wepfer

**Associate Chair for Georgia Tech-Lorraine and Professor**

Yves Berthelot

**Associate Chair for Georgia Tech-Savannah and Professor**

Farrokh Mistree

**Associate Chair for Administration and Professor**

Jianmin Qu

**Associate School Chair, Chair of the Nuclear and Radiological Engineering/Medical Physics Programs, and Professor**

Farzad Rahnema

**Associate Chair for Graduate Studies and Professor**

David Rosen

**Associate Chair for Undergraduate Studies and Senior Academic Professional**

David M. Sanborn

**Southern Nuclear Distinguished Professor**

Said Abdel-Khalik

**HUSCO/ Ramirez Chair in Fluid Power and Motion Control**

Wayne J. Book

**Morris M. Bryan Jr. Chair in Mechanical Engineering for Advanced Manufacturing Systems**

Steven Danyluk

**George W. Woodruff Chair in Mechanical Systems**

Jerry H. Ginsberg

**George W. Woodruff Chair in Thermal Systems**

Ari Glezer

**Warren D. Shiver and John McKenney Distinguished Chair in Building Mechanical Systems**

Yogendra Joshi

**Lawrence P. Huang Endowed Chair in Engineering and Entrepreneurship**

David N. Ku

**Morris M. Bryan Jr. Professorship in Mechanical Engineering for Advanced Manufacturing Systems**

Steven Y. Liang

**Carter N. Paden Distinguished Chair in Metals Processing**

David L. McDowell

**Parker H. Petit Distinguished Chair for Engineering in Medicine**

Robert M. Nerem

**Rae and Frank H. Neely Chair in Mechanical Engineering**

Peter H. Rogers

**Georgia Power Distinguished Professor in Mechanical Engineering**

Richard F. Salant

**Fuller E. Callaway Professor in Nuclear Engineering**

Weston M. Stacey Jr.

**David S. Lewis Chair in Aerospace Engineering**

Ben T. Zinn

### Wallace H. Coulter Distinguished Faculty Chair in Engineering and Regents' Professor

Ajit P. Yoganathan

### Professors

Cyrus K. Aidun, Janet Allen, Bert Bras, Ye-Hwa Chen, Gary W. Caille, Kenneth A. Cunefare, Mohammed Cherkaoui, Jonathan S. Colton, F. Levent Degertekin, Andrei Fedorov, Andres J. Garcia, Srinivas Garimella, S. Mostafa Ghiaasiaan, James L. Gole, Itzhak Green, Robert E. Guldberg, Nolan E. Hertel, Peter J. Hesketh, Karl Jacob, Laurence J. Jacobs, W. Steven Johnson, Kok-Meng Lee, Shreyes Melkote, G. Paul Neitzel, Richard W. Neu, David Orloff, Bojavic, Suresh K. Sitaraman, Marc K. Smith, Naresh N. Thadhani, I. Charles Ume, Raymond P. Vito, C.K- Chris Wang, Minami Yoda, Zhuomin Zhang, Min Zhou, Cheng Zhu

### Associate Professors

Sang Hyun Cho, Suman Das, Aldo A. Ferri, Ken Gall, Samuel Graham, Sheldon M. Jeter, Timothy Lieuwen, Harvey Lipkin, John G. Papastarvridis, Chris Paredis, Nader Sadegh, William Singhose, Jeffrey L. Streator

### Assistant Professors

Alexander Alexeev, Antonia Antoniou, Nazanin Bassiri-Gharb, Seung, Kyum Choi, Nico F. Declercq, Chaitanya Deo, Mervyn Fathianathan, Rudolph Gleason, Tequila Harris, Kyriaki Kalaitzidou, Michael Leamy, J. Rhett Mayor, Timothy Patterson, Olivier Pierron, Dirk Schaefer, Erica Ryherd, Karim Sabra, Todd Sulchek, Jun Ueda, W. F. G. van Rooijen, Evan Zamir, Ting Zhu

## SCHOOL FACILITIES

The Woodruff School is housed in a multibuilding classroom/research complex. Included in this complex are modern classroom/seminar conference rooms that serve the entire Institute. The School has many types of specialized instruments and other equipment associated with its laboratories in mechanical engineering for the study of acoustics and dynamics; automation and mechatronics; bioengineering; computer-aided engineering and design; fluid mechanics; heat transfer, combustion, and energy systems; manufacturing; mechanics of materials; microelectromechanical systems; and tribology. The Nuclear and Radiological Engineering Program has special facilities for the study of fission, fusion, and medical physics.

Special facilities in the Woodruff School include laboratories dedicated to undergraduate use; the Integrated Acoustic Laboratory (anechoic chamber); a hi-bay area for research and testing; an underwater acoustic tank; a wind tunnel; and a clean room for MEMS fabrication. Laboratories include: Computer-Aided Simulation of Packaging Reliability Lab, Dynamics Properties Research Lab, Fluid Mechanics Research Laboratories, Composites Manufacturing Research Lab, Intelligent Machine Dynamics Laboratory, Mechanical Properties Research Lab, Precision Machining Research Consortium, Systems Realization Laboratory, Sustainable Thermal Systems Laboratory, and the Vascular and Biofluids Laboratory.

The facilities available for the nuclear and radiological engineering and medical physics programs include a radiation control zone, which houses a graphite subcritical assembly, a californium-252 source and an AmBe source for use in neutron dosimetry studies. Other facilities include: numerous high-speed computing clusters, thermal-hydraulic laboratories, a complete nuclear instrumentation laboratory, radiochemical laboratories, and facilities for analyzing environmental samples by nuclear techniques.

## ACCREDITATION

The following undergraduate engineering programs are accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012. Telephone: 410.347.7700:

- Bachelor of Science in Mechanical Engineering
- Bachelor of Science in Nuclear and Radiological Engineering

The following undergraduate engineering program is not currently accredited by the Engineering Accreditation Commission of ABET:

- Bachelor of Science in Mechanical Engineering (Regional Engineering Program offered through Georgia Tech-Savannah)

## UNDERGRADUATE RESEARCH

Georgia Tech encourages undergraduate students to participate in quality and substantive research. There are several options in the Woodruff School for both mechanical engineering and nuclear and radiological engineering majors to do a Special Problem Course or an Undergraduate Research Course. Students can do a non-research special problem course. This is usually a design course and may be combined with the capstone design class for a two-semester design problem. There are undergraduate research courses; an ME or NRE elective for juniors and seniors; and research internships, where students are paid for working on a project either part time or full time. Each course requires a written final report and that the student work with a faculty member. Funding opportunities are available through the President's Undergraduate Research Awards (PURA).

For more information on undergraduate research at Georgia Tech, go to: www.undergradresearch.gatech.edu and for specific ME/NRE program information, go to: www.me.gatech.edu.

## BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING ACCREDITATION

The B.S. in Mechanical Engineering program is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012 - telephone: (410) 347-7700.

# BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

## PROGRAM EDUCATIONAL OBJECTIVES

The educational objectives of the undergraduate programs in the Woodruff School are:

- to prepare students for successful careers and lifelong learning;
- to train students thoroughly in methods of analysis, including the mathematical and computational skills appropriate for engineers to use when solving problems;
- to develop the skills pertinent to the design process, including the students' ability to formulate problems, to think creatively, to communicate effectively, to synthesize information, and to work collaboratively;
- to teach students to use current experimental and data analysis techniques for engineering applications; and
- to instill in our students an understanding of their professional and ethical responsibilities.

The undergraduate curriculum in mechanical engineering covers the fundamental aspects of the field, emphasizes basic principles, and educates the student in the use of these principles to reach optimal design solutions for engineering problems. Specific design subject matter and materials are also drawn from engineering activities such as biomechanical systems, as well as from the more traditional areas. Emphasis in the freshman and sophomore years is on mathematics, chemistry, physics, mechanics of materials, applied mechanics, graphic communications, and an introduction to design. The junior and senior years are devoted to thermodynamics, heat transfer, fluid mechanics, systems and controls, design, manufacturing, and the application of fundamentals to the diverse problems of mechanical engineering. The curriculum stresses laboratory work and design projects. Computer skills developed during the first two years are a prerequisite for junior- and senior-level courses. Satisfactory completion of the curriculum leads to the degree Bachelor of Science in Mechanical Engineering (B.S. ME).

In addition to the Institute's academic requirements for graduation with a bachelor's degree, the following are required for a B.S. ME degree:

- A *C* or better must be earned in MATH 1501, MATH 1502, MATH 2401, and MATH 2403.
- The aggregate GPA of all mechanical engineering classes must be a 2.0 or higher.

## PROGRAM OBJECTIVES

The Woodruff School faculty have adopted the following objectives:

A. To graduate engineers prepared for successful careers and empower them to be lifelong learners.

B. To graduate engineers who are able to solve problems using analysis that is anchored in the engineering sciences and/or computational tools.

C. To graduate engineers who are able to design engineering systems for a global economy. This necessitates the development of skills that include the ability to formulate problems, to think creatively, to communicate effectively, to synthesize information, and to work ethically and collaboratively in a distributed engineering environment.

D. To graduate engineers who are able to use experimental and data analysis techniques to understand engineering phenomena and/or validate them

E. To graduate engineers who understand their professional and ethical responsibilities to society

# BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING
## 2008 - 2009 DEGREE REQUIREMENTS
### SCHOOL OF MECHANICAL ENGINEERING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| MATH 1501 CALCULUS I | 4 |
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| CHEM 1310 GENERAL CHEMISTRY | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| MATH 1502 CALCULUS II | 4 |
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1371 COMPUTING FOR ENGINEERS | 3 |
| ME / CEE 1770 ENGINEERING GRAPHICS & VISUALIZATION | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-FALL | HRS |
|---|---|
| MATH 2401 CALCULUS III | 4 |
| PHYS 2212 INTRODUCTORY PHYSICS II | 4 |
| MSE 2001 PRINCIPLES & APPLICATIONS OF ENGINEERING MATERIALS | 3 |
| ME 2110 CREATIVE DECISIONS AND DESIGN | 3 |
| COE 2001 STATICS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| MATH 2403 DIFFERENTIAL EQUATIONS | 4 |
| ME 2202 DYNAMICS OF RIGID BODIES | 3 |
| ME 2016 COMPUTING TECHNIQUES | 3 |
| LAB SCIENCE (BIOL, CHEM, EAS, PHYS) | 3 |
| ECE 3710 CIRCUITS & ELECTRONICS | 2 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-FALL | HRS |
|---|---|
| ME 3322 THERMODYNAMICS | 3 |
| ME 3340 FLUID MECHANICS | 3 |
| COE 3001 MECHANICS OF DEFORMABLE BODIES | 3 |
| ECON 2100 or 2105 or 2106 | 3 |
| ECE 3741 INSTRUMENTATION & ELECTRONICS LAB | 1 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| ME 3015 SYSTEM DYNAMICS & CONTROL | 4 |
| ME 3345 HEAT TRANSFER | 3 |
| ENGINEERING ETHICS ELECTIVE | 3 |
| CEE / MATH / ISYE 3770 STATISTICS & APPLICATIONS | 3 |
| ISYE 3025 ESSENTIALS OF ENGINEERING ECONOMY | 1 |
| HUMANITIES ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| ME 3057 EXPERIMENTAL METHODOLOGY & TECHNICAL WRITING | 3 |
| ME 3180 MACHINE DESIGN or<br>ME 4315 ENERGY SYSTEMS ANALYSIS AND DESIGN | 3 |
| ME 4210 MANUFACTURING PROCESSES & ENGINEERING | 3 |
| MECHANICAL ENGINEERING ELECTIVE | 3 |

| | |
|---|---|
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| ME 4053 MECHANICAL ENGINEERING SYSTEMS LABORATORY | 2 |
| ME 4182 CAPSTONE DESIGN | 3 |
| MECHANICAL ENGINEERING ELECTIVE | 3 |
| FREE ELECTIVE | 3 |
| SOCIAL SCIENCE ELECTIVE or HUMANITIES ELECTIVE * | 3 |
| **TOTAL SEMESTER HOURS =** | **14** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

*
Social Science or humanities is required depending on the ethics class selection. Twelve hours of social science electives and twelve hours of humanities electives are required. If the ethics selection is a social science, then a humanities elective is required. If the ethics selection is a humanities, then a social science elective is required.

# MECHANICAL ENGINEERING ELECTIVES

## WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

## HUMANITIES AND SOCIAL SCIENCES

Twelve credit hours of humanities and twelve credit hours of social sciences are required.

The twelve hours of humanities are comprised of six hours of English composition classes and six hours of humanities electives. The English composition classes are satisfied by ENG 1101 and ENG 1102.

The twelve hours of social sciences include three hours of economics, three hours of work in history and the constitutions of the United States and Georgia, and six hours of social science electives. The three hours of economics is satisfied by either ECON 2100 (Economic Analysis and Policy Problems), ECON 2105 (Principles of Macroeconomics), or ECON 2106 (Principles of Microeconomics). The three hours of history and constitutions are satisfied by selecting one of the following courses: HIST 2111 (The United States to 1877), HIST 2112 (The United States Since 1877), POL 1101 (Government of the United States), PUBP 3000 (American Constitutional Issues), or INTA 1200 (American Government in Comparative Perspective).

The six hours of social science electives and the six hours of humanities electives must include three hours of engineering ethics. The remaining hours of social science electives and humanities electives must be selected from the Institute-approved humanities courses and the Institute-approved social science courses.

**ENGINEERING ETHICS ELECTIVE(S)** - The ethics class can be selected from PST 3127 (Science, Technology, and Human Values), PST 3105 (Ethical Theories), PST 3109 (Ethics for Technical Professions), PST 4176 (Environmental Ethics), INTA 2030 (Ethics in International Affairs), or HTS 2084 (Technology and Society). The PST ethics courses are humanities electives, while the INTA and HTS ethics courses are social science electives.

## FREE ELECTIVES

The six hours of free electives must be at the 2000 level or above. In addition, classes used as free electives may not overlap any other classes used for the bachelor's degree in mechanical engineering.

## MECHANICAL ENGINEERING ELECTIVES

Mechanical engineering electives include ME 3180 and any ME elective at the 4000 level, except for ME 4741 and ME 4742. The mechanical engineering electives cannot duplicate any other class required for the bachelor's degree in mechanical engineering. Approved classes at the 6000 level or above may be scheduled if the student has an overall GPA of 3.0 and prior consent of the professor. A maximum of 4 hours of undergraduate research, ME 4699, and undergraduate special problems, ME 4903, may be used for ME electives.

## SCIENCE ELECTIVES

The three-hour science elective may be satisfied by classes from the following list: CHEM 1311 (Inorganic Chemistry) and CHEM 1312 (Inorganic Chemistry Lab) taken together, or one of the following: BIOL 1510 (Biology Principles), BIOL 1520 (Introduction to Organismal Biology), EAS 1600 (Introduction to Environmental Science), EAS 1601 (Habitable Planet), or PHYS 2213 (Modern Physics).

## BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING - COOPERATIVE PLAN

Since 1912, Georgia Tech has offered a five-year Undergraduate Cooperative Program to those students who wish to combine career-related experience with classroom studies. The program is the fourth oldest of its kind in the world and the largest optional co-op program in the country. Traditionally, mechanical engineering students have been the largest group participating in the program at Georgia Tech.

Students alternate between industrial assignments and classroom studies until they complete four or five semesters of work. Co-op students with mechanical engineering majors complete the same coursework on campus that is completed by regular four-year students. Most co-op students begin the program as freshman or sophomores and are classified as full-time students regardless whether they are attending classes on campus or are full-time at an employer's location.

Students who participate in the program have the opportunity to develop career interests, become more confident in their career choices, and develop human relation skills through their work experience. Graduates of the program receive a bachelor's degree with a Cooperative Plan Designation. Woodruff School students have traditionally been the largest group participating in the program.

Students can also complete work assignments in a foreign country as part of the International Cooperative Program. This program is a great opportunity to utilize foreign language skills, gain a global perspective, and experience a diverse culture. Proficiency in a foreign language is necessary to earn the International Cooperative Plan degree designation. Mechanical engineering students have worked in countries such as Germany, China, and Japan. For more information on the Cooperative Program, go to www.coop.gatech.edu.

The Undergraduate Professional Internship Program is for mechanical engineering students who do not participate in the Cooperative Program but want some career-related experience before graduation. Students generally work for one semester, usually in the summer, with an option for more work. Students must have completed at least thirty hours of coursework at Georgia Tech before they can participate in the program. For more details, see www.upi.gatech.edu.

In addition, there is a Work Abroad Program (www.workabroad.gatech.edu), which complements a student's formal education with paid international work experience directly related to mechanical engineering. Participating students typically include juniors and seniors. The international work assignments are designed to include practical training, cross-cultural exposure and learning, and the acquisition of needed skills. This program satisfies requirements for the International Plan, which is available to mechanical engineering students.

For more information about all of the programs in the Division of Professional Practice, visit www.profpractice.gatech.edu.

## BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING - INTERNATIONAL PLAN

The Woodruff School is joining thirteen other programs at the Institute in the Undergraduate International Plan. This is a new degree designation, similar to the Cooperative Plan. Mechanical engineering students can spend two semesters abroad (a minimum of twenty-six weeks), gaining valuable international experience. This is especially important in today's global economy, where more companies are looking for graduates with international experience in their major area. Mechanical engineering students can spend a year at Georgia Tech-Lorraine in Metz, France, at the Technical University in Munich, or at other approved locations.

In order to receive the B.S. ME-International Plan degree, students will have to meet several requirements. The first is to show proficiency in a language through at least the second year of study; a proficiency exam must be passed. The second requirement is specific coursework: international relations, global economy, and society/culture. The third requirement is for two semesters abroad (a minimum of twenty-six weeks). This can be done either in residence at a university, or one semester in residence plus one as an engineering intern, or both semesters as an intern. Finally, the student's capstone design experience must meet certain international requirements. Ideally, this would be a joint project including students from Georgia Tech and the selected school abroad. For more information this program, visit www.oie.gatech.edu.

## B.S. IN NUCLEAR AND RADIOLOGICAL ENGINEERING ACCREDITATION

The B.S. in Nuclear and Radiological Engineering program is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012 - telephone: (410) 347-7700.

## BACHELOR OF SCIENCE NUCLEAR AND RADIOLOGICAL ENGINEERING

The educational objectives of the undergraduate programs in the Woodruff School are:

- to prepare students for successful careers and lifelong learning;
- to train students thoroughly in methods of analysis, including the mathematical and computational skills appropriate for engineers to use when solving problems;
- to develop the skills pertinent to the design process, including the students' ability to formulate problems, to think creatively, to communicate effectively, to synthesize information, and to work collaboratively;
- to teach students to use current experimental and data analysis techniques for engineering applications; and
- to instill in our students an understanding of their professional and ethical responsibilities.

The undergraduate curriculum in nuclear and radiological engineering is structured to meet the needs of both the student who contemplates employment immediately after graduation and the student planning to pursue graduate study. It provides maximum flexibility in the form of options for each student to develop his or her unique interests and capabilities. The core curriculum covers the basic principles of nuclear engineering, nuclear reactor core design, reactor systems engineering, nuclear power economics, reactor operations, radiation sources and detection instruments, radiation transport, radiation protection, criticality safety, regulatory requirements, and radioactive materials management.

In addition to the Institute's academic requirements for graduation with a bachelor's degree, the following are required for a B.S. NRE degree.

- A *C* or better must be earned in MATH 1501, MATH 1502, MATH 2401, MATH 2403, and ISYE/MATH 3770
- The aggregate GPA of all NRE classes must be a 2.0 or higher

## PROGRAM OBJECTIVES

The Woodruff School faculty have adopted the following objectives:

A. To graduate engineers prepared for successful careers and empower them to be lifelong learners.

B. To graduate engineers who are able to solve problems using analysis that is anchored in the engineering sciences and/or computational tools.

C. To graduate engineers who are able to design engineering systems for a global economy. This necessitates the development of skills that include the ability to formulate problems, to think creatively, to communicate effectively, to synthesize information, and to work ethically and collaboratively in a distributed engineering environment.

D. To graduate engineers who are able to use experimental and data analysis techniques to understand engineering phenomena and/or validate them

E. To graduate engineers who understand their professional and ethical responsibilities to society

# B.S. IN NUCLEAR AND RADIOLOGICAL ENGINEERING

## 2008 - 2009 DEGREE REQUIREMENTS

### SCHOOL OF MECHANICAL ENGINEERING

Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| MATH 1501 CALCULUS I | 4 |
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| CHEM 1310 GENERAL CHEMISTRY | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| MATH 1502 CALCULUS II | 4 |
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1371 COMPUTING FOR ENGINEERS | 3 |
| NRE 2110 INTRODUCTION TO NUCLEAR & RADIOLOGICAL ENGINEERING | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| MATH 2401 CALCULUS III | 4 |
| PHYS 2212 INTRODUCTORY PHYSICS II | 4 |
| COE 2001 STATICS | 2 |
| ECON 2100 or 2105 or 2106 | 3 |
| HUMANITIES ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| MATH 2403 DIFFERENTIAL EQUATIONS | 4 |
| PHYS 2213 INTRODUCTION TO MODERN PHYSICS | 3 |
| MSE 2001 PRINCIPLES & APPLICATIONS OF ENGINEERING MATERIALS | 3 |
| ECE 3710 CIRCUITS & ELECTRONICS | 2 |
| NRE 3212 FUNDAMENTALS OF NUCLEAR & RADIOLOGICAL ENGINEERING | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-FALL | HRS |
|---|---|
| NRE 3301 RADIATION PHYSICS | 3 |
| ME 3322 THERMODYNAMICS | 3 |
| ME 3340 FLUID MECHANICS | 3 |
| ECE 3741 INSTRUMENTATION & ELECTRONICS LAB | 1 |
| ECE 3025 ELECTROMAGNETICS | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| ISYE 3025 ESSENTIALS OF ENGINEERING ECONOMY | 1 |
| NRE 3316 RADIATION PROTECTION ENGINEERING | 3 |
| NRE 3112 NUCLEAR RADIATION DETECTION | 3 |
| CEE / MATH / ISYE 3770 STATISTICS & APPLICATIONS | 3 |
| ME 3345 HEAT TRANSFER | 3 |
| COE 3001 MECHANICS OF DEFORMABLE BODIES | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| NRE 4214 REACTOR ENGR | 3 |
| NRE 4328 RADIATION SOURCES AND APPLICATIONS | 3 |
| NRE 4204 NUCLEAR REACTOR PHYSICS | 4 |
| ETHICS ELECTIVE | 3 |
| TECHNICAL ELECTIVE | 3 |

| | |
|---|---|
| **TOTAL SEMESTER HOURS =** | **16** |

| FOURTH YEAR-SPRING | HRS |
|---|---|
| SOCIAL SCIENCE ELECTIVE or HUMANITIES ELECTIVE(S) * | 3 |
| NRE 4232 NUCLEAR & RADIOLOGICAL ENGINEERING DESIGN | 4 |
| TECHNICAL ELECTIVES | 6 |
| NRE 4206 RADIATION PHYSICS LAB | 2 |
| **TOTAL SEMESTER HOURS =** | **15** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

*

Social Science or humanities is required depending on the ethics class selection. Twelve hours of social science electives and twelve hours of humanities electives are required. If the ethics selection is a social science, then a humanities elective is required. If the ethics selection is a humanities, then a social science elective is required.

# NUCLEAR AND RADIOLOGICAL ENGINEERING ELECTIVES

## WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

## HUMANITIES, SOCIAL SCIENCES, AND MODERN LANGUAGES

Twelve credit hours of humanities and twelve credit hours of social sciences are required.

The twelve hours of humanities are comprised of six hours of English composition classes and six hours of electives. The English composition classes are satisfied by ENG 1101 and 1102 (English Composition 1 and 2).

The twelve hours of social sciences include three hours of economics, three hours of work in history and the constitutions of the United States and Georgia, and six hours of social science electives. The three hours of economics is satisfied by either ECON 2100 (Economic Analysis and Policy Problems), ECON 2105 (Principles of Macroeconomics), or ECON 2106 (Principles of Microeconomics). The three hours of history and constitutions are satisfied by selecting one of the following courses: HIST 2111 (The United States to 1877), HIST 2112 (The United States since 1877), POL 1101 (Government of the United States), PUBP 3000 (American Constitutional Issues), or INTA 1200 (American Government in Comparative Perspective).

The six hours of social science electives and the six hours of humanities electives must include three hours of ethics. The ethics class can be selected from PST 3127 (Science, Technology, and Human Values), PST 3105 (Ethical Theories), PST 3109 (Ethics for Technical Professions), PST 4176 (Environmental Ethics), INTA 2030 (Ethics in International Affairs), or HTS 2084 (Technology and Society). The PST ethics courses are humanities electives, while the INTA and HTS ethics courses are social science electives. The remaining hours of social science electives and humanities electives must be selected from a list of core curriculum classes from the Institute-approved humanities courses and the Institute-approved social science courses.

## SCIENCE ELECTIVE

No science electives are required.

## FREE ELECTIVES

No free electives are required for graduation.

## TECHNICAL ELECTIVES

Technical electives may be any 3000 or 4000 level course in the Colleges of Engineering, Sciences, or Computing. This excludes psychology (PSYC) and applied physiology (APPH) courses. NRE courses at the 6000 level or 8000 level may also be scheduled, provided the student has a grade point average of 3.0 or higher and prior consent is obtained from the instructor.

A student completing his or her sophomore year with a grade point average of 2.5 or higher may elect one technical elective for a maximum of four credit hours from the Design Special Problem Course, NRE 4903 or the Research Special Problem Course, NRE 4699.

## BACHELOR OF SCIENCE IN NUCLEAR AND RADIOLOGICAL ENGINEERING - COOPERATIVE PLAN

Since 1912, Georgia Tech has offered a five-year **Undergraduate Cooperative Program** to those students who wish to combine career-related experience with classroom studies. The program is the fourth oldest of its kind in the world and the largest optional co-op program in the country.

Students alternate between industrial assignments and classroom studies until they complete four or five semesters of work. Co-op students with nuclear and radiological engineering majors complete the same coursework on campus that is completed by regular four-year students. Most co-op students begin the program as freshman or sophomores and are classified as full-time students regardless whether they are attending classes on campus or are full-time at an employer's location.

Students who participate in the program have the opportunity to develop career interests, become more confident in their career choices, and develop human relation skills through their work experience. Graduates of the program receive a bachelor's degree with a Cooperative Plan Designation. Woodruff School students have traditionally been the largest group participating in the program.

Students can also complete work assignments in a foreign country as part of the **International Cooperative Program**. This program is a great opportunity to utilize foreign language skills, gain a global perspective, and experience a diverse culture. Proficiency in a foreign language is necessary to earn the International Cooperative Plan degree designation. For more information on the Cooperative Program, go to www.coop.gatech.edu.

The **Undergraduate Professional Internship Program** is for nuclear and radiological engineering students who do not participate in the Cooperative Program, but want some career-related experience before graduation. Students generally work for one semester, usually in the summer, with an option for more work. Students must have completed at least thirty hours of coursework at Georgia Tech before they can participate in the program. For more details, see: www.upi.gatech.edu.

In addition, there is a **Work Abroad Program** (www.workabroad.gatech.edu), which complements a student's formal education with paid international work experience directly related to nuclear and radiological engineering. Participating students typically include juniors and seniors. The international work assignments are designed to include practical training, cross-cultural exposure and learning, and the acquisition of needed skills.

For more information about all of the programs in the Division of Professional Practice, view www.profpractice.gatech.edu.

## THE FIVE-YEAR B.S./M.S. PROGRAM

The Woodruff School offers a five-year B.S./M.S. program for those students who demonstrate an interest in and ability for additional education beyond the B.S. degree. The program fosters intense interaction among students and faculty and includes mentoring and undergraduate research. Careful advising and course planning will enable students to begin graduate coursework in their fourth year of study. Woodruff School students with a GPA of 3.5 or higher are eligible to apply for the program after completion of thirty semester credit hours at Georgia Tech, but before the completion of seventy-five semester credit hours, including transfer and advanced placement credits.

## MINOR IN NUCLEAR AND RADIOLOGICAL ENGINEERING

The Nuclear & Radiological Engineering and Health Physics Program of the Woodruff School offers a certificate and a minor in Nuclear & Radiological Engineering to non-NRE engineering students. These programs provide a general knowledge of Nuclear and Radiological Engineering topics and are valuable for students considering graduate work in Nuclear Engineering or Medical Physics. The requirements for both programs include the following courses:

NRE 3301 Radiation Physics
NRE 3212 Fundamentals of Nuclear Engineering
NRE 3316 Radiation Protection Engineering

Additional courses are required from the list below for a total of at least twelve credit hours for the Certificate Program and 18 credit hours for the Minor Program.

NRE 2110 Introduction to Nuclear and Radiological Engineering
NRE 4204 Nuclear Reactor Physics
NRE 4206 Radiation Physics Laboratory
NRE 4214 Reactor Engineering
NRE 4232 Nuclear Radiological Engineering Design
NRE 4234 Nuclear Criticality Safety Engineering
NRE 4266 Light Water Reactor Technology
NRE 4328 Radiation Sources and Applications
NRE 4335 Radiation Imaging
NRE 4404 Radiological Assessment and Waste Management
NRE 4610 Introduction to Plasma Physics and Fusion Engineering
NRE 4770 Nuclear Chemical Engineering, cross-listed with ChE 47xx

# GRADUATE PROGRAMS - GENERAL INFORMATION

## PROGRAM EDUCATIONAL OBJECTIVES

The educational objectives of the doctoral programs in the Woodruff School are:

- to prepare students for successful careers in industry and/or academia and to promote and instill an ethic for lifelong learning;
- to educate students in methods of advanced analysis, including the mathematical, computational, and experimental skills appropriate for professionals to use when solving problems;
- to provide a substantial depth of knowledge in a particular field or subfield of study that allows the student to be recognized as an expert;
- to provide a breadth of knowledge in a minor field of study that fosters an awareness of and skill in interdisciplinary approaches to problem solving;
- to develop the skills pertinent to the research process, including the students' ability to formulate problems, to synthesize and integrate information, to work collaboratively, to communicate effectively, and to publish the results of their research; and
- to promote a sense of scholarship, leadership, and service among our graduates.

The educational objectives of the master's degree programs in the Woodruff School are:

- to prepare students for successful careers in industry and to promote and instill an ethic for lifelong learning;
- to educate students in methods of advanced analysis appropriate for professionals to use when solving problems;
- to provide a depth of knowledge in a particular field of study that allows the student to apply innovative techniques to solve problems;
- to provide a breadth of knowledge that fosters an awareness of and skill in interdisciplinary approaches to problem solving; and
- to develop the skills pertinent to the research process, including the students' ability to formulate problems, to synthesize and integrate information, to work collaboratively, to communicate effectively, and to publish the results of their research (M.S. thesis students).

The graduate program in mechanical engineering offers advanced study and research in the areas of acoustics and dynamics; automation and mechatronics; bioengineering; computer-aided engineering and design; fluid mechanics; heat transfer, combustion, and energy systems; manufacturing; mechanics of materials; microelectromechanical systems; and tribology. The graduate programs lead to the degrees of Master of Science in Mechanical Engineering, Master of Science, Master of Science in Bioengineering, Master of Science in Paper Science and Engineering, and Doctor of Philosophy for qualified graduates having backgrounds in engineering, mechanics, mathematics, the physical sciences, or the biological sciences.

The master's degree requires a minimum of thirty approved credit hours. Students may elect to earn nine of these hours by writing a thesis, or they may earn all credit toward the degree through coursework. Six hours of credit for graduate courses taken as an undergraduate at Georgia Tech and used for credit toward the B.S. ME may be included in the M.S. program of study if the student graduated with an undergraduate grade point average of at least 3.5. Students must earn a graduate grade point average of at least 3.0 and satisfy all remaining requirements to be certified for the master's degree. Candidates for the Doctor of Philosophy degree must earn a graduate grade point average of at least 3.3. Students may obtain additional information about the programs by viewing the Woodruff School Handbook for Graduate Students. Every student enrolled must consult this source of information with respect to special rules and degree requirements.

The graduate program in nuclear and radiological engineering/medical physics leads to the degrees of Master of Science in Nuclear Engineering, Master of Science in Medical Physics, Master of Science, and Doctor of Philosophy. In nuclear and radiological engineering, students with a bachelor's degree in engineering pursue the Master of Science in Nuclear Engineering degree, while students with a Bachelor of Science degree in other fields enroll for the Master of Science degree. Depending on the career objectives of the student, the Woodruff School may encourage a thesis as part of the Master of Science program. Nuclear and radiological engineering students must earn a graduate grade point average of at least 3.0 and satisfy all remaining requirements to be certified for the master's degree.

The doctoral program is designed with great latitude to capitalize on variations in experience and interests of individual students. Candidates for the Doctor of Philosophy degree must earn a graduate grade point average of at least 3.3.

## THE FIVE-YEAR B.S./M.S. PROGRAM

The Woodruff School offers a five-year B.S./M.S. program for those students who demonstrate an interest in and ability for additional education beyond the B.S. degree. The program fosters intense interaction among students and faculty and includes mentoring and undergraduate research. Careful advising and course planning will enable students to begin graduate coursework in their fourth year of study. Woodruff School students with a GPA of 3.5 or higher are eligible to apply for the program after completion of thirty semester credit hours at Georgia Tech, but before the completion of seventy-five semester credit hours, including transfer and advanced placement credits.

## MASTER OF SCIENCE IN BIOENGINEERING

The Woodruff School participates in Georgia Tech's interdisciplinary bioengineering graduate program, offering both the M.S. and the Ph.D. degrees. The program enrolls students in a participating school (the home school) and upon completion of the degree requirements, the home school (the Woodruff School) recommends the award of the degree. Bioengineering research focuses on the development of new or improved physical and mathematical concepts and techniques that may be applied to problems in medicine and biology, including the development of new medical devices. The curriculum provides the flexibility to concentrate in special areas so that the training is both multidiciplinary and integrated. For more information, see www.bioengineering.gatech.edu.

## MASTER OF SCIENCE IN MECHANICAL ENGINEERING

The Woodruff School has a challenging graduate program that encompasses advanced study and research leading to the degree of Master of Science in Mechanical Engineering for qualified graduates with backgrounds in engineering, mechanics, mathematics, physical sciences, and life sciences. Most graduate coursework is elective, but the program of study must meet the Woodruff School's requirements of breadth, depth, and level. Graduate degrees in mechanical engineering can be completed through a combination of studies at Georgia Tech-Lorraine, via video and online course offerings, or by attending classes at the Atlanta campus.

## MASTER OF SCIENCE IN MEDICAL PHYSICS

The graduate program in medical physics leads to the degree of Master of Science in Medical Physics (M.S.M.P.) and a Doctor of Philosophy as an option under the Ph.D. program in nuclear engineering. The program focuses on the application of radiation to medicine, particularly in the diagnosis and treatment of human disease. In addition to the traditional on-campus M.S. program, a distance learning program leading to the M.S.M.P. degree is also offered to accommodate the needs of professionals in the field. A large number of medical physics practitioners in government and industry participate in the video-based program.

Three hours of credit for graduate courses taken as an undergraduate at Georgia Tech and used for credit toward an undergraduate degree in science or engineering may also be included in the M.S.M.P. program of study if the student graduated with an undergraduate grade point average of at least 3.5. Medical physics students must earn a graduate grade point average of at least 3.0 and satisfy all remaining requirements to be certified for the master's degree.

## MASTER OF SCIENCE IN NUCLEAR ENGINEERING

The graduate program in nuclear and radiological engineering/medical physics leads to the degrees of Master of Science in Nuclear Engineering, Master of Science in Medical Physics, Master of Science, and Doctor of Philosophy. In nuclear and radiological engineering, students with a bachelor's degree in engineering pursue the Master of Science in Nuclear Engineering degree, while students with a Bachelor of Science degree in other fields enroll for the Master of Science degree. Depending on the career objectives of the student, the Woodruff School may encourage a thesis as part of the Master of Science program. Nuclear and radiological engineering students must earn a graduate grade point average of at least 3.0 and satisfy all remaining requirements to be certified for the master's degree.

## MASTER OF SCIENCE IN PAPER SCIENCE AND ENGINEERING

The Master's (M.S.P.S.) and Ph.D. degrees in Paper Science and Engineering (PSE) provide an education in the science and engineering involved in the production of paper, tissue, and other products from natural fiber. PSE students are enrolled in a participating school (the home school) and, upon completion of the degree requirements, the home school (in this case, the Woodruff School) recommends the award of an M.S. or Ph.D. degree.

## MASTER OF SCIENCE (UNDESIGNATED)

The undesignated master's degree (M.S.) enables you to pursue a program of highly interdisciplinary coursework. For the undesignated degree, the major area is a coherent field of interest in the Woodruff School, but courses taken in the major area need not all have ME designations. Examples of major areas are acoustics and dynamics, bioengineering, materials science, MEMS, and thermal sciences. The list of major areas is limited only by the current interests of the faculty in the Woodruff School. The requirement for a major area is motivated by the need to have some coherent area of special expertise.

## DISTANCE LEARNING PROGRAMS

The Woodruff School offers working professionals the opportunity to enroll in many of its graduate courses through video, CD-ROM, or Internet technologies. The distance-learning program has the same admission, course, and degree requirements as those for graduate students attending classes at the Atlanta campus or at Georgia Tech-Lorraine. Qualified individuals may complete the requirements for the master's degrees in mechanical engineering (M.S.M.E.) and medical physics (M.S.M.P.) by utilizing the distance-learning mode.

## DUAL DEGREE PROGRAM IN MANAGEMENT

Through the dual-degree program, qualified graduate students wishing to pursue an M.B.A. degree and a graduate degree in mechanical engineering can efficiently earn two graduate degrees in almost the same time it would take to earn the M.B.A. alone. For example, the M.B.A. program is normally sixty hours. For students pursuing a graduate degree in mechanical engineering, the length of the M.B.A. program is reduced to thirty-nine hours, with the area of concentration being the coursework in the mechanical engineering program. Students in the dual-degree program take approximately thirty hours of required management core courses, plus nine hours of graduate management electives. Those interested in graduate degrees in management and in mechanical engineering should consult with advisors in the College of Management as well as the Woodruff School, because admissions requirements for both programs must be met.

## GEORGIA TECH-LORRAINE (GTL)

The Woodruff School's program at Georgia Tech-Lorraine in Metz, France has a number of components. In addition to the master's of science degree in mechanical engineering (M.S.M.E.) there is also a doctoral program, which has grown as a result of major funding from CNRS and Georgia Tech; a new fall/spring semester undergraduate program; and the undergraduate summer program. Most graduate students focus on the M.S.M.E. French students from partner institutions, such as ENSAM and the Ecole des Mines, take courses at Georgia Tech-Lorraine, typically for two semesters, before coming to the Atlanta campus to finish their master's degree. U.S. students take classes at GTL as well as at ENSAM for three semesters and receive both the M.S.M.E. and the Master Professionel of ENSAM. Students must also complete an internship in France during the summer. The mechanical engineering programs offered at GTL have the same admission, course, and degree requirements as those for graduate students in mechanical engineering attending classes on the Atlanta campus or through the distance-learning program. ENSAM is a leading institution for the study of mechanical and industrial engineering with eight campuses across France, including one in Metz. For more information on the Georgia Tech-Lorraine program, view http://www.georgiatech-metz.fr.

## MULTIDISCIPLINARY PROGRAMS

Mechanical engineering students may plan electives that satisfy simultaneously the requirements of the degree program and a designated multidisciplinary field within the College of Engineering, thus earning both a graduate degree and a certificate indicating expertise in a related specialty. For a complete description of these and other multidisciplinary programs, contact us below.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN BIOENGINEERING

The Woodruff School participates in Georgia Tech's interdisciplinary bioengineering graduate program, offering both the M.S. and the Ph.D. degrees. The program enrolls students in a participating school (the home school) and upon completion of the degree requirements, the home school (the Woodruff School) recommends the award of the degree. Bioengineering research focuses on the development of new or improved physical and mathematical concepts and techniques that may be applied to problems in medicine and biology, including the development of new medical devices. The curriculum provides the flexibility to concentrate in special areas so that the training is both multidiciplinary and integrated. For more information, see www.bioengineering.gatech.edu.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN MECHANICAL ENGINEERING

The doctoral program is designed with great latitude to capitalize on variations in experience and interests of individual students. The Ph.D. degree recognizes proficiency and high achievement in research. Candidates for the Doctor of Philosophy degree must earn a graduate grade point average of at least 3.3.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN NUCLEAR AND RADIOLOGICAL ENGINEERING

The graduate program in nuclear and radiological engineering/medical physics leads to the degrees of Master of Science in Nuclear Engineering, Master of Science in Medical Physics, Master of Science, and Doctor of Philosophy. The doctoral program is designed with great latitude to capitalize on variations in experience and interests of individual students (e.g., nuclear power engineering, radiological engineering, and medical physics). Candidates for the Doctor of Philosophy degree must earn a graduate grade point average of at least 3.3.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN NUCLEAR AND RADIOLOGICAL ENGINEERING MEDICAL PHYSICS OPTION

The graduate program in nuclear and radiological engineering/medical physics leads to the degrees of Master of Science in Nuclear Engineering, Master of Science in Medical Physics, Master of Science, and Doctor of Philosophy. The medical physics option in the doctoral program is designed for students with a specific interest in the fields of medical physics and leads to a Doctor of Philosophy with a major in Nuclear and Radiological Engineering. Candidates for the Doctor of Philosophy degree must earn a graduate grade point average of at least 3.3.

# DOCTOR OF PHILOSOPHY WITH A MAJOR IN PAPER SCIENCE AND ENGINEERING

The Master's (M.S.P.S.) and Ph.D. degrees in Paper Science and Engineering (PSE) provide an education in the science and engineering involved in the production of paper, tissue, and other products from natural fiber. PSE students are enrolled in a participating school (the home school) and, upon completion of the degree requirements, the home school (in this case, the Woodruff School) recommends the award of an M.S. or Ph.D. degree.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN ROBOTICS

Students pursuing a Ph.D. in Robotics must take thirty-six semester hours of core research and elective courses, pass a comprehensive qualifying exam with written and oral components, and successfully complete, document, and defend a piece of original research culminating in a doctoral thesis. Students select a home school, such as ECE, AE, ME, or CS, and apply for admission to the Ph.D. program in robotics through that home school.

# SCHOOL OF POLYMER, TEXTILE AND FIBER ENGINEERING

Established in 1897
Location: Manufacturing Related Disciplines Complex I
Telephone: 404.894.2490
Fax: 404.894.8780
Web site: www.ptfe.gatech.edu

## GENERAL INFORMATION

The School of Polymer, Textile and Fiber Engineering has a strong focus on polymer engineering and the underpinning science of polymers while retaining its historical connections with the textile industry and its expertise in textile and fiber technology. Polymers and fibers can be used to form engineered fibrous structures, which play critical, complex roles in fields such as space, aeronautics, automotives, medicine, safety, environmental control, sports, transportation, and construction.

Multidisciplinary by nature, the field of polymer science and engineering encompasses, among other areas: the syntheses of polymers by nature and in the laboratory; plastics and fiber fabrication processes; design, engineering, and assembly of polymeric materials into one-, two-, and three-dimensional structures; modification of structural and functional properties through additives, blends and composites; and measurement of complex aesthetic and mechanical properties of polymer-based systems. The design and synthesis of new polymers and fibers, engineering new methods of assembling polymeric materials into useful products, and exploring new engineering applications of polymers and fibers are continually expanding.

The School of Polymer, Textile and Fiber Engineering prepares students for rewarding careers in the polymer-fiber-textile-fabricated products industrial complex. Graduates obtain positions in design, process and plant engineering, manufacturing, research, technical service, sales, product and process development, quality control, and corporate management. They participate in the design, development, manufacturing, and marketing of a broad range of polymeric materials and associated products. Many hold key decision-making positions at a young age.

## VISION STATEMENT

The vision of PTFE is to be a national and international leader in education and research in polymers and fibers.

## MISSION

The mission of PTFE is

- To educate undergraduate and graduate students who will advance knowledge and be leaders in industry, academia, and government;
- To conduct fundamental and applied research in polymer and fiber science and engineering and related interdisciplinary areas including textiles and carpets; and
- To provide leadership and service to the profession, to the state of Georgia, and to the nation.

## FACULTY

### Chair and Professor
Anselm C. Griffin

### Director of Undergraduate Affairs and Associate Professor
Mary Lynn Realff

### Professors
Haskell W. Beckham, David G. Bucknall, Wallace W. Carr, Fred L. Cook, Karl I. Jacob, Sundaresan Jayaraman, Satish Kumar, Mohan Srinivasarao, Vladimir Tsukruk, Youjiang Wang

### Associate Professors
Donggang Yao

### Assistant Professors
Meisha L. Shofner, Yonathan Thio

### Professors Emeriti
John L. Lundberg, Malcom B. Polk, Wayne C. Tincher

### Research Scientist
Radhakrishnaiah Parachuru

## FACILITIES

The School of Polymer, Textile and Fiber Engineering is centered in the Manufacturing Related Disciplines Complex I Building, a modern classroom and laboratory facility. The School also has additional laboratories in the Bunger-Henry Building. Well-equipped laboratories are also available for synthesis as well as chemical and physical characterization of polymers, fibers, and textile structures. Specialized equipment is available for, among other studies: NMR imaging, ink-jet printing, mechanics of fabric formation, polymer viscoelasticity, carbon nanotube enabled materials, advanced optical microscopy, polymer environmental stability experiments, modeling of polymer processing and polymer dynamics, electrospinning, polymer micro/nano-fabrication, hollow fiber technology, polymer blends, polymer synthesis, fiber-reinforced composite formation and testing, biodegradable polymeric materials, carbon and other high-performance fiber development, Smart Shirt technology, energy conservation, elastomer characterization, structural coloration, and water pollution studies. Instrumentation facilities are also available.

## B.S. POLYMER AND FIBER ENGINEERING - ACCREDITATION

The B.S. in Polymer and Fiber Engineering program is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012 - telephone: (410) 347-7700.

# UNDERGRADUATE PROGRAMS

## GENERAL INFORMATION

The undergraduate program offers the Bachelor of Science in Polymer and Fiber Engineering. Students may pursue the degree in a regular four-year program or under the five-year cooperative plan. Because of the multidisciplinary nature of polymers and fibers, the curriculum provides graduates with broad, diverse academic backgrounds. Emphasis in the freshman and sophomore years is on mathematics, chemistry, and physics, and in the junior and senior years on materials characterization, polymer/textile chemistry and engineering, process dynamics, applied mechanics, and application of each field to the broad range of problems encountered in the industrial complex. The program allows students to select courses from a range of general and technical electives.

Since most of the polymer/fiber coursework is concentrated in the last two years of the programs, students from junior and community colleges can readily transfer into the School of Polymer, Textile and Fiber Engineering. The Regents' Engineering Transfer Program (RETP) greatly facilitates such transfers. Eligible students may also enroll in the five-year B.S./M.S. degree program (see Graduate Programs). In the last part of the student's program, there are two options (tracks) to allow choice of some advanced coursework in either the polymer or the fiber area.

## PROGRAM EDUCATIONAL OBJECTIVES

The following Program Educational Objectives were established to assist in attaining the visions and missions of the Georgia Institute of Technology and its College of Engineering and to be consistent with ABET Criteria for Accrediting Engineering Programs.

The Program Educational Objectives of the Bachelor of Science in Polymer and Fiber Engineering program are:

- To produce graduates who have successful careers in the polymer and fiber engineering field in industry, academia, and government and
- To produce graduates who are successful in advanced study, and
- To produce graduates capable of functioning effectively in the global arena.

## B.S. POLYMER AND FIBER ENGINEERING - ACCREDITATION

The B.S. in Polymer and Fiber Engineering program is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012 - telephone: (410) 347-7700.

## BACHELOR OF SCIENCE IN POLYMER AND FIBER ENGINEERING

The B.S. in Polymer and Fiber Engineering prepares all students for careers in the polymer and fiber arena. At the upper level, students choose to take advance coursework and concentrate in either the polymer track or the fiber track.

### POLYMER TRACK

The Polymer Track deals with the chemistry and properties of polymeric materials and the manufacturing of polymer-based products. Students are exposed to all aspects of fundamental polymer science and engineering, are trained to handle relevant unit operations (e.g., polymer extrusion), and address issues involving polymer chemistry. In this program, students enjoy further flexibility by tailoring their degree to a specific area of interest using seven hours of approved elective hours. With these approved hours, students may take additional courses within the School of Polymer, Textile and Fiber Engineering or work towards one of the numerous certificates offered by other schools on campus.

Since most of the polymer/fiber coursework is concentrated in the last two years of the programs, students from junior and community colleges can readily transfer into the School of Polymer, Textile and Fiber Engineering. The Regents' Engineering Transfer Program (RETP) greatly facilitates such transfers. Eligible students may also enroll in the five-year B.S./M.S. degree program.

### FIBER TRACK

The Fiber Track is multidisciplinary, with emphasis on design, development, and implementation of systems for fiber production, handling, and conversion into various value-added products. In this program, students enjoy further flexibility by tailoring their degree to a specific area of interest using six hours of approved elective hours. With these approved hours, students may work towards one of the numerous certificates offered by other schools on campus. Alternatively, they can take additional courses within the School of Polymer, Textile and Fiber Engineering to expand their expertise in polymer, fiber and fabricated products specialty interest areas.

Since most of the polymer/fiber coursework is concentrated in the last two years of the programs, students from junior and community colleges can readily transfer into the School of Polymer, Textile and Fiber Engineering. The Regents' Engineering Transfer Program (RETP) greatly facilitates such transfers. Eligible students may also enroll in the five-year B.S./M.S. degree program.

## PROGRAM EDUCATIONAL OBJECTIVES

The following Program Educational Objectives were established to assist in attaining the visions and missions of the Georgia Institute of Technology and its College of Engineering, and to be consistent with ABET Criteria for Accrediting Engineering Programs.

The Program Educational Objectives of the Bachelor of Science in Polymer and Fiber Engineering program are:

1. To produce graduates who have successful careers in the polymer and fiber engineering field in industry, academia, and government;
2. To produce graduates who are successful in advanced study; and
3. To produce graduates capable of functioning effectively in the global arena.

## PROGRAM OUTCOMES

The Program Outcomes (POs) for the BSPFE program reflect the skills that the students will have obtained by the time of graduation from the program. The POs are:

- an ability to solve polymer and fiber engineering problems by applying knowledge of mathematics, sciences, and engineering;
- an ability to design and conduct experiments and to analyze and interpret data;
- an integrated understanding of the scientific and engineering principles underlying the four major elements of polymer and fiber engineering: structure, properties, processing, and performance related to polymer and fiber systems;
- an ability to apply and integrate knowledge of the structure, properties, processing, and performance of polymers and fibers to solve materials selection and design problems;
- an ability to design a system, component, or process to specified performance objectives and needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- an ability to function effectively on multidisciplinary teams;
- an ability to identify, formulate, and solve polymer and fiber engineering problems;
- an understanding of professional and ethical responsibilities as a polymer and fiber engineer;
- an ability to communicate effectively in both written reports and oral presentations;
- a broad understanding of the impact of polymer and fiber engineering solutions in a global, economic, environmental, and societal context;
- a recognition of the need for, and the ability to engage in, life-long learning;
- a knowledge of contemporary issues; and
- an ability to solve polymer and fiber engineering problems in practice by using modern engineering techniques, skills, and tools such as experimental, statistical, and computational methods.

# BACHELOR OF SCIENCE IN POLYMER AND FIBER ENGINEERING
## FIBER TRACK
## 2008 - 2009 DEGREE REQUIREMENTS
### SCHOOL OF POLYMER, TEXTILE AND FIBER ENGINEERING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| MATH 1501 CALCULUS I | 4 |
| CHEM 1310 GENERAL CHEMISTRY | 4 |
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| CS 1371 COMPUTING FOR ENGINEERS | 3 |
| PTFE 1100 INTRODUCTION TO THE POLYMER, FIBER, TEXTILE, & FABRICATED PRODUCTS ENTERPRISES | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **17** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| MATH 1502 CALCULUS II | 4 |
| CHEM 1311 INORGANIC CHEMISTRY I | 3 |
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| ECON 2100 or 2105 or 2106 | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-FALL | HRS |
|---|---|
| MATH 2403 DIFFERENTIAL EQUATIONS | 4 |
| PHYS 2212 INTRODUCTORY PHYSICS II | 4 |
| COE 2001 STATICS | 2 |
| CHEM 1315 SURVEY OF ORGANIC CHEMISTRY | 3 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| MATH 2401 CALCULUS III | 4 |
| ME 3322 THERMODYMANICS or CHEM 3411 PHYSICAL CHEMISTRY I | 3 |
| COE 3001 MECHANICS OF DEFORMABLE BODIES | 3 |
| PTFE 2200 STRUCTURE & PROPERTIES OF FIBERS & POLYMERS | 3 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-FALL | HRS |
|---|---|
| MSE 2001 PRINCIPLES & APPLICATIONS OF ENGINEERING MATERIALS | 3 |
| ECE 3710 CIRCUITS & ELECTRONICS | 2 |
| PTFE 4775 POLYMER SCIENCE & ENGINEERING I | 3 |
| ME 3340 FLUID MECHANICS | 3 |
| CEE / MATH / ISYE 3770 STATISTICS & APPLICATIONS | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| PTFE 3200 YARN & FABRIC FORMATION | 3 |
| PTFE 3221 TEXTILE FORMATION & TESTING | 2 |
| PTFE 4776 POLYMER SCIENCE & ENGINEERING II | 3 |
| PTFE 3230 POLYMER & FIBER PROCESSING | 3 |
| ECE 3741 INSTRUMENTATION & ELECTRONICS LAB | 1 |
| ISYE 3025 ESSENTIALS OF ENGINEERING ECONOMY | 1 |
| PTFE 3210 FUNDAMENTALS OF TRANSPORT | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| APPROVED ELECTIVE | 3 |

| | |
|---|---|
| PTFE 4100 CHEMICAL PROCESSING OF TEXTILE MATERIALS | 2 |
| PTFE 4122 TEXTILE CHEMISTRY LAB | 1 |
| PTFE 4110 POLYMER & FIBER ENGINEERING DESIGN I | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| ETHICS ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-SPRING | HRS |
|---|---|
| PTFE 4210 POLYMER & FIBER ENGINEERING DESIGN II | 3 |
| PTFE 4761 INDUSTRIAL CONTROLS & MANUFACTURING | 3 |
| PTFE 3220 TEXTILE OPERATIONS & MANAGEMENT METHODS | 3 |
| HUMANITIES ELECTIVE | 3 |
| APPROVED ELECTIVES | 4 |
| **TOTAL SEMESTER HOURS =** | **16** |

**TOTAL PROGRAM HOURS = 127 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

# BACHELOR OF SCIENCE IN POLYMER AND FIBER ENGINEERING
## POLYMER TRACK
## 2008 - 2009 DEGREE REQUIREMENTS
### SCHOOL OF POLYMER, TEXTILE AND FIBER ENGINEERING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| MATH 1501 CALCULUS I | 4 |
| CHEM 1310 GENERAL CHEMISTRY | 4 |
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| CS 1371 COMPUTING FOR ENGINEERS | 3 |
| PTFE 1100 INTRODUCTION TO THE POLYMER, FIBER, TEXTILE, & FABRICATED PRODUCTS ENTERPRISES | 1 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **17** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| MATH 1502 CALCULUS II | 4 |
| CHEM 1311 INORGANIC CHEMISTRY I | 3 |
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| ECON 2100 or 2105 or 2106 | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-FALL | HRS |
|---|---|
| MATH 2403 DIFFERENTIAL EQUATIONS | 4 |
| PHYS 2212 INTRODUCTORY PHYSICS II | 4 |
| COE 2001 STATICS | 2 |
| CHEM 2311 ORGANIC CHEMISTRY I | 3 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| MATH 2401 CALCULUS III | 4 |
| CHEM 3411 PHYSICAL CHEMISTRY I | 3 |
| COE 3001 MECHANICS OF DEFORMABLE BODIES | 3 |
| PTFE 2200 STRUCTURE & PROPERTIES OF FIBERS & POLYMERS | 3 |
| CHEM 2312 ORGANIC CHEMISTRY II | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| MSE 2001 PRINCIPLES & APPLICATIONS OF ENGINEERING MATERIALS | 3 |
| ECE 3710 CIRCUITS & ELECTRONICS | 2 |
| PTFE 4775 POLYMER SCIENCE & ENGINEERING I | 3 |
| ISYE 3025 ESSENTIALS OF ENGINEERING ECONOMY | 1 |
| ME 3340 FLUID MECHANICS | 3 |
| CEE / MATH / ISYE 3770 STATISTICS & APPLICATIONS | 3 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| SOCIAL SCIENCE ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| PTFE 3210 FUNDAMENTALS OF TRANSPORT | 3 |
| PTFE 4776 POLYMER SCIENCE & ENGINEERING II | 3 |
| PTFE 3230 POLYMER & FIBER PROCESSING | 3 |
| ECE 3741 INSTRUMENTATION & ELECTRONICS LAB | 1 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| APPROVED ELECTIVES | 4 |

| | |
|---|---|
| PTFE 4140 POLYMER SOLUTIONS & SURFACES | 3 |
| PTFE 4141 POLYMER CHARACTERIZATION | 4 |
| PTFE 4110 POLYMER & FIBER ENGINEERING DESIGN I | 3 |
| **TOTAL SEMESTER HOURS =** | **14** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| PTFE 4210 POLYMER & FIBER ENGINEERING DESIGN II | 3 |
| PTFE 4761 INDUSTRIAL CONTROLS & MANUFACTURING | 3 |
| ETHICS ELECTIVE | 3 |
| APPROVED ELECTIVES | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

**TOTAL PROGRAM HOURS = 127 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

# ELECTIVES

## WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

## HUMANITIES/SOCIAL SCIENCES/MODERN LANGUAGES ELECTIVES

A total of twelve credit hours of humanities and twelve credit hours of social sciences are required. Humanities consists of ENGL 1101, ENGL 1102, a three-hour humanities elective, and an ethics course (PST 3105, 3109, 3127, or 4176). Social sciences consists of a U.S. history/ government course (HIST 2111, HIST 2112, POL 1101, PUBP 3000, or INTA 1200), ECON 2100, and six hours of general social science.

## ETHICS

The following courses have been approved by the School of Electrical and Computer Engineering to satisfy the ethics requirement for the electrical engineering and computer engineering programs. Courses used to satisfy the ethics requirement also count as part of the appropriate elective category. Other courses may be approved in the future and will be added to this list.

### Humanities:

- LCC 3318 - Biomedicine and Culture
- PST 3105 - Ethical Theories
- PST 3109 - Ethics and Technical Professions
- PST 3127 - Science, Technology, and Human Values
- PST 4176 - Environmental Ethics

### Social Sciences:

- HTS 2084 - Technology and Society
- INTA 2030 - Ethics and International Affairs
- HTS 3032 - Modern European Intellectual History

### Other:

- CS 4001 - Computing, Society, and Professionalism
- PUBP 3600 - Sustainability, Technology, and Policy
- CS 4002 - Robots and Society

## APPROVED ELECTIVES

Students can tailor their degree to obtain hours towards a concentration, certificate, or minor offered at Georgia Tech through the approved electives. A student's academic advisor can help develop the plan for these elective hours during the academic advisement time or by appointment. The faculty academic advisor approves the plan for these electives.

## B.S. POLYMER AND FIBER ENGINEERING - COOPERATIVE PLAN

A significant number of students majoring in Polymer, Textile and Fiber Engineering participate in Georgia Tech's Undergraduate Cooperative Education, Undergraduate Professional Internship and Work Abroad programs. The Division of Professional Practice is the home of these programs. For more information please go to: www.profpractice.gatech.edu/

## B.S./M.S. POLYMER, TEXTILE AND FIBER ENGINEERING - FIVE-YEAR

Current undergraduate students may participate in the five-year B.S./M.S. program offered by the School of Polymer, Textile and Fiber Engineering. Qualified students are allowed to use up to six credit hours of graduate-level coursework in the major discipline for both degrees. Georgia Tech undergraduate students may be admitted into the program upon completion of thirty semester credit hours at Georgia Tech and attaining a GPA of 3.5 or higher. Students must maintain a 3.0 GPA to continue in the program.

## MINOR AND CERTIFICATE PROGRAMS FOR NON-MAJORS

The School offers two certificate programs and one minor program. A substantial number of students graduating in other majors at Georgia Tech enter the Polymer, Fiber, Textile Fabricated Products (PFTFP) industry. Minor and certificate programs have been implemented in Polymer/Fiber Enterprise Management. The certificate program is designed to impart basic understanding of polymer/fiber materials, as well as an understanding of their manufacturing processes. The Minor in Polymer/Fiber Enterprise Management is designed to provide more in-depth understanding of polymer/fiber materials and their manufacturing processes through a combination of required and elective courses. Attainment of the certificate requires twelve credit hours of specified courses. Attainment of a minor requires nineteen credit hours of specified courses. Both the certificate and minor programs draw on some of the courses taught for the School's undergraduate degree program. Requirements for the minor and certificate programs are available in the School's main office or at www.ptfe.gatech.edu.

The School also offers a multidisciplinary certificate program in Polymer Engineering and Polymers. The objective of the Polymers Certificate Program is to provide students with a structured program for an in-depth study of polymers. Programs of study will be structured to meet the needs and to fit the background of individual students. Required courses will cover the areas of polymer production, polymer chemistry, measurement of polymer structure and properties, and polymer processing. Opportunities are available for independent research. The certificate program requires six credit hours of specified courses and six hours of electives selected from a list of courses. The director of undergraduate affairs acts as advisor for all certificate and minor programs.

## MASTER OF SCIENCE IN POLYMERS

The School of Polymer, Textile and Fiber Engineering offers a graduate programs leading to the degree Master of Science in Polymers. The school offers two tracks; the Polymer Materials Science track, and the Polymer Chemistry track. Students holding an undergraduate degree in any one of several fields of science or engineering may qualify for admission. The School participates in the Graduate Course Option Program.

The M.S. and Ph.D. programs encompass advanced study and research in such broad areas as: advanced polymer characterization techniques, biomedical applications of polymers, functional polymers and systems, modeling and simulation, nano-structured polymers and nanocomposites, polymer processing (including micro- and nano-fabrication), polymer synthesis and characterization, sustainability and polymer recycling.

For Ph.D. and M.S. program requirements, please refer to the PTFE Web site at www.ptfe.gatech.edu.

## MASTER OF SCIENCE IN POLYMER, TEXTILE AND FIBER ENGINEERING

The School of Polymer, Textile and Fiber Engineering offers a graduate program leading to a Master of Science degree in Polymer, Textile and Fiber Engineering. Students with a bachelor's degree in engineering, chemistry, or science may be accepted into the M.S. program. Students in the M.S. program may take the thesis option or non-thesis option. The School participates in the Graduate Courses Option Program.

The M.S. and Ph.D. programs encompass advanced study and research in such broad areas as: advanced polymer characterization techniques, biomedical applications of polymers, functional polymers and systems, modeling and simulation, nano-structured polymers and nanocomposites, polymer processing (including micro- and nano-fabrication), polymer synthesis and characterization, sustainability and polymer recycling.

For Ph.D. and M.S. program requirements, please refer to the PTFE Web site at www.ptfe.gatech.edu.

## B.S./M.S. POLYMER, TEXTILE AND FIBER ENGINEERING - FIVE-YEAR

Current undergraduate students may participate in the five-year B.S./M.S. program offered by the School of Polymer, Textile and Fiber Engineering. Qualified students are allowed to use up to six credit hours of graduate-level coursework in the major discipline for both degrees. Georgia Tech undergraduate students may be admitted into the program upon completion of thirty semester credit hours at Georgia Tech and attaining a GPA of 3.5 or higher. Students must maintain a 3.0 GPA to continue in the program.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN POLYMER, TEXTILE AND FIBER ENGINEERING

The School of Polymer, Textile and Fiber Engineering offers a Doctor of Philosophy. Students holding an undergraduate or master's degree in any one of several fields of science or engineering may qualify for admission. Each student pursues an individually structured program. The School participates in the Graduate Course Option Program.

The Ph.D. programs encompass advanced study and research in such broad areas as: advanced polymer characterization techniques, biomedical applications of polymers, functional polymers and systems, modeling and simulation, nano-structured polymers and nanocomposites, polymer processing (including micro- and nano-fabrication), polymer synthesis and characterization, sustainability, and polymer recycling.

For Ph.D. and M.S. program requirements, please refer to the PTFE Web site at www.ptfe.gatech.edu

# COLLEGE OF ENGINEERING

## SCHOOL OF AEROSPACE ENGINEERING

Bachelor of Science in Aerospace Engineering

Additional Options:

Cooperative Plan

International Plan

Research Option

B.S./M.S.A.E. - Five-year

B.S./M.S.A.E. - Five-year

Master of Science in Aerospace Engineering

Master of Science in Computational Science and Engineering

Doctor of Philosophy with a Major in Aerospace Engineering

Doctor of Philosophy with a Major in Computational Science and Engineering

Doctor of Philosophy with a Major in Robotics

## SCHOOL OF CHEMICAL AND BIOMOLECULAR ENGINEERING

Bachelor of Science in Chemical and Biomolecular Engineering

Additional Options:

Cooperative Plan

Biotechnology Option

Research Option

B.S./M.S.C.H.B.E. - Five-year

B.S./M.S.C.H.B.E. - Five-year

Master of Science in Bioengineering

Master of Science in Chemical Engineering

Master of Science in Paper Science and Engineering

Master of Science in Polymers

Master of Science with a Major in Chemical Engineering

Doctor of Philosophy with a Major in Bioengineering

Doctor of Philosophy with a Major in Chemical Engineering

Doctor of Philosophy with a Major in Paper Science and Engineering

## SCHOOL OF CIVIL & ENVIRONMENTAL ENGINEERING

Bachelor of Science in Civil Engineering

Additional Options:

Cooperative Plan

International Plan

Research Option

Bachelor of Science in Civil Engineering - Regional Engineering Program

Additional Options:

Cooperative Plan

International Plan

Research Option

Bachelor of Science in Environmental Engineering

Additional Options:

Cooperative Plan

International Plan

Research Option

B.S./M.S.C.E. - Five-year

B.S./M.S.C.E. - Five-year

Master of Science in Bioengineering

Master of Science in Civil Engineering

Additional Options:

GT Savannah

Master of Science in Computational Science and Engineering

Master of Science in Engineering Science and Mechanics

Master of Science in Environmental Engineering

Additional Options:

GT Savannah

Master of Science with a Major in Civil Engineering

Master of Science with a Major in Environmental Engineering

Doctor of Philosophy with a Major in Bioengineering

Doctor of Philosophy with a Major in Civil Engineering

Additional Options:

GT Savannah

Doctor of Philosophy with a Major in Computational Science and Engineering

Doctor of Philosophy with a Major in Engineering Science and Mechanics

Doctor of Philosophy with a Major in Environmental Engineering

Additional Options:

GT Savannah

## SCHOOL OF ELECTRICAL & COMPUTER ENGINEERING

Bachelor of Science in Computer Engineering

Additional Options:

Cooperative Plan

International Plan

Research Option

Bachelor of Science in Computer Engineering - Regional Engineering Program

Additional Options:

Cooperative Plan

International Plan

Research Option

Bachelor of Science in Electrical Engineering

Additional Options:

Cooperative Plan

International Plan

Research Option

Bachelor of Science in Electrical Engineering - Regional Engineering Program

Additional Options:

Cooperative Plan

International Plan

Research Option

B.S./M.S. E.C.E. - Five-year

B.S./M.S. E.C.E. - Five-year

Master of Science in Bioengineering

Master of Science in Electrical and Computer Engineering

Additional Options:

GT Lorraine

GT Savannah

Dual Degrees:

Dual GT Lorraine and European partner universities

Dual with Shanghai Jiao Tong University (SJTU)

Dual with The Politecnico di Torino (ITALY)

Master of Science with a Major in Electrical and Computer Engineering

Additional Options:

GT Savannah

GT Lorraine

Doctor of Philosophy with a Major in Bioengineering

Doctor of Philosophy with a Major in Electrical and Computer Engineering

Additional Options:

- GT Lorraine
- GT Savannah

Doctor of Philosophy with a Major in Robotics

## SCHOOL OF INDUSTRIAL & SYSTEMS ENGINEERING

Bachelor of Science in Industrial Engineering

Additional Options:

- Cooperative Plan
- International Plan

B.S./M.S. I.S.Y.E. - Five-year

B.S./M.S. I.S.Y.E. - Five-year

Master of Science in Computational Science and Engineering

Master of Science in Health Systems

Master of Science in Industrial Engineering

Options:

- Human Integrated Systems Track
- Manufacturing and Logistics Track

Master of Science in International Logistics

Master of Science in Operations Research

Master of Science in Quantitative and Computational Finance

Master of Science in Statistics

Doctor of Philosophy with a Major in Algorithms, Combinatorics, Optimization

Doctor of Philosophy with a Major in Bioinformatics

Doctor of Philosophy with a Major in Computational Science and Engineering

Doctor of Philosophy with a Major in Industrial Engineering

Additional Options:

- Applied Statistics Track
- Economic Decision Analysis Track
- Human-Integrated Systems Track
- Manufacturing / Logistics Track
- Optimization Track
- Stochastic Systems Track

Doctor of Philosophy with a Major in Operations Research

## SCHOOL OF MATERIALS SCIENCE & ENGINEERING

Bachelor of Science in Materials Science and Engineering

Additional Options:

- Cooperative Plan
- Research Option

B.S./M.S.M.S.E. - Five-year

B.S./M.S.M.S.E. - Five-year

Master of Science in Materials Science and Engineering

Master of Science in Paper Science and Engineering

Master of Science in Bioengineering

Master of Science in Polymers

Master of Science with a Major in Materials Science and Engineering

Doctor of Philosophy with a Major in Materials Science and Engineering

Doctor of Philosophy with a Major in Paper Science and Engineering

Doctor of Philosophy with a Major in Bioengineering

## SCHOOL OF MECHANICAL ENGINEERING

Bachelor of Science in Mechanical Engineering

Additional Options:

Cooperative Plan

International Plan

Bachelor of Science in Mechanical Engineering - Regional Engineering Program

Additional Options:

Cooperative Plan

International Plan

Bachelor of Science in Nuclear and Radiological Engineering

Additional Options:

Cooperative Plan

B.S./M.S.M.E. - Five-year

B.S./M.S.M.E. - Five-year

Master of Science in Bioengineering

Master of Science in Mechanical Engineering

Additional Options:

GT Savannah

Master of Science in Medical Physics

Master of Science in Nuclear Engineering

Master of Science in Paper Science and Engineering

Doctor of Philosophy with a Major in Bioengineering

Doctor of Philosophy with a Major in Mechanical Engineering

Additional Options:

GT Savannah

Doctor of Philosophy with a Major in Nuclear and Radiological Engineering

Additional Options:

Medical Physics

Doctor of Philosophy with a Major in Paper Science and Engineering

Doctor of Philosophy with a Major in Robotics

## SCHOOL OF POLYMER, TEXTILE & FIBER ENGINEERING

Bachelor of Science in Polymer and Fiber Engineering

Additional Options:

Cooperative Plan

B.S./M.S.P.T.F.E. - Five-year

B.S./M.S.P.T.F.E. - Five-year

Master of Science in Polymers

Master of Science in Polymer, Textile and Fiber Engineering

Doctor of Philosophy with a Major in Polymer, Textile and Fiber Engineering

## GT/EMORY DEPARTMENT OF BIOMEDICAL ENGINEERING

Bachelor of Science in Biomedical Engineering

Additional Options:

Cooperative Plan

International Plan

Research Option

Master of Science in Computational Science and Engineering

Doctor of Philosophy with a Major in Biomedical Engineering

Doctor of Philosophy with a Major in Bioengineering

Doctor of Philosophy with a Major in Bioinformatics

Doctor of Philosophy with a Major in Computational Science and Engineering

Doctor of Philosophy with a Major in Robotics

## GT SAVANNAH - REGIONAL ENGINEERING PROGRAM

Bachelor of Science in Civil Engineering - Regional Engineering Program

Bachelor of Science in Computer Engineering - Regional Engineering Program

Bachelor of Science in Electrical Engineering - Regional Engineering Program

Bachelor of Science in Mechanical Engineering - Regional Engineering Program

Master of Science in Bioengineering (GT Savannah)
Master of Science in Civil Engineering (GT Savannah)
Master of Science in Environmental Engineering (GT Savannah)
Master of Science in Electrical and Computer Engineering (GT Savannah)
Master of Science in Mechanical Engineering (GT Savannah)
Doctor of Philosophy with a Major in Bioengineering (GT Savannah)
Doctor of Philosophy with a Major in Civil Engineering (GT Savannah)
Doctor of Philosophy with a Major in Environmental Engineering (GT Savannah)
Doctor of Philosophy with a Major in Electrical & Computer Engineering (GT Savannah)
Doctor of Philosophy with a Major in Mechanical Engineering (GT Savannah)

## GEORGIA TECH-SAVANNAH

Established in 1998
Location: 210 Technology Circle
Savannah, GA 31407
Telephone: 912.966.7922
Fax: 912.966.7836
Web site: www.gtsav.gatech.edu

### GENERAL INFORMATION

Initiated in 1998 with the offering of undergraduate degrees through the Georgia Tech Regional Engineering Program (GTREP), Georgia Tech-Savannah was created to unite education, industry, and technology in Georgia's Southeast region. Continuing Georgia Tech's tradition of excellence in academics, research, and community outreach, the Savannah campus also offers robust graduate degree programs and professional education courses. Cutting-edge research facilities house the academic programs as well as the regional office of the Georgia Tech Enterprise Innovation Institute, the Savannah Advanced Technology Development Center (ATDC), and the Maritime Logistics Innovation Center (MLIC).

## FACULTY

### Director of Georgia Tech-Savannah, Vice Provost, and Professor

J. David Frost

### CEE Associate Chair and Associate Professor

Paul Work

### ECE Associate Chair and Professor

Monson H. Hayes

### ME Associate Chair and Professor

Farrokh Mistree

### Professors

Janet K. Allen

### Associate Professors

Christopher F. Barnes, Hermann M. Fritz, Rafi L. Muhanna, David W. Scott, Yichang (James) Tsai, P. Douglas Yoder

### Assistant Professors

Ghassan Al-Regib, Seung-Kyum Choi, Francesco Fedele, Kevin A. Haas, Jongman Kim, Benjamin D. B. Klein, Elliot Moore II, Dirk Schaefer, Hongwei Wu, Fumin Zhang, Ying Zhang

### Professor of the Practice

Stanley D. Lindsey

## GEORGIA TECH-SAVANNAH ACCREDITATION STATEMENT

The following undergraduate engineering programs are accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012 - Telephone number: (410) 347-7700:

- Bachelor of Science in Civil Engineering - Regional Engineering Program (offered through Georgia Tech-Savannah)
- Bachelor of Science in Computer Engineering - Regional Engineering Program (offered through Georgia Tech-Savannah)

The following undergraduate engineering programs are not currently accredited by the Engineering Accreditation Commission of ABET:

- Bachelor of Science in Electrical Engineering - Regional Engineering Program (offered through Georgia Tech-Savannah)
- Bachelor of Science in Mechanical Engineering - Regional Engineering Program (offered through Georgia Tech-Savannah)

# GEORGIA TECH-SAVANNAH CAMPUS UNDERGRADUATE PROGRAMS

## GENERAL INFORMATION

The Savannah campus of Georgia Tech offers courses leading to the degrees Bachelor of Science in Civil Engineering, Bachelor of Science in Computer Engineering, Bachelor of Science in Electrical Engineering, and Bachelor of Science in Mechanical Engineering. Students may enter into these undergraduate degree programs via a number of different paths including as a direct admit transfer student from any institution to Georgia Tech, through a dual degree program offered with Armstrong Atlantic State University, or through the Georgia Tech Regional Engineering Program (GTREP). Details of these options by which students can enter into the academic programs are outlined below.

The curricula for the undergraduate programs are the same as those in their corresponding academic units in Atlanta and are presented elsewhere in the Civil and Environmental Engineering, Electrical and Computer Engineering, and Mechanical Engineering sections of this catalog.

The cornerstone of campus activities is the use of technology-enhanced classrooms and studios that allow seamless collaboration between the campuses of Georgia Tech — from classroom instruction and research projects to guest lectures and student organizations. Students are also offered many opportunities for hands-on learning while they complete their degree programs, ranging from undergraduate research projects and internships to Georgia Tech's world-renowned Cooperative Program.

The Regional Engineering Program designation is used for all undergraduate degree programs offered through the Georgia Tech-Savannah campus, irrespective of the path by which a student is admitted. In order to receive the Cooperative Plan designation, a student must be admitted to the Division of Professional Practice and complete a minimum of three work sessions, at least two of which must be undertaken during the fall or spring semesters. The Cooperative Plan normally requires an additional year for completion.

### Georgia Tech-Savannah Campus Undergraduate Programs – Transfer Program

Students who have completed sixty semester hours of college coursework may apply for transfer admission into the undergraduate degree programs offered on the Savannah campus of Georgia Tech. Students in the transfer program are taught by Savannah-based Georgia Tech faculty, complemented by distance instruction from the Georgia Tech Atlanta campus.

### Georgia Tech-Savannah Campus Undergraduate Programs – Dual Degree Program with AASU

The Georgia Tech-Savannah / Armstrong Atlantic State University Partnership Program has been created to provide a unique dual degree opportunity for students applying to Georgia Tech to take courses at Armstrong Atlantic State University for the first two years of their engineering degree program in conjunction with Georgia Tech's Savannah campus. This partnership provides the best of both campuses for students seeking the finest in engineering education, but looking for a smaller community and more personalized, hands-on instruction.

This program is distinct from the statewide Regents' Engineering Transfer Program and the Georgia Tech Regional Engineering Program. These programs both require participants to enroll at a partner institution for approximately two years before enrolling as a Tech student in the junior year. This new dual degree partnership program offers admission to both Armstrong Atlantic State University and Georgia Tech-Savannah as freshmen.

During the first two years, students will take courses from both AASU and Georgia Tech-Savannah faculty and have the opportunity to participate in co-curricular activities such as the Georgia Tech cooperative engineering program. Campus housing and financial aid will be available through AASU. At the end of the sophomore year, and upon successful completion of the degree requirements, students will receive an Associate of Science degree from AASU (final approval of this degree is pending at the Board of Regents of the University System of Georgia). The remainder of the program will be focused on completing the degree requirements for a Bachelor of Science degree in engineering from Georgia Tech.

### Georgia Tech-Savannah Campus Undergraduate Programs – Regional Engineering Program

The Regional Engineering Program (GTREP) is operated under a formal academic collaboration between Georgia Tech and three partner institutions: Armstrong Atlantic State University and Savannah State University in Savannah, Georgia and Georgia Southern University in Statesboro, Georgia.

During the freshman and sophomore years of the undergraduate degree program, students are enrolled at one of the three partner institutions. These universities offer all of the humanities, mathematics, and science courses and some of the engineering courses required in the first two years of the Georgia Tech engineering curricula. Prior to their junior year, students apply for transfer admission to Georgia Tech and complete their degree program as a Georgia Tech-Savannah student. Students are taught by Savannah-based Georgia Tech faculty, complemented by distance instruction from the other Georgia Tech campuses.

### B.S. IN CIVIL ENGINEERING - REGIONAL ENGINEERING PROGRAM ACCREDITATION

The B.S. in Civil Engineering - Regional Engineering Program program offered through Georgia Tech-Savannah is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012 - telephone: (410) 347-7700.

## BACHELOR OF SCIENCE IN CIVIL ENGINEERING - REGIONAL ENGINEERING PROGRAM

The four-year curriculum leading to the Bachelor of Science in Civil Engineering (B.S.C.E.) enables the graduate to enter professional practice as an engineer or to continue his or her studies in programs leading to advanced degrees in the following broad fields of specialization: construction engineering and management, environmental engineering, environmental hydraulics, geotechnical engineering, hydrology, materials, structural engineering and mechanics, transportation, and water resources planning and management. The B.S.C.E. degree program is designed to offer depth in course material considered essential for all civil engineers, as well as flexibility in selecting elective courses that offer breadth of topic exposure. Civil engineers contribute to society in numerous ways; thus, the School's philosophy is to provide the student with a range of electives that meet student interests. Civil engineers must not only be technically proficient, but also must be effective in working with people and with professionals in other disciplines.

The course requirements of the B.S.C.E. degree are listed in the Degree Requirements page. Although students are not obligated to take the courses during the semester indicated, they must satisfy all prerequisites for a particular course. In addition to campus-wide academic requirements for graduation with a bachelor's degree, the following are also required for the B.S.C.E. degree:

A *C* or better must have been earned in MATH 1501-1502, PHYS 2211, CHEM 1310, and COE 2001.

The number of quality points earned in CEE courses taken toward the degree must be at least twice the number of credit hours in those courses. If a course is repeated, the latest grade will be included in applying this rule. No CEE course may be repeated for the purpose of satisfying this rule if the original grade was a *C* or higher.

## PROGRAM OBJECTIVES

A. Graduates will be technically competent. This includes having the ability to analyze and solve civil engineering problems by applying basic principles of mathematics, science, and engineering. Graduates will be able to use modern engineering techniques, skills, and tools to identify, formulate, and solve civil engineering problems.

B. Graduates will be able to apply the knowledge and skills from a broad education in order to understand the impact of civil engineering solutions in a global, societal, and environmental context consistent with the principles of sustainable development.

C. Graduates will be prepared for professional practice in civil engineering. Graduates will demonstrate an understanding of ethical, societal, and professional responsibility; will recognize the limits of their knowledge and initiate self-directed learning opportunities; and will be able to function and communicate effectively individually and within multidisciplinary teams.

# BACHELOR OF SCIENCE IN CIVIL ENGINEERING
## REGIONAL ENGINEERING PROGRAM
## 2008 - 2009 DEGREE REQUIREMENTS
### SCHOOL OF CIVIL AND ENVIRONMENTAL ENGINEERING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| MATH 1501 CALCULUS I | 4 |
| CHEM 1310 GENERAL CHEMISTRY | 4 |
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| CS 1371 COMPUTING FOR ENGINEERS | 3 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| MATH 1502 CALCULUS II | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| CEE 1770 ENGINEERING GRAPHICS & VISUALIZATION | 3 |
| HUMANITIES ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-FALL | HRS |
|---|---|
| MATH 2401 CALCULUS III | 4 |
| PHYS 2212 INTRODUCTORY PHYSICS II | 4 |
| CEE 2300 ENVIRONMENTAL ENGINEERING PRINCIPLES | 3 |
| ECON 2100 or 2105 or 2106 | 3 |
| COE 2001 STATICS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| MATH 2403 DIFFERENTIAL EQUATIONS | 4 |
| BIOL 1510 or BIOL1520 or EAS2600 | 4 |
| CEE 2040 DYNAMICS | 2 |
| CEE 3000 CIVIL ENGINEERING SYSTEMS | 3 |
| PST 3105 or 3109 or 3127 (Ethics Elective) | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| CEE 3040 FLUID MECHANICS | 3 |
| CEE 3020 CIVIL ENGINEERING MATERIALS | 3 |
| COE 3001 MECHANICS OF DEFORMABLE BODIES | 3 |
| MSE 3000 or ME 3322 or CHBE 2110 (COE Elective-Group A) | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| CEE 3055 or 4100 or 4200 or 4300 or 4405 or 4600 (Breadth Electives) * | 12 |
| CEE/MATH/ISYE 3770 STATISTICS & APPLICATIONS | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CEE TECHNICAL ELECTIVES | 9 |
| APPROVED ELECTIVE | 3 |
| MSE 2001 or ECE 2025 or (ECE 3710 & 3741)<br>(COE Technical Elective-Group B) | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-SPRING | HRS |
|---|---|
| CEE TECHNICAL ELECTIVES | 6 |

| | |
|---|---|
| SOCIAL SCIENCE ELECTIVE (3000 or 4000 Level) | 3 |
| CEE 4090 CEE CAPSTONE DESIGN | 3 |
| APPROVED ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

**TOTAL PROGRAM HOURS = 126 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

*

at least one of the four courses must include a physical laboratory section, i.e. CEE 4200 and CEE 4405.

## ELECTIVES

### WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

### HUMANITIES/SOCIAL SCIENCES

A total of twelve credit hours of humanities and twelve credit hours of social sciences are required. The humanities requirement consists of ENGL 1101, ENGL 1102, a three-hour humanities elective*, and an ethics course: PST 3105, 3109, or 3127. The social science requirement consists of a United States history/government course, economics (ECON 2100, ECON 2105, or ECON 2106), and six hours of general social science. All courses taken to satisfy humanities and social sciences must be taken on a letter-grade basis. To satisfy the state requirements regarding coursework in the history and constitutions of the United States and Georgia, students must complete one of the following courses: HIST 2111, HIST 2112, POL 1101, INTA 1200, or PUBP 3000.

### BREADTH ELECTIVES

Select four (4) Breadth Elective courses from the following list (at least one of the four courses must include a physical laboratory section, i.e. CEE4200 and CEE4405)

CEE 3055 Structural Analysis
CEE 4100 Construction Engineering and Management
CEE 4200 Hydraulic Engineering
CEE 4300 Environmental Engineering Systems
CEE 4405 Geotechnical Engineering
CEE 4600 Transportation Planning, Operations and Design

### TECHNICAL ELECTIVES

There are fifteen hours of elective credit that students may use to pursue a specific area of interest within civil engineering. A maximum of six hours, with faculty approval, may be chosen from outside the School of Civil Engineering. Select five Technical Elective courses from the following list:

The fifth and sixth courses on the Breadth Elective List (CEE 3055, CEE 4100, CEE 4200, CEE 4300, CEE 4405, or CEE 4600)
CEE 3010 Geomatics
CEE 3340 Environmental Engineering Laboratory
CEE 4110 Construction Planning, Estimating, and Scheduling
CEE 4120 Construction Operations
CEE 4210 Hydrology
CEE 4225 Introduction to Coastal Engineering
CEE 4230 Environmental Transport Modeling
CEE 4310 Water Quality Engineering
CEE 4320 Hazardous Substance Engineering
CEE 4330 Air Pollution Engineering
CEE 4390 Environmental Engineering / Water Resources Design
CEE 4395 Environmental Systems Design
CEE 4410 Geosystems Engineering Design
CEE 4420 Subsurface Characterization
CEE 4430 Environmental Geotechnics
CEE 4510 Structural Steel Design
CEE 4520 Reinforced Concrete Design
CEE 4530 Timber and Masonry Design
CEE 4540 Infrastructure Rehabilitation
CEE 4550 Structural Analysis II
CEE 4610 Multimodal Transportation Planning, Design, and Operations
CEE 4620 Environmental Impact Assessment
CEE 4630 Computer-Aided Site and Roadway Design
CEE 4699 Undergraduate Research
CEE 4791 Mechanical Behavior of Composites
CEE 4793 Composite Materials and Processes
CEE 4794 Composite Materials and Manufacturing
CEE 4795 Ground Water Hydrology
CEE 4900 CEE Honors Research

### APPROVED ELECTIVES

There are six hours of elective credit which may be chosen from either inside or outside the School of

Civil and Environmental Engineering, but they require faculty approval.

## BACHELOR OF SCIENCE IN CIVIL ENGINEERING (REP) - COOPERATIVE OPTION

Since 1912, Georgia Tech has offered a five-year Undergraduate Cooperative Program to those students who wish to combine career-related experience with classroom studies. The program is the fourth oldest of its kind in the world and the largest optional co-op program in the country.

Students alternate between work assignments and classroom studies until they complete four or five semesters of work. Co-op students with a civil engineering major complete the same coursework on campus that is completed by regular four-year students. Most co-op students begin the program as freshmen or sophomores and are classified as full time students regardless of whether they are attending classes on campus or are full time at an employer's location.

Students who participate in the program have the opportunity to develop career interests, become more confident in their career choices, and develop human relations skills through their work experience. Graduates of the program receive a bachelor's degree with a Cooperative Plan Designation.

The Undergraduate Professional Internship Program is for civil engineering students who do not participate in the Cooperative Program, but want some career-related experience before graduation. Students generally work for one semester, usually in the summer, with an option for more work experiences. Students must have completed at least thirty hours of coursework at Georgia Tech before they can participate in the program. For more details, see: www.upi.gatech.edu.

In addition, there is a Work Abroad Program (www.workabroad.gatech.edu), which complements a student's formal education with paid international work experience directly related to civil engineering. Participating students typically are juniors and seniors. The international work assignments are designed to include practical training, cross-cultural exposure and learning, and the acquisition of needed skills. This program satisfies requirements for the International Plan, which is available to civil engineering students.

For more information about all of the programs in the Division of Professional Practice, view www.profpractice.gatech.edu.

## BACHELOR OF SCIENCE IN CIVIL ENGINEERING (REP) - INTERNATIONAL PLAN

The International Plan is a challenging and coherent academic program for undergraduates that develops global competence within the context of a student's major. It is a degree-long program that integrates international studies and experiences into any participating major at Georgia Tech. It helps to prepare Georgia Tech graduates professionally and personally for successful lives in the twenty-first century.

The International Plan is not intended to replace current international programs; it supplements them. Existing study abroad opportunities continue to be offered. It is also not intended to be an add-on to the current degree programs. It is intended to be another curriculum path to earn a degree in which international competence is integrated into the program of study. The Plan can be completed within the normal timeframe of four years of undergraduate study.

The overarching model for the International Plan has four components:

1. International coursework: Three courses to include one from each of the following categories:
    1. International relations
    2. Global economics
    3. A course about a specific country or region
2. International experience: Two terms abroad (not less than twenty-six weeks) engaged in any combination of study abroad, research, or internship
3. Second language proficiency: All students in the program are expected to reach at least the proficiency level equivalent to two years of college-level language study. Students who use the language to study, conduct research, or participate in an internship during their international experience are expected to attain a higher level of proficiency. Language proficiency is determined by testing (not course credits).
4. Culminating course: A capstone course in the major designed to tie the international studies and experiences together with the student's major

Completion of the International Plan is recognized by a designation on the student's diploma indicating completion of the degree with global competence.

For additional information about the International Plan visit www.oie.gatech.edu/internationalplan.

## BACHELOR OF SCIENCE IN CIVIL ENGINEERING (REP) - RESEARCH OPTION

The Research Option is intended for students who seek a concentrated research experience, culminating in an undergraduate thesis, integrated into their undergraduate studies in civil engineering. In order to graduate with a B.S.C.E – Research Option degree, the students must:

Complete at least nine units of undergraduate research (over at least two, preferably three terms). Research may be for either pay (CEE 2698 or CEE 4698) or credit (CEE 2699 or CEE 4699). Research for credit may be used towards the B.S.C.E. approved elective requirements.

Write an undergraduate thesis/report of research on their findings. This is usually done during the graduating term. The thesis will be published in the Georgia Tech Library.

Take the class LCC 4700 "Writing an Undergraduate Thesis" (taken during the thesis-writing semester).

At least six of the nine required hours of research should be on the same topic. A research proposal must be approved by a faculty advisor and one other faculty member. This proposal and at least six hours of research are required for admission to the LCC 4700 undergraduate thesis course. Completion of Research Option is noted on the student's transcript.

## B.S. IN COMPUTER ENGINEERING - REGIONAL ENGINEERING PROGRAM ACCREDITATION

The B.S. in Computer Engineering - Regional Engineering Program (offered through Georgia Tech-Savannah) is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012. Telephone: 410.347.7700:

Additional information about program accreditation and assessment for all of the School's programs is available on the ECE Web site.

## BACHELOR OF SCIENCE IN COMPUTER ENGINEERING - REGIONAL ENGINEERING PROGRAM

The School of Electrical and Computer Engineering offers two undergraduate degree programs: electrical engineering (EE) and computer engineering (CmpE). Both programs include elective hours, enabling students to individually tailor their programs to provide emphasis in a particular specialization or exposure to a broad range of subjects. Engineering analysis and design concepts are integrated throughout both programs, culminating in a common major design experience involving a broad range of issues including economic and societal considerations.

The field of computer engineering is centered in digital design, computer architecture, computer networks and internetworking, and computer applications. The B.S. CmpE program offers elective courses in a wide variety of specializations, including computer architecture; embedded systems and software; design tools, test, and verification; computer networks and internetworking; distributed systems and software; and VLSI design. Additionally, students may elect to take advanced courses in other EE specializations, computer science, or programs, such as mathematics, physics, or management. As an alternative to the B.S. CmpE degree, students may choose a computer engineering specialization within the B.S. EE degree program.

## PROGRAM OBJECTIVES

The School of Electrical and Computer Engineering has established the following student educational objectives for its undergraduate programs:

A. Graduates will be successful in the professional practice of engineering or other related fields. They will obtain employment appropriate to their background, interests, and education and will advance in their career field.

B. Graduates will engage in life-long learning; e.g., advanced education/degrees, professional development activities, and/or other career-appropriate options.

C. Graduates who are employed within engineering fields will demonstrate technical competence, such as identifying, formulating, analyzing, and creating engineering solutions using appropriate current engineering techniques, skills, and tools.

D. As appropriate to their professional or educational positions, graduates will (i) effectively communicate technical information in multiple formats, (ii) function effectively on teams, and (iii) develop and apply electrical/computer engineering solutions within global, societal, and environmental contexts.

Additional information about program assessment for all of the School's programs is available on the ECE Web site.

# BACHELOR OF SCIENCE IN COMPUTER ENGINEERING
## REGIONAL ENGINEERING PROGRAM
## 2008 - 2009 DEGREE REQUIREMENTS
### SCHOOL OF ELECTRICAL AND COMPUTER ENGINEERING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| MATH 1501 CALCULUS I | 4 |
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| CHEM 1310 GENERAL CHEMISTRY | 4 |
| CS 1371 COMPUTING FOR ENGINEERS | 3 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| MATH 1502 CALCULUS II | 4 |
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1372 PROGRAM DESIGN FOR ENGINEERS | 3 |
| ECE 2030 INTRODUCTION TO COMPUTER ENGINEERING | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-FALL | HRS |
|---|---|
| ECE 2025 INTRODUCTION TO SIGNAL PROCESSING | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| MATH 2401 CALCULUS III | 4 |
| PHYS 2212 INTRODUCTORY PHYSICS II | 4 |
| HUMANITIES ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **18** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| ECE 2031 DIGITAL DESIGN LAB | 2 |
| ECE 2040 CIRCUIT ANALYSIS | 3 |
| MATH 2403 DIFFERENTIAL EQUATIONS | 4 |
| SCIENCE ELECTIVE (CHEM, PHYS, BIOL, EAS) | 3 |
| ECE 3035 MECHANISMS FOR COMPUTING SYSTEMS | 4 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| ECE 3040 MICROELECTRONIC CIRCUITS | 4 |
| ECE 3041 INSTRUMENTATION & CIRCUITS LAB | 2 |
| ECE 3055 COMPUTER ARCHITECTURE & OPERATING SYSTEMS | 4 |
| ECON 2100 or 2101 or 2105 or 2106 | 3 |
| DISCRETE MATH ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| ECE 3042 MICROELECTRONIC CIRCUITS LAB | 2 |
| ECE 3060 VLSI & ADVANCED DIGITAL DESIGN | 4 |
| ECE 3025 ELECTROMAGNETICS | 3 |
| ENGINEERING ELECTIVE | 3 |
| APPROVED ELECTIVE | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **18** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| ECE 4001 ENGINEERING PRACTICE AND PROFESSIONALISM | 2 |
| ECE / CS ELECTIVE | 3 |
| ENGINEERING ELECTIVE | 3 |
| APPROVED ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |

| | |
|---|---|
| **TOTAL SEMESTER HOURS =** | **14** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| ECE 4007 ECE CULMINATING DESIGN PROJECT | 4 |
| ECE / CS ELECTIVES | 7 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| APPROVED ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

**TOTAL PROGRAM HOURS = 130 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

## ELECTIVES

The computer engineering curriculum includes forty-nine semester hours of electives, subject to the following requirements:

### HUMANITIES/SOCIAL SCIENCES ELECTIVES

ENGL 1101 and 1102 apply toward satisfaction of the twelve-hour humanities requirement. An additional six hours of Institute-approved humanities courses are required to fulfill the twelve-hour humanities requirement. To satisfy the state requirements regarding coursework in the history and constitutions of the United States and Georgia, students must complete one of the following courses: HIST 2111, HIST 2112, POL 1101, PUBP 3000, or INTA 1200. Students must complete one of the following economics courses: ECON 2100, 2101, 2105, or 2106. The history/constitution and economics courses, combined with an additional six hours of Institute-approved social science courses, satisfy the twelve-hour social sciences requirement.

### ETHICS

CS 4001, CS 4002, HTS 2084, HTS 3032, INTA 2030, LCC 3318, PST 3105, PST 3109, PST 3127, PST 4176, or PUBP 3600. This course is commonly taken as part of either the humanities or social science electives.

### WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

### SCIENCES

Three hours: APPH/BIOL 3751, BIOL 1510, BIOL 1520, CHEM 1311, CHEM 1315, EAS 1600, EAS 1601, EAS 2601, PHYS 2022, PHYS 2213, PHYS 3225, or course(s) approved by the School

### DISCRETE MATHEMATICS

Three hours: MATH 2602, MATH 3012, or course(s) approved by the School; course must be taken on a letter-grade basis.

### ENGINEERING ELECTIVES

Six hours, must include (a) thermodynamics: AE 3450, ME 3322, or ME 3720; and (b) probability/statistics: CEE/ISYE/MATH 3770 or ISYE 2027. All other courses must be approved by the School.

### ECE/CS ELECTIVES

Ten hours: 3000 level or above in ECE or CS, at least six hours at the 4000 level or above.

### APPROVED (FREE)

Nine hours: ECE, other engineering, mathematics, sciences, management, humanities, social sciences, or ROTC; all other courses subject to School approval.

## BACHELOR OF SCIENCE IN COMPUTER ENGINEERING (REP) - COOPERATIVE PLAN

The Georgia Tech Undergraduate Cooperative Education Program allows students to combine classroom study with paid practical work experience directly related to the academic major. Co-ops alternate semesters of on-campus study with semesters of full-time employment, normally beginning the program as freshmen or sophomores. Over 30% of ECE undergraduates participate in the co-op program.

The degree requirements for students in the co-op program are the same as those for other students in the major. The Cooperative Plan designation may be pursued separately or in combination with the International Plan and/or the Research Option.

Begun in 1912, Georgia Tech's program is currently the largest optional co-op program in the United States and has perennially been listed in U.S. News & World Report as one of the "Top Ten" co-op programs in America. As an integral part of the overall education experience, the co-op program allows students to take on increasing levels of responsibility and to use their job knowledge and classroom learning to make meaningful contributions to the organizations in which they work. Many co-op graduates are hired by their co-op employer, and more than 700 companies or government organizations throughout the United States and abroad currently employ Georgia Tech Undergrad Co-op Program students.

In addition to the co-op program, the Division of Professional Practice also offers the Undergraduate Professional Internship and Work Abroad programs. These programs also provide opportunities for students to gain practical work experience, without the long-term commitment of the co-op program.

## BACHELOR OF SCIENCE IN COMPUTER ENGINEERING (REP) - INTERNATIONAL PLAN

The International Plan is intended for students who seek an intensive international experience integrated into their undergraduate studies in computer engineering. The International Plan develops global competence through a combination of coursework, language study, and residential overseas experience. Students who complete this option receive a designation on their transcript and diploma.

The computer engineering aspects of the B.S. CmpE - International Plan degree requirements are identical to those for the regular B.S. CmpE . Please refer to the B.S. CmpE catalog description for general information about the degree program. Students may be able to satisfy the additional requirements imposed for the International Plan designation through appropriate choices of electives without additional credit hours to complete the degree. The International Plan designation may be pursued separately, or in combination with the Cooperative Plan and/or the Research Option.

The School of Electrical and Computer Engineering offers a junior-year program at the Georgia Tech-Lorraine campus in Metz, France, that is designed to facilitate participation in the International Plan. However, computer engineering majors are not restricted to this option and may complete any allowable courses, languages, and overseas experiences that satisfy the International Plan requirements.

## BACHELOR OF SCIENCE IN COMPUTER ENGINEERING (REP) - RESEARCH OPTION

The Research Option is intended for students who seek a concentrated research experience, culminating in an undergraduate thesis, integrated into their undergraduate studies in computer engineering. This option includes three or four semesters of structured research and provides an open evaluation of a student's research capabilities, viewable by the public via a required Web-based research portfolio. Students who complete this option receive a designation on their transcript.

The computer engineering aspects of the B.S. CmpE-Research Option degree requirements are identical to those for the regular B.S. CmpE . Please refer to the B.S. CmpE catalog description for general information about the degree program. Students may be able to satisfy the additional requirements imposed for the Research Option designation through appropriate choices of electives without additional credit hours to complete the degree. The Research Option designation may be pursued separately, or in combination with the Cooperative Plan and/or the International Plan.

The School of Electrical and Computer Engineering (ECE) offers a two-semester Undergraduate Research Opportunity Program (UROP), which may be completed to provide a less-intensive research experience or as the initial phase of the Research Option. Contact the ECE Academic Office for additional information about the Research Option, including specific Institute and ECE requirements, and assistance in planning your schedule to allow participation in this program.

## B.S. IN ELECTRICAL ENGINEERING - REGIONAL ENGINEERING PROGRAM ACCREDITATION

The B.S. in Electrical Engineering - Regional Engineering Program (offered through Georgia Tech-Savannah) is not currently accredited.

Additional information about program accreditation and assessment for all of the School's programs is available on the ECE Web site.

## BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING - REGIONAL ENGINEERING PROGRAM

The School of Electrical and Computer Engineering offers two undergraduate degree programs: electrical engineering (EE) and computer engineering (CmpE). Both programs include elective hours, enabling students to individually tailor their programs to provide emphasis in a particular specialization or exposure to a broad range of subjects. Engineering analysis and design concepts are integrated throughout both programs, culminating in a common major design experience involving a broad range of issues including economic and societal considerations.

The EE program offers elective courses in a wide variety of specializations including analog electronics, bioengineering, computer engineering, systems and controls, microsystems and nanosystems, electronics packaging, digital signal processing, optics and photonics, electric power, energy processing, electromagnetics, and telecommunications. Additionally, students may elect to take advanced courses in other programs such as computer science, mathematics, physics, or management.

## PROGRAM OBJECTIVES

The School of Electrical and Computer Engineering has established the following student educational objectives for its undergraduate programs:

A. Graduates will be successful in the professional practice of engineering or other related fields. They will obtain employment appropriate to their background, interests, and education and will advance in their career field.

B. Graduates will engage in life-long learning; e.g., advanced education/degrees, professional development activities, and/or other career-appropriate options.

C. Graduates who are employed within engineering fields will demonstrate technical competence, such as identifying, formulating, analyzing, and creating engineering solutions using appropriate current engineering techniques, skills, and tools.

D. As appropriate to their professional or educational positions, graduates will (i) effectively communicate technical information in multiple formats, (ii) function effectively on teams, and (iii) develop and apply electrical/computer engineering solutions within global, societal, and environmental contexts.

Additional information about program assessment for all of the School's programs is available on the ECE Web site.

# BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING
## REGIONAL ENGINEERING PROGRAM
## 2008 - 2009 DEGREE REQUIREMENTS
### SCHOOL OF ELECTRICAL AND COMPUTER ENGINEERING
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| MATH 1501 CALCULUS I | 4 |
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| CHEM 1310 GENERAL CHEMISTRY | 4 |
| CS 1371 COMPUTING FOR ENGINEERS | 3 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| MATH 1502 CALCULUS II | 4 |
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1372 PROGRAM DESIGN FOR ENGINEERS | 3 |
| ECE 2030 INTRODUCTION TO COMPUTER ENGINEERING | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-FALL | HRS |
|---|---|
| ECE 2025 INTRODUCTION TO SIGNAL PROCESSING | 4 |
| HUMANITIES ELECTIVE | 3 |
| MATH 2401 CALCULUS III | 4 |
| PHYS 2212 INTRODUCTORY PHYSICS II | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| **TOTAL SEMESTER HOURS =** | **18** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| ECE 2031 DIGITAL DESIGN LAB | 2 |
| ECE 2040 CIRCUIT ANALYSIS | 3 |
| MATH 2403 DIFFERENTIAL EQUATIONS | 4 |
| SCIENCE ELECTIVE (CHEM, PHYS, BIOL, EAS) | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-FALL | HRS |
|---|---|
| ECE 3025 ELECTROMAGNETICS | 3 |
| ECE 3040 MICROELECTRONIC CIRCUITS | 4 |
| ECE 3041 INSTRUMENTATION & CIRCUITS LAB | 2 |
| ECON 2100 or 2101 or 2105 or 2106 | 3 |
| HUMANITIES ELECTIVE | 3 |
| APPROVED ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **18** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| ECE 3042 MICROELECTRONIC CIRCUITS LAB | 2 |
| ECE BREADTH ELECTIVES | 9 |
| APPROVED ELECTIVE | 3 |
| ENGINEERING ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| ECE 4001 ENGINEERING PRACTICE AND PROFESSIONALISM | 2 |
| ECE ELECTIVES | 4 |
| ENGINEERING ELECTIVE | 3 |
| APPROVED ELECTIVE | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-SPRING | HRS |
|---|---|
| ECE 4007 ECE CULMINATING DESIGN PROJECT | 4 |
| ECE ELECTIVES | 7 |
| ENGINEERING ELECTIVE | 2 |
| APPROVED ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

**TOTAL PROGRAM HOURS = 130 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

## ELECTIVES

The electrical engineering curriculum includes sixty-one semester hours of electives, subject to the following requirements:

### HUMANITIES/SOCIAL SCIENCES ELECTIVES

ENGL 1101 and 1102 apply toward satisfaction of the twelve-hour humanities requirement. An additional six hours of Institute-approved humanities courses are required to fulfill the twelve-hour humanities requirement. To satisfy the state requirements regarding coursework in the history and constitutions of the United States and Georgia, students must complete one of the following courses: HIST 2111, HIST 2112, POL 1101, PUBP 3000, or INTA 1200. Students must complete one of the following economics courses: ECON 2100, 2101, 2105, or 2106. The history/constitution and economics courses, combined with an additional six hours of Institute-approved social science courses, satisfy the twelve-hour social sciences requirement.

### ETHICS

CS 4001, CS 4002, HTS 2084, HTS 3032, INTA 2030, LCC 3318, PST 3105, PST 3109, PST 3127, PST 4176, or PUBP 3600. This course is commonly taken as part of either the humanities or social science electives.

### WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

### SCIENCES

Three hours: APPH/BIOL 3751, BIOL 1510, BIOL 1520, CHEM 1311, CHEM 1315, EAS 1600, EAS 1601, EAS 2601, PHYS 2022, PHYS 2213, PHYS 3225, or course(s) approved by the School.

### ENGINEERING ELECTIVES

Eight hours, must include (a) thermodynamics: AE 3450, ME 3322, or ME 3720; (b) probability/statistics: CEE/ISYE/MATH 3770 or ISYE 2027; and (c) AE 2120, BMED 3400, CEE 2020, COE 2001, ME 2211, MSE 2001, or a course at the 3000 level or above in the College of Engineering, outside ECE. All other courses must be approved by the School.

### ECE ELECTIVES

Twenty hours: 3000 level or above in ECE, at least six hours at the 4000 level or above; must include three of the following course options: ECE 3050, (ECE 3055 or 3060), ECE 3065, (ECE 3070 or 3071), (ECE 3075 or 3076), ECE 3080, ECE 3085, or ECE 3090.

### APPROVED (FREE)

Twelve hours: ECE, other engineering, mathematics, sciences, computing, management, humanities, social sciences, or ROTC; all other courses subject to School approval.

## BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING (REP) - COOPERATIVE OPTION

The Georgia Tech Undergraduate Cooperative Education Program allows students to combine classroom study with paid practical work experience directly related to the academic major. Co-ops alternate semesters of on-campus study with semesters of full-time employment, normally beginning the program as freshmen or sophomores. Over 30% of ECE undergraduates participate in the co-op program.

The degree requirements for students in the co-op program are the same as those for other students in the major. The Cooperative Plan designation may be pursued separately or in combination with the International Plan and/or the Research Option.

Begun in 1912, Georgia Tech's program is currently the largest optional co-op program in the United States and has perennially been listed in U.S. News & World Report as one of the "Top Ten" co-op programs in America. As an integral part of the overall education experience, the co-op program allows students to take on increasing levels of responsibility and to use their job knowledge and classroom learning to make meaningful contributions to the organizations in which they work. Many co-op graduates are hired by their co-op employer, and more than 700 companies or government organizations throughout the United States and abroad currently employ Georgia Tech Undergrad Co-op Program students.

In addition to the co-op program, the Division of Professional Practice also offers the Undergraduate Professional Internship and Work Abroad programs. These programs also provide opportunities for students to gain practical work experience, without the long-term commitment of the co-op program.

## BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING (REP) - INTERNATIONAL PLAN

The International Plan is intended for students who seek an intensive international experience integrated into their undergraduate studies in electrical engineering. The International Plan develops global competence through a combination of coursework, language study, and residential overseas experience. Students who complete this option receive a designation on their transcript and diploma.

The electrical engineering aspects of the B.S. EE - International Plan degree requirements are identical to those for the regular B.S. EE. Please refer to the B.S. EE catalog description for general information about the degree program. Students may be able to satisfy the additional requirements imposed for the International Plan designation through appropriate choices of electives without additional credit hours to complete the degree. The International Plan designation may be pursued separately or in combination with the Cooperative Plan and/or the Research Option.

The School of Electrical and Computer Engineering offers a junior-year program at the Georgia Tech-Lorraine campus in Metz, France, that is designed to facilitate participation in the International Plan. However, electrical engineering majors are not restricted to this option and may complete any allowable courses, languages, and overseas experiences that satisfy the International Plan requirements.

## BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING (REP) - RESEARCH OPTION

The Research Option is intended for students who seek a concentrated research experience, culminating in an undergraduate thesis, integrated into their undergraduate studies in electrical engineering. This option includes three or four semesters of structured research and provides an open evaluation of a student's research capabilities, viewable by the public via a required Web-based research portfolio. Students who complete this option receive a designation on their transcript.

The electrical engineering aspects of the B.S. EE - Research Option degree requirements are identical to those for the regular B.S. EE. Please refer to the B.S. EE catalog description for general information about the degree program. Students may be able to satisfy the additional requirements imposed for the Research Option designation through appropriate choices of electives without additional credit hours to complete the degree. The Research Option designation may be pursued separately, or in combination with the Cooperative Plan and/or the International Plan.

The School of Electrical and Computer Engineering (ECE) offers a two-semester Undergraduate Research Opportunity Program (UROP), which may be completed to provide a less-intensive research experience or as the initial phase of the Research Option. Contact the ECE Academic Office for additional information about the Research Option, including specific Institute and ECE requirements, and assistance in planning your schedule to allow participation in this program.

## B.S. IN MECHANICAL ENGINEERING (REGIONAL ENGR PGM) ACCREDITATION

The B.S. in Mechanical Engineering - Regional Engineering Program program offered through Georgia Tech-Savannah is not currently accredited.

## BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING - REGIONAL ENGINEERING PROGRAM

### PROGRAM DESCRIPTION

The Program Educational Objectives of the undergraduate program are aligned with both the mission of the Georgia Tech-Savannah campus and the goal enunciated in the College of Engineering's Strategic Plan:

> *"Georgia Tech-Savannah seeks to be a technology-enabled academic enterprise of diverse students, faculty and staff that is globally recognized for innovation in engineering-centered education, scholarship and economic development."*
> *Mission of Georgia Tech-Savannah*
>
> *"Develop rigorous, innovative, experiential educational programs that integrate disciplines and that engage students in the excitement of learning, motivate their passion for positive societal impact and develop leaders for the future."*
> *College of Engineering's Strategic Plan – Goal 1*

The Program Educational Objectives are similar to those adopted by the Woodruff School faculty in 2005 with Objective C being slightly different for the Atlanta and Savannah programs. The Program Educational Objectives adopted on December 11, 2006, after input from and consultation with various constituencies, are:

A. To graduate engineers prepared for successful careers and empower them to be life-long learners;

B. To graduate engineers who are able to solve problems using analysis that is anchored in the engineering sciences and / or computational tools;

C. To graduate engineers who are able to design engineering systems for a global economy. This necessitates the development of skills that include the ability to formulate problems, to think creatively, to communicate effectively, to synthesize information, and to work ethically and collaboratively in a distributed engineering environment;

D. To graduate engineers who are able to use experimental and data analysis techniques to understand engineering phenomena and / or validate them; and

E. To graduate engineers who understand their professional and ethical responsibilities to society;

The current undergraduate curriculum in mechanical engineering is similar to that which is offered by the Woodruff School in Atlanta. The emphasis is on ensuring that students internalize basic principles and learn how to determine solutions to engineering problems.

Our intent, moving forwards, is to evolve the curriculum to one that is focused on product creation in a Culturally Diverse World. One in which design is at the core of an engineering-centric curriculum that is anchored in scholarship thereby facilitating experiential learning and the development of human competencies for creating value through the realization of products and systems that are sourced and marketed globally.

Satisfactory completion of the curriculum leads to the degree Bachelor of Science in Mechanical Engineering - Regional Engineering Program (BSME - REP).

In addition to the Institute's academic requirements for graduation with a bachelor's degree, the following are required for a BSME - REP degree:

A *C*
or better must be earned in MATH 1501, MATH 1502, MATH 2401, and MATH 2403. The aggregate GPA of all mechanical engineering courses taken must be 2.0 or higher.

## PROGRAM OBJECTIVES

The Program Educational Objectives for the Bachelor of Science in Mechanical Engineering - Regional Engineering Program (BSME - REP).are similar to those adopted by the Woodruff School faculty in 2005 with Educational Objective C being slightly different for the Atlanta and Savannah programs.

The Program Educational Objectives adopted on December 11, 2006, after input from and consultation with various constituencies, are:

A. To graduate engineers prepared for successful careers and empower them to be lifelong learners;

B. To graduate engineers who are able to solve problems using analysis that is anchored in the engineering sciences and/or computational tools;

C. To graduate engineers who are able to design engineering systems for a global economy. This necessitates the development of skills that include the ability to formulate problems, to think creatively, to communicate effectively, to synthesize information, and to work ethically and collaboratively in a distributed engineering environment;

D. To graduate engineers who are able to use experimental and data analysis techniques to understand engineering phenomena and / or validate them; and

E. To graduate engineers who understand their professional and ethical responsibilities to society.

# BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING
## REGIONAL ENGINEERING PROGRAM
## 2008 - 2009 DEGREE REQUIREMENTS
### SCHOOL OF MECHANICAL ENGINEERING

Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| MATH 1501 CALCULUS I | 4 |
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| CHEM 1310 GENERAL CHEMISTRY | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| MATH 1502 CALCULUS II | 4 |
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1371 COMPUTING FOR ENGINEERS | 3 |
| ME / CEE 1770 ENGINEERING GRAPHICS & VISUALIZATION | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-FALL | HRS |
|---|---|
| MATH 2401 CALCULUS III | 4 |
| PHYS 2212 INTRODUCTORY PHYSICS II | 4 |
| MSE 2001 PRINCIPLES & APPLICATIONS OF ENGINEERING MATERIALS | 3 |
| ME 2110 CREATIVE DECISIONS AND DESIGN | 3 |
| COE 2001 STATICS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| MATH 2403 DIFFERENTIAL EQUATIONS | 4 |
| ME 2202 DYNAMICS OF RIGID BODIES | 3 |
| ME 2016 COMPUTING TECHNIQUES | 3 |
| LAB SCIENCE (BIOL, CHEM, EAS, PHYS) | 3 |
| ECE 3710 CIRCUITS & ELECTRONICS | 2 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-FALL | HRS |
|---|---|
| ME 3322 THERMODYNAMICS | 3 |
| ME 3340 FLUID MECHANICS | 3 |
| COE 3001 MECHANICS OF DEFORMABLE BODIES | 3 |
| ECON 2100 or 2105 or 2106 | 3 |
| ECE 3741 INSTRUMENTATION & ELECTRONICS LAB | 1 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| ME 3015 SYSTEM DYNAMICS & CONTROL | 4 |
| ME 3345 HEAT TRANSFER | 3 |
| ENGINEERING ETHICS ELECTIVE | 3 |
| CEE / MATH / ISYE 3770 STATISTICS & APPLICATIONS | 3 |
| ISYE 3025 ESSENTIALS OF ENGINEERING ECONOMY | 1 |
| HUMANITIES ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| ME 3057 EXPERIMENTAL METHODOLOGY & TECHNICAL WRITING | 3 |
| ME 3180 MACHINE DESIGN or<br>ME 4315 ENERGY SYSTEMS ANALYSIS AND DESIGN | 3 |
| ME 4210 MANUFACTURING PROCESSES & ENGINEERING | 3 |

| | |
|---|---|
| MECHANICAL ENGINEERING ELECTIVE | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-SPRING | HRS |
|---|---|
| ME 4053 MECHANICAL ENGINEERING SYSTEMS LABORATORY | 2 |
| ME 4182 CAPSTONE DESIGN | 3 |
| MECHANICAL ENGINEERING ELECTIVE | 3 |
| FREE ELECTIVE | 3 |
| SOCIAL SCIENCE ELECTIVE or HUMANITIES ELECTIVE * | 3 |
| **TOTAL SEMESTER HOURS =** | **14** |

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

*

Social Science or humanities is required depending on the ethics class selection. Twelve hours of social science electives and twelve hours of humanities electives are required. If the ethics selection is a social science, then a humanities elective is required. If the ethics selection is a humanities, then a social science elective is required.

# MECHANICAL ENGINEERING ELECTIVES

## WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

## HUMANITIES AND SOCIAL SCIENCES

Twelve credit hours of humanities and twelve credit hours of social sciences are required.

The twelve hours of humanities are comprised of six hours of English composition classes and six hours of humanities electives. The English composition classes are satisfied by ENG 1101 and ENG 1102.

The twelve hours of social sciences include three hours of economics, three hours of work in history and the constitutions of the United States and Georgia, and six hours of social science electives. The three hours of economics is satisfied by either ECON 2100 (Economic Analysis and Policy Problems), ECON 2105 (Principles of Macroeconomics), or ECON 2106 (Principles of Microeconomics). The three hours of history and constitutions are satisfied by selecting one of the following courses: HIST 2111 (The United States to 1877), HIST 2112 (The United States Since 1877), POL 1101 (Government of the United States), PUBP 3000 (American Constitutional Issues), or INTA 1200 (American Government in Comparative Perspective).

The six hours of social science electives and the six hours of humanities electives must include three hours of engineering ethics. The remaining hours of social science electives and humanities electives must be selected from the Institute-approved humanities courses and the Institute-approved social science courses.

**ENGINEERING ETHICS ELECTIVE(S)** - The ethics class can be selected from PST 3127 (Science, Technology, and Human Values), PST 3105 (Ethical Theories), PST 3109 (Ethics for Technical Professions), PST 4176 (Environmental Ethics), INTA 2030 (Ethics in International Affairs), or HTS 2084 (Technology and Society). The PST ethics courses are humanities electives, while the INTA and HTS ethics courses are social science electives.

## FREE ELECTIVES

The six hours of free electives must be at the 2000 level or above. In addition, classes used as free electives may not overlap any other classes used for the bachelor's degree in mechanical engineering.

## MECHANICAL ENGINEERING ELECTIVES

Mechanical engineering electives include ME 3180 and any ME elective at the 4000 level, except for ME 4741 and ME 4742. The mechanical engineering electives cannot duplicate any other class required for the bachelor's degree in mechanical engineering. Approved classes at the 6000 level or above may be scheduled if the student has an overall GPA of 3.0 and prior consent of the professor. A maximum of 4 hours of undergraduate research, ME 4699, and undergraduate special problems, ME 4903, may be used for ME electives.

## SCIENCE ELECTIVES

The three-hour science elective may be satisfied by classes from the following list: CHEM 1311 (Inorganic Chemistry) and CHEM 1312 (Inorganic Chemistry Lab) taken together, or one of the following: BIOL 1510 (Biology Principles), BIOL 1520 (Introduction to Organismal Biology), EAS 1600 (Introduction to Environmental Science), EAS 1601 (Habitable Planet), or PHYS 2213 (Modern Physics).

## BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING (REP) - COOPERATIVE OPTION

Since 1912, Georgia Tech has offered a five-year Undergraduate Cooperative Program to those students who wish to combine career-related experience with classroom studies. The program is the fourth oldest of its kind in the world and the largest optional co-op program in the country. Traditionally, mechanical engineering students have been the largest group participating in the program at Georgia Tech.

Students alternate between industrial assignments and classroom studies until they complete four or five semesters of work. Co-op students with mechanical engineering majors complete the same coursework on campus that is completed by regular four-year students. Most co-op students begin the program as freshman or sophomores and are classified as full-time students regardless whether they are attending classes on campus or are full-time at an employer's location.

Students who participate in the program have the opportunity to develop career interests, become more confident in their career choices, and develop human relation skills through their work experience. Graduates of the program receive a bachelor's degree with a Cooperative Plan Designation. Woodruff School students have traditionally been the largest group participating in the program.

Students can also complete work assignments in a foreign country as part of the International Cooperative Program. This program is a great opportunity to utilize foreign language skills, gain a global perspective, and experience a diverse culture. Proficiency in a foreign language is necessary to earn the International Cooperative Plan degree designation. Mechanical engineering students have worked in countries such as Germany, China, and Japan. For more information on the Cooperative Program, go to www.coop.gatech.edu.

The Undergraduate Professional Internship Program is for mechanical engineering students who do not participate in the Cooperative Program but want some career-related experience before graduation. Students generally work for one semester, usually in the summer, with an option for more work. Students must have completed at least thirty hours of coursework at Georgia Tech before they can participate in the program. For more details, see www.upi.gatech.edu.

In addition, there is a Work Abroad Program (www.workabroad.gatech.edu), which complements a student's formal education with paid international work experience directly related to mechanical engineering. Participating students typically include juniors and seniors. The international work assignments are designed to include practical training, cross-cultural exposure and learning, and the acquisition of needed skills. This program satisfies requirements for the International Plan, which is available to mechanical engineering students.

For more information about all of the programs in the Division of Professional Practice, visit www.profpractice.gatech.edu.

## BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING (REP) - INTERNATIONAL PLAN

The Woodruff School is joining thirteen other programs at the Institute in the Undergraduate International Plan. This is a new degree designation, similar to the Cooperative Plan. Mechanical engineering students can spend two semesters abroad (a minimum of twenty-six weeks), gaining valuable international experience. This is especially important in today's global economy, where more companies are looking for graduates with international experience in their major area. Mechanical engineering students can spend a year at Georgia Tech-Lorraine in Metz, France, at the Technical University in Munich, or at other approved locations.

In order to receive the B.S. ME-International Plan degree, students will have to meet several requirements. The first is to show proficiency in a language through at least the second year of study; a proficiency exam must be passed. The second requirement is specific coursework: international relations, global economy, and society/culture. The third requirement is for two semesters abroad (a minimum of twenty-six weeks). This can be done either in residence at a university, or one semester in residence plus one as an engineering intern, or both semesters as an intern. Finally, the student's capstone design experience must meet certain international requirements. Ideally, this would be a joint project including students from Georgia Tech and the selected school abroad. For more information this program, visit www.oie.gatech.edu.

## GEORGIA TECH-SAVANNAH CAMPUS DOCTORAL PROGRAMS

The Ph.D. programs are offered to students with an excellent academic background and a capacity for independent research. Doctoral students tailor a highly individualized program of study directed toward completion of a dissertation that is expected to make an important contribution in their selected areas of study. Doctoral degrees are offered in civil engineering, environmental engineering, electrical and computer engineering, and mechanical engineering. Typically, four to five years of study beyond the bachelor's degree are required to complete the doctoral program.

The criteria for the doctoral programs offered through the Georgia Tech-Savannah campus are the same as those in their corresponding academic unit and are presented elsewhere in the Civil and Environmental Engineering, Electrical and Computer Engineering, and Mechanical Engineering sections of this catalog.

## GEORGIA TECH-SAVANNAH CAMPUS MASTER'S PROGRAMS

Five master's degree programs are available through Georgia Tech-Savannah: Master of Science Civil Engineering, Master of Science in Environmental Engineering, Master of Science in Electrical and Computer Engineering, Master of Science in Mechanical Engineering, and Master of Science (undesignated). The master's degree programs require thirty semester credit hours beyond the bachelor's degree. Depending on the specific program of study, students may elect to earn six of these hours by writing a thesis, or they may earn all of the credit through coursework.

The criteria for the master's programs offered through the Georgia Tech-Savannah campus are the same as those in their corresponding academic unit and are presented elsewhere in the Civil and Environmental Engineering, Electrical and Computer Engineering, and Mechanical Engineering sections of this catalog.

## UNDECLARED ENGINEERING STUDENTS - GENERAL INFORMATION

College of Engineering
Dean's Office
Location: Tech Tower, Third Floor
Web site: www.coe.gatech.edu/academics/undeclared.php

First-year students entering the College of Engineering may choose a specific engineering major or remain undeclared until they determine which Georgia Tech major best fits their interests and goals. It is recommended that students select a major by the end of the first year, but the selection must be made before completion of sixty credit hours. Until a student has chosen a major, course schedules should be planned using courses that are common to all engineering majors. A list of these courses may be found at http://www.coe.gatech.edu/academics/commoncourses.php.

## UNDECLARED ENGINEERING STUDENTS - SUGGESTED SCHEDULE

| SUGGESTED 1ST YEAR SCHEDULE - FIRST SEMESTER | HRS |
|---|---|
| MATH 1501 CALCULUS I | 4 |
| ENGL 1101 ENGLISH COMPOSITION I | 4 |
| CHEM 1310 GENERAL CHEMISTRY | 3 |
| CS 1371 COMPUTING FOR ENGINEERS | 3 |
| GT 1000 FRESHMAN SEMINAR | 1 |
| **TOTAL SEMESTER HOURS =** | **15** |

| SUGGESTED 1ST YEAR SCHEDULE - SECOND SEMESTER | HRS |
|---|---|
| MATH 1502 CALCULUS II | 4 |
| ENGL 1102 ENGLISH COMPOSITION II | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 3 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

# COLLEGE OF MANAGEMENT

Established in 1913 as the School of Commerce
800 West Peachtree Street, Atlanta, GA 30308-0520
Telephone: 404.894.2600
Fax: 404.894.1552
Web site: http://mgt.gatech.edu

## GENERAL INFORMATION

The College of Management offers a full range of undergraduate and graduate programs. The undergraduate program in management leads to the Bachelor of Science degree. The College offers four master's degree programs: the Master of Business Administration (M.B.A.) can be completed in two years as a full-time program or in three years as a part-time evening program; the Master of Business Administration in Management of Technology, M.B.A.-MOT and M.B.A.-Global Business are offered in weekend formats and can be completed in less than two years. The College also offers a Master of Science in Quantitative and Computational Finance, as well as an undesignated Master of Science degree. The doctoral program leads to a Ph.D. in Management. Students to the graduate management programs are admitted only on a degree-seeking basis. The College is accredited by the American Assembly of Collegiate Schools of Business International (AACSB International).

The College is a recognized leader in developing business leaders to succeed in today's high-tech business world. Programs combine excellence in the functional areas of business education with the multidisciplinary focus on management of technology, international business, and entrepreneurial and innovative processes for a global economy. Students learn to create value that will make a social and economic difference in the lives of individuals, groups, communities, and societies. With a curriculum that emphasizes collaborative learning based on real-world experience, the College offers the resources of centers focusing on global business, leadership, and entrepreneurship to foster research, teaching excellence, and discussion across the major functional areas of business.

For more information, visit: http://mgt.gatech.edu.

## COLLEGE OF MANAGEMENT ACCREDITATION STATEMENT

The College of Management and all of its degrees are fully accredited by the Association to Advance Collegiate Schools of Business.

## ADMINISTRATION

**Steve Salbu**
Dean and Stephen P. Zelnak, Jr. Chair

**Sridhar Narasimhan**
Senior Associate Dean and Robert A. Anclien Professor

**Goutam Challagalla**
Associate Dean, Exective Education

**Vinod Singhal**
Associate Dean, MBA Program and Alfred F. and Patricia L. Knoll Professor

**Charles Parsons**
Associate Dean, Undergraduate Program

**Dennis H. Nagao**
Faculty Director of M.B.A. - M.O.T. and Associate Professor

**Saby Mitra**
Faculty Director, GEMBA and Associate Professor

### DEPARTMENT DIRECTORS

**James A. Kranzusch, MA**
Executive Director, Career Development

**Daniel L. Stotz, MS**
Director, Executive Education

**Nancy Gimbel, MA**
Director, Undergraduate Programs

**Ann J. Scott, MBA**
Director, Graduate Program

**Paula Wilson, MS**
Director M.B.A. Admissions

**Kurt G. Paquette, MSM**
Chief Administrative and Financial Officer

**Carla Zachery, BS**
Director of Finance

**Hope M. Wilson, MA**
Director, College Relations and Communications

**W. Gail Greene, MS**
Director, Administrative Services

**Phil Spessard, BA**
Director, Development

**Michael Cummins, PhD**
Director of Information Technology Services

### REGENTS' PROFESSORS

Cheryl Gaimon, David Ku (joint appointment), Naresh K. Malhotra

### CHAIRHOLDERS AND PROFESSORS

**Terry Blum**
Director of the Institute of Leadership and Entrepreneurship and Tedd Munchak Chair and Professor

**Eugene Comiskey**
Fuller E. Callaway Chair and Professor of Accounting

**Cheol Eun**
Thomas R. Williams Chair in Finance and Professor

**David Ku**
Lawrence P. Huang Chair Professor of Engineering

**John R. McIntyre**
Professor and Director of the Center for International Business Education and Research

**Charles Mulford**
INVESCO Chair and Professor, Faculty Director, MBA Program, GT Financial Reporting and Analysis Lab

**Vikram Nanda**
McDonough Chair and Professor of Finance

**Sandra Slaughter**

Costley Chair and Professor of Information Technology Management

**Jerry Thursby**
Professor and Ernest Scheller, Jr. Chair in Innovation, Entrepreneurship, and Commercialization

**Marie Thursby**
**Hal and John Smith Chair in Entrepreneurship, Professor and Executive Director, Technology Innovation: Generating Economic Returns (TI:GER)**

**PROFESSORS**
**Nathan Bennett, Terry Blum, Eugene Comiskey, Yih-Long Chang, Bryan Church, Cheol Eun, Don Fedor, Cheryl Gaimon, Soumen Ghosh, Lawrence James, Narayanan Jayaraman, Sundaresan Jayaraman (joint appointment), Ajay Khorana, Charles Mulford, Vikram Nanda, Sridhar Narasimhan, Charles Parsons, Arnold Schneider, Christina Shalley, Vinod Singhal, Sandra Slaughter, Marie Thursby, Jerry Thursby**

**ASSOCIATE PROFESSORS**
**Goutam Challagalla, Jonathan Clarke, Mark Ferguson, Stylianos Kavadias, Luis Martins, Saby Mitra, Dennis Nagao, Frank Rothaermel, L. Beril Toktay, Deborah Turner, Francis Ulgado, Qinghai Wang, Dongjun Wu, Han Zhang**

**ASSISTANT PROFESSORS**
**Atalay Atasu, Samuel Bond, Marco Ceccagnoli, Alka Citrin, Nishant Dass, Chris Forman, Ingrid Fulmer, Stuart Graham, Jeffrey Hales, Matthew Higgins, Manpreet Hora, Xi (Jason) Kuang, Jeongsik (Jay) Lee, Seo Yeon (Suzanne) Lee, Minqiang Li, Nicholas Lurie, Eric Overby, Cindy Zapata-Phelan, Ravi Subramanian, Koert van Ittersum, Nancy Wong**

**PROFESSOR OF THE PRACTICE**

**Gary T. Jones**
**Professor of the Practice of Finance**

**Robert Thomas**
**Professor of the Practice for Leadership and Entrepreneurship**

**Nick Voigt**
**Professor of the Practice for Global Technology, Entrepreneurship, and Commercialization**

**LECTURERS**
**Margi Berbari, Robert Burgess, James Turner, Peter Vantine**

**ACADEMIC PROFESSIONALS**
**Michael Cummins, Stuart Milne, Linda Oldham**

**PROFESSORS EMERITI**
**Philip Adler, Lloyd Byars, Fred C. Allvine, Andrew J. Cooper, Robert Hawkins, David Herold, Ferdinand Levy, Leonard Parsons, Richard Teach**

## BACHELOR OF SCIENCE IN MANAGEMENT

Students with a broad interest in all management activities and operating problems should profit from the Management degree program. The program builds upon knowledge of the functional, environmental, behavioral, and legal aspects of business and provides analytical and conceptual tools for analyzing complicated problems. It prepares the student for managerial responsibilities and decision making. The large number of elective hours allows the student to tailor a program to his or her individual educational objectives. Students may take a concentration of electives in areas such as finance, accounting, marketing, operations management, international management, and information technology management.

## BACHELOR OF SCIENCE IN MANAGEMENT
### 2008 - 2009 DEGREE REQUIREMENTS
### COLLEGE OF MANAGEMENT
Suggested Schedule

| **FIRST YEAR-FALL** | **HRS** |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I or MATH 1712 SURVEY OF CALCULUS | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| LAB SCIENCE (BIOL, CHEM, EAS, PHYS) | 4 |
| **TOTAL SEMESTER HOURS =** | **14** |

| **FIRST YEAR-SPRING** | **HRS** |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II or MATH 1711 FINITE MATHEMATICS | 4 |
| WELLNESS | 2 |
| LAB SCIENCE (BIOL, CHEM, EAS, PHYS) | 4 |
| COMPUTING REQUIREMENT | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| **SECOND YEAR-FALL** | **HRS** |
|---|---|
| ECON 2105 PRINCIPLES OF MACROECONOMICS | 3 |
| MGT 2250 MANAGEMENT STATISTICS | 3 |
| ACCT 2101 ACCOUNTING I : FINANCIAL ACCOUNTING | 3 |
| HUMANITIES ELECTIVE | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **SECOND YEAR-SPRING** | **HRS** |
|---|---|
| ECON 2106 PRINCIPLES OF MICROECONOMICS | 3 |
| MGT 2106 LEGAL, SOCIAL, & ETHICAL ASPECTS OF BUSINESS | 3 |
| ACCT 2102 ACCOUNTING II :MANAGERIAL ACCOUNTING | 3 |
| MGT 2251 INTRODUCTION TO MANAGEMENT SCIENCE | 3 |
| MGT 2200 MANAGEMENT APPLICATIONS OF INFORMATION TECHNOLOGY | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **THIRD YEAR-FALL** | **HRS** |
|---|---|
| MGT 3062 FINANCIAL MANAGEMENT | 3 |
| MGT 3101 ORGANIZATIONAL BEHAVIOR | 3 |
| MGT 3102 HUMAN RESOURCES | 3 |
| HUMANITIES ELECTIVE | 3 |
| FREE ELECTIVE | 3 |
| LCC 3401 TECHNICAL COMMUNICATION PRACTICES | 2 |
| **TOTAL SEMESTER HOURS =** | **17** |

| **THIRD YEAR-SPRING** | **HRS** |
|---|---|
| MGT 3300 MARKETING MANAGEMENT I | 3 |
| MGT 3501 OPERATIONS MANAGEMENT | 3 |
| MGT 3660 INTERNATIONAL BUSINESS | 3 |
| MANAGEMENT ELECTIVE | 3 |
| NON MANAGEMENT ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-FALL** | **HRS** |
|---|---|
| MANAGEMENT ELECTIVE | 12 |
| NON MANAGEMENT ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| MGT 4195 STRATEGIC MANAGEMENT | 3 |

| | |
|---|---|
| MANAGEMENT ELECTIVE | 3 |
| FREE ELECTIVES | 9 |
| **TOTAL SEMESTER HOURS =** | **15** |

**TOTAL PROGRAM HOURS = 120 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

## ELECTIVES

### COMPUTING REQUIREMENT

Students must complete CS 1315, CS 1301, or a computer programming course approved as satisfying the general education requirements in computer literacy.

### FREE ELECTIVES

Students must complete twelve semester hours of free electives. These electives may be selected from any academic area, including the College of Management. These courses may not be required otherwise by this curriculum or used elsewhere in this curriculum. An unlimited number of hours of HPS courses is allowed. A maximum nine pass/fail hours are allowed. The student must consult the Institute rules for the pass/fail system
and/or obtain advising in the College of Management Office of Undergraduate Programs regarding allowable pass/fail hours.

### HUMANITIES ELECTIVES

Students are required to complete twelve hours of humanities, including six hours of required courses, ENGL 1101 and ENGL 1102, from Core Area A. In addition, they are required to complete six hours of humanities selected from Core Area C. Humanities electives transferred from other institutions may be used to fulfill this twelve-hour requirement. Note: Any courses completed that were listed in prior catalogs as satisfying the humanities requirement and were completed while that catalog was in effect may also be used to satisfy this requirement.

### MATHEMATICS ELECTIVES

Students must complete eight hours of mathematics electives to be selected from MATH 1501 or MATH 1712, and MATH 1502 or MATH 1711.

### NON-COLLEGE OF MANAGEMENT ELECTIVES

Students must complete six semester hours of non-College of Management electives. These courses may be selected from any academic area outside the College of Management. HPS courses are not allowed. The courses must be taken on a letter-grade basis.

### PASS/FAIL COURSES

Up to nine credit hours in the named category of free electives may be taken on a pass/fail basis if no nonresident credit has been awarded. See the Institute rules for the pass/fail system.

### PREREQUISITES

Management majors should complete all required 2000 level management courses prior to registering for 3000 and 4000 level management courses. Course prerequisites are enforced.

### COLLEGE OF MANAGEMENT ELECTIVES

Students must complete eighteen hours of College of Management electives. Management courses not otherwise required for the degree will satisfy this requirement. These electives may not be taken pass/fail. Students should meet with an academic advisor to strategically select these electives. Management courses used towards completing a Management certificate can also be used to fulfill the Management elective area. Students are advised to complete at least one Management certificate by graduation.

### SOCIAL SCIENCES ELECTIVES

Students must complete twelve hours of social science electives. Within these twelve hours, students are required to complete the United States and Georgia history and constitution requirement with three semester hours selected from HIST 2111, HIST 2112, POL 1101, PUBP 3000, or INTA 1200. Students must then complete six hours of economics: ECON 2105 and ECON 2106. For the final three semester hours of social science, students should choose a course from CORE AREA E.

### WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

## BACHELOR OF SCIENCE IN MANAGEMENT - INTERNATIONAL PLAN

The International Plan degree option is available to all College of Management undergraduate students. This option has been specifically designed to increase the international competence of our students through foreign language instruction, selected international courses, overseas residential experience, and a capstone, culminating course. This international competence is characterized by a graduate's ability to communicate in a second world language, discuss substantively the major international socioeconomic processes, assimilate into foreign lifestyles and work environments, and communicate with confidence the specifics of management and business in a global context. Given the ever-increasing pace of globalization of business, this option should help students prepare for the business world of the future. All Management students should seek advising through the College of Management Undergraduate Programs Office.

## CERTIFICATE PROGRAMS

In addition to its degree programs, the College of Management offers students in good standing an opportunity to broaden their areas of expertise or acquire skills or information beyond their major degree requirements. Students who satisfactorily complete this special program will receive a certificate of recognition.

The following certificate programs are available for undergraduate students:

- Accounting
- Entrepreneurship
- Finance
- Information Technology Management
- International Management
- Marketing
- Technology and Operations Management

## CHANGE OF MAJOR POLICY

On October 1, 2007, the College of Management implemented a 2.3 cumulative GPA requirement for all Georgia Tech students requesting a change of major to Management if the student has completed sixty credits (junior standing) or more. There is no GPA requirement for freshmen and sophomores (less than sixty credits) requesting a major change. This policy was approved by the College of Management faculty in April 2007. All students seeking a major change to Management must attend a “change of major” meeting. Contact the College of Management Undergraduate Program Office for dates and times of upcoming meetings.

## TRANSFER CREDIT POLICY FOR UNDERGRADUATE STUDENTS

Students may transfer courses taken at another accredited institution if the courses are passed with a *C* or better and are deemed by the College of Management to be equivalent to a Georgia Tech course. Such courses will be transferred for the same number of credits as the corresponding College of Management courses, provided they are equal to three or more semester hours of credit. Transfer credits will be accepted from newly-formed institutions of the University System of Georgia prior to accreditation.

For institutions within the University System of Georgia, the total number of credit hours transferred for courses within the core curriculum* will match the number of credit hours granted by the originating institution. Hours of credit in excess of the corresponding Georgia Tech courses may be transferred only as free electives. For courses taken outside the core curriculum, the rules in the previous paragraph will apply.

Junior- or senior-level courses with three or more semester hours of credit that have no corresponding College of Management course may transfer as electives in management if they are approved by the College of Management.

Because of the difference in the intellectual level of various courses, freshman- or sophomore-level courses taken at other institutions may only be transferred for equivalent freshman- or sophomore-level courses offered at Georgia Tech. ***** Exception: University System of Georgia schools may transfer the equivalent of MGT 2106, Business Law and Ethics, if taught at the freshman level. Business Law and Ethics has been designated as a core course.

*****
Core curriculum for this purpose may be defined as 2000 level Management courses plus Business Law and Ethics.

Management students considering taking courses at other institutions should keep in mind Georgia Tech's 36-hour Residency Rule, which states that "no student may be considered a candidate for a degree unless the final thirty-six credit hours required for the degree are earned in residence at Georgia Tech and approved by the major school."

## MASTER OF BUSINESS ADMINISTRATION (M.B.A.)

The M.B.A. program provides a professional management education for students with baccalaureate degrees in any discipline. Calculus is the only prerequisite. The M.B.A. is an innovative and rigorous program with a technical and quantitative instructional focus. Highly qualified candidates from all academic backgrounds enter the program, which is designed to foster teamwork and a closely knit class. It is offered in both full-time and evening formats.

Excellence in management education has long been a hallmark of Georgia Tech. The Georgia Tech M.B.A. helps students develop the skills they will need to effectively lead in the high-tech, global businesses of the twenty-first century, and the vision and ingenuity to become valued leaders in their fields. At Georgia Tech, M.B.A. students are exposed to the social, environmental, political, and international factors shaping the global marketplace. Some of the primary advantages of the M.B.A. program include a close-knit community that promotes enriched student-faculty relationships; classmates with diverse educational and work experiences; intimate class sizes that foster group cooperation and a true understanding of the business environment; an innovative curriculum that keeps pace with the rapidly changing environment of technology and management; and a wide range of educational, social, and professional opportunities in the metro-Atlanta area.

During the summer term between the first and second academic years, full-time M.B.A. students work in summer internships with both major employers and small entrepreneurial ventures. Summer internships enhance permanent employment opportunities.

The M.B.A. program requires fifty-four hours; thirty semester hours are core classes. The core courses develop a common body of knowledge essential to all M.B.A. students. The remainder of the curriculum consists of electives, which provide flexibility for students to build competence in one or more concentration areas. This freedom permits students to fashion a curriculum directed toward their own educational and career goals.

M.B.A. concentration areas include accounting, entrepreneurship, finance, information technology, international business, marketing, operations management, organizational behavior, and strategic management. M.B.A. students may also earn certificates in entrepreneurship, international business, or management of technology.

For the full-time program, entry is in the fall semester only, and enrollment is strictly full time. For the evening program, admission is offered in both fall and spring semesters.

Applicants to the M.B.A. program should note that supplementary application materials are required by the College of Management, in addition to those requested by Georgia Tech's Office of Graduate Admissions and Enrollment Services.

Applications and viewbooks are available online at www.mgt.gatech.edu/mba.

For more information, call 404.894.8722 or contact the:

College of Management Graduate Office
Georgia Institute of Technology
Atlanta, Georgia 30308-0520

The undesignated Master of Science degree program serves students whose educational and career goals may not be best served by the M.B.A. program. Under these circumstances, the student may pursue a specially tailored master's-level curriculum that satisfies the American Assembly of Collegiate Schools of Business (AACSB) common body of knowledge requirements and provides a coherent concentration of elective courses chosen in consultation with an academic advisor. This specialized degree program is designed primarily for students who are admitted to Georgia Tech on approved foreign education programs. Admission to this program must be approved by the M.B.A. Admissions Committee prior to enrollment.

## TECHNOLOGY LEADERSHIP PROGRAM (M.B.A. DUAL-DEGREE OPTION)

Through the Technology Leadership Program, qualified graduate students wishing to pursue a full-time M.B.A. degree and a graduate degree in another Georgia Tech graduate program can efficiently earn two graduate degrees in almost the same time it would take to earn the M.B.A. degree alone. For example, the M.B.A. program is normally fifty-four hours. For students interested in pursuing or currently pursuing another graduate degree at Georgia Tech, the length of the M.B.A. program is reduced to thirty-nine hours, with the area of concentration being the coursework in the other Tech graduate program. Students in the Technology Leadership Program take thirty semester hours of required management core courses, plus nine hours of graduate management electives.

Those interested in dual master's degrees should consult with the respective graduate program directors to determine the feasibility of this approach. Technology Leadership students must complete applications for and be admitted to both programs.

Applications and viewbooks are available online at www.mgt.gatech.edu/mba.

For more information, call 404.894.8722 or contact the:

College of Management Graduate Office
Georgia Institute of Technology
Atlanta, Georgia 30308-0520

## MASTER OF SCIENCE IN QUANTITATIVE AND COMPUTATIONAL FINANCE

The Master of Science degree in Quantitative and Computational Finance (M.S.Q.C.F.) is a collaboration among the College of Management, the School of Mathematics, and the H. Milton Stewart School of Industrial and Systems Engineering. This is a sixteen-month interdisciplinary degree program that provides students with the practical skills and theoretical understanding they need to become experts in the formulation, implementation, and evaluation of the models used by the financial sector to structure transactions, manage risk, and construct investment strategies. Students require a thorough understanding of the principles, structures, and everyday activities of finance; an understanding of the mathematics used to model these financial activities; and knowledge of the techniques, such as programming, numerical analysis, statistics, optimization, and intuition, used to implement these models in finance.

Contact:
Dr. Shijie Deng, Director
Shijie.deng@isye.gatech.edu
404-894-6519

Web site: www.qcf.gatech.edu

# MASTER OF BUSINESS ADMINISTRATION - GLOBAL BUSINESS

As the business world becomes increasingly global, executives must understand and actively manage its impact on current business operations and future business trends. Georgia Tech's M.B.A. - Global Business (Global Executive M.B.A.) program trains executives to take leadership positions in businesses that have global aspirations. Whether you want to work overseas or grow your company at home, understanding how global issues are increasingly affecting every type of business is essential. The M.B.A. - Global Business program will prepare you to effectively lead your business in a global environment of increasing complexity and technological sophistication.

## RIGOROUS CURRICULUM

The M.B.A. - Global Business program enhances traditional M.B.A. coursework to include international perspectives on finance, operations, economics, technology, and marketing. The core M.B.A. curriculum is supplemented with coursework on global markets, global trade, global supply chain and global organizations. The curriculum takes advantage of Georgia Tech's unique academic strengths and international presence.

## INTERNATIONAL BUSINESS EXPERIENCE

Designed to be a truly international experience, the M.B.A. - Global Business program includes two trips overseas to gain firsthand knowledge of key issues in international commerce. These destinations vary from year to year, but focus on regions of emerging importance such as China, India, Latin America and Eastern Europe. Through lectures and company visits, these international trips examine the cultural, social, and economic aspects of each location. A year-long global strategy capstone project ties together the international residencies and classroom learning to provide an integrative experience across all aspects of the curriculum.

## DEGREE REQUIREMENTS AND SCHEDULE

The M.B.A. - Global Business degree is a specialized M.B.A. degree requiring fifty semester credit hours of study. It consists of a fixed sequence of courses over a seventeen-month period with a new class beginning each fall semester and graduating at the end of the following fall semester. Classes are held every-other weekend (Friday evening and all day Saturday) allowing participants to minimize time away from their jobs. In addition there are four residencies, two of which are at Georgia Tech of one week each at the beginning and the end of the program. There are two international residencies of one-week and two-week durations in the spring and fall. To graduate, students must have no more than three grades of *C*
or lower and must have a cumulative grade point average of 2.77. Employer support is an important component of student success. Although your company is not required to sponsor you financially for the program, Georgia Tech does require that employers support your time commitment to the program.

## WHO SHOULD APPLY?

Candidates should have a minimum of five years of professional work experience, a baccalaureate degree from an accredited institution, and a record of positive career growth and achievements through positions of increasing responsibility. Candidates should be highly motivated to develop business skills critical for leaders in a global setting. We endeavor to create a dynamic and diverse classroom environment.

## ADMISSIONS

Applications are reviewed and accepted throughout the year. Priority will be given to applications received prior to April 1. After that date, applications received will be reviewed on a space-available basis. GMAT may be required based on a review of your application portfolio. For additional information on admissions requirements, please contact us at GlobalEMBA@gatech.edu.

## CONTACT INFORMATION

M.B.A.-Global Business
Georgia Tech College of Management
800 West Peachtree Street
Atlanta, GA 30308
Phone: 404.385.2254
Fax: 404.894.1464
M.B.A. – Global Business Web site

# MASTER OF BUSINESS ADMINISTRATION IN MANAGEMENT OF TECHNOLOGY

The curriculum of this M.B.A. program is designed for working professionals who seek to advance their careers by acquiring the business knowledge and skills needed to lead and succeed in today's technologically intensive and globally competitive environments. The program develops a rigorous fluency in the language of business (e.g., accounting, finance, economics, etc.) and blends it with an emphasis on strategic management of technology, innovation, intra- and entrepreneurship, leadership and change management skills, and global issues affecting corporate strategy. The curriculum is delivered in a dynamic, discussion-oriented classroom environment with significant, hands-on collaborative projects. Participants will be able to immediately apply their new knowledge to their jobs while attending the program. Graduates possess the skills, understanding, and confidence to lead and manage throughout the organization as well as the ability to quickly leverage technology and other business opportunities for competitive advantage.

Key program features include:

- Leadership and team skills development: Collaboration is a key participant skill developed through varied team projects across the curriculum. Teams provide opportunities for participants to learn from other members coming from different industries, companies, and functional areas. Leadership, teamwork, conflict management, communication and other "soft" skills are the focus of the first residency and are developed throughout the program.
- Capstone new venture project: A multi-term team project is used to integrate course knowledge within the context of a technology-oriented new venture business plan. This project requires the team to blend and apply its knowledge about technology forecasting, intellectual property, innovation, entrepreneurship principles, marketing, accounting and finance, and strategy. The project is presented to and evaluated by an outside panel of experts.
- Capstone international residency: Global and strategic management of technology issues are the focus of the last portion of the program, which concludes with an international residency comprised of company visits, presentations by regional experts, cultural events, and direct experience with the host culture.

## DEGREE REQUIREMENTS AND SCHEDULE

The M.B.A. - Management of Technology (Executive M.B.A. in Management of Technology) degree requires fifty semester credit hours of study consisting of a fixed sequence of courses over a nineteen-month period. A new class begins each summer semester. The program begins with a weeklong residency on campus followed by classes on a convenient every other weekend basis (all day Friday and Saturday). Another weeklong campus residency begins the second part of the curriculum. The program concludes with a ten-twelve day international residency in China. To graduate, students must have no more than three grades of *C* or lower and a cumulative grade point average of 2.77.

## WHO SHOULD APPLY?

Candidates should have a minimum of five years of professional work experience, a baccalaureate degree from an accredited institution, and a record of positive career growth and achievements through positions of increasing responsibility. The M.B.A. – Management of Technology program is particularly well-suited for technical professionals as well as for professionals working in companies strongly impacted by technology and/or increasing demands for innovative new products and services.

## ADMISSIONS

Applications are reviewed and accepted throughout the year. Priority will be given to applications received prior to March 1. After that date, applications will be reviewed on a space-available basis. GMAT may be required based on a review of your application portfolio. For additional information on admissions requirements, please contact us at emba-mot@gatech.edu.

## CONTACT INFORMATION

M.B.A. - Management of Technology
Georgia Tech College of Management
800 West Peachtree St. NW
Atlanta, GA 30308-0520
Phone: 404.385.2254
FAX: 404.894.1464
M.B.A – Management of Technology Web site

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN MANAGEMENT

The Ph.D. program in Management is designed to produce graduates who can make scholarly contributions to their chosen fields. Most graduates undertake careers as teachers, scholars, and researchers in academic environments. The doctoral degree in Management also may lead to careers in industry and government.

The doctoral program in the College of Management is intended for full-time students who will complete their entire doctoral program prior to leaving campus. Full-time residence in or near Atlanta is expected. The doctoral program is strongly research-oriented and emphasizes early and effective involvement in research, with students experiencing considerable personal attention and close interaction with faculty. The Ph.D. program complements and reflects the technological emphasis of the Institute and places considerable weight on learning outside the classroom. The tutorial model is the basic educational approach employed throughout the program.

All doctoral students take comprehensive examinations, which include both a general and a special examination. The student becomes a candidate for the degree after successful completion of both exams and the approval of the prospectus of his or her dissertation. On completion of the dissertation, the student must take a final oral examination as prescribed in the general regulations of the Graduate Division.

Applicants to the doctoral program in management should note that supplementary application materials are required by the College of Management in addition to those required by Georgia Tech's Office of Graduate Admissions and Enrollment Services.

Applications and viewbooks are available online at www.mgt.gatech.edu/phd.

For more information, call 404.894.8722 or contact the:

College of Management Graduate Office
Georgia Institute of Technology
Atlanta, Georgia 30308-0520

## IVAN ALLEN COLLEGE

Established in 1990
Location: 781 Marietta Street
Telephone: 404.385.1493
Fax: 404.894.8573
Web site: www.iac.gatech.edu
Ivan Allen Student Services Web site: www.iac.gatech.edu/students

### GENERAL INFORMATION

The Ivan Allen College (IAC), named after a visionary leader who served as mayor of Atlanta during a time associated with the creation of the "New South," is a unique configuration of six schools as well as Georgia Tech's three ROTC departments. The College was established in 1990 in order to broaden the range of majors available to Tech students. The degree programs are unique in the ways they link the study of the social sciences and humanities to the world of technology and science. IAC majors prepare students for a wide range of professional careers, including leadership in government, business, and technology.

Study in these fields also prepares students for advanced study in professional programs in law, medicine, international affairs, public policy, and new media as well as graduate study in the humanities and social sciences. The success of these new programs has resulted in a realization of the close connections between service and progress expressed in Georgia Tech's motto.

The Ivan Allen College offers nine undergraduate degrees, six master's degrees, and four doctoral degrees. Detailed descriptions of these programs can be found under the appropriate school headings. In addition to its degree programs, the Ivan Allen College provides all Tech students with instruction in the humanities and social sciences. The College's course offerings and its certificate and minor programs enable students, regardless of their major, to broaden their educational experience and to better understand the cultural underpinnings of their professional and personal lives and the international context in which they live and work.

## DEANS

### Dean

Sue V. Rosser

### Associate Deans

Susan Cozzens, John Tone

### Assistant Dean

Peter Brecke

## SCHOOL OF ECONOMICS

Established in 1990
Location: The Habersham Building
781 Marietta Street
Telephone: 404.894.4919
Fax: 404.894.1890
Web site: www.econ.gatech.edu

### GENERAL INFORMATION

The School of Economics provides high-quality programs of study leading to a Bachelor of Science degree in Economics and to a Minor or Certificate in Economics for students in other disciplines. The School also participates in the International Plan and the Research Option for undergraduate students. The program focuses on skills and knowledge critical for a life of learning and leads to careers in academics, management, banking, the public sector and other professional fields. A degree in economics is especially appropriate for students intending to pursue advanced degrees in the social sciences and in professional schools of management, law, and public administration.

Modern economics is analytically rigorous, requiring a background in mathematics and statistics. At the same time, it is critically linked with the other social sciences and humanities, as well as to applied management and policy studies. The undergraduate curriculum provides a strong, in-depth understanding of economic thought and policy and is intended to prepare students for productive careers, for useful roles in society, and for satisfying personal lives in a technologically complex, culturally diverse world.

The School of Economics offers a Bachelor of Science degree in Global Economics and Modern Language (GEML) in cooperation with the School of Modern Languages and a Bachelor of Science degree in Economics and International Affairs (EIA) in cooperation with the Sam Nunn School of International Affairs. These programs provide students an opportunity to broaden their educational experience and to enhance their marketability in these areas.

The School of Economics also offers graduate courses leading to a Master of Science degree and in support of Ph.D. programs in management, public policy, industrial and systems engineering, and city and regional planning.

## FACULTY

### Chair and Professor

Patrick S. McCarthy

### Associate Chair and Associate Professor

Willie J. Belton Jr

### Professors

Thomas D. Boston, Christine P. Ries

### Associate Professors

Vivek Ghosal, Mikhail Klimenko, Haizheng Li, Usha Nair-Reichert

### Assistant Professors

Chul Chung, Maurizio Iacopetta, Derek Kellenberg, Rehim Kilic, Mark J. McCabe, Minjae Song

### Adjunct Professors

Parks A. Dodd, Richard Fritz, Derek Tittle

### Emeritus Professors

W. Carl Biven, Kong Chu, Marilu H. McCarty, William A. Schaffer

## BACHELOR OF SCIENCE IN ECONOMICS

The program of study provides a thorough grounding in science, the humanities, and mathematics; a broad grasp of the tools of economic analysis and decision making; and an understanding of the institutional milieu in which tomorrow's leaders must operate. In addition, the curriculum provides ample opportunities for career-oriented studies in fields such as accounting, finance, management science, public policy, and international affairs; life-enriching studies in history and literature are also available.

# BACHELOR OF SCIENCE IN ECONOMICS
## 2008 - 2009 DEGREE REQUIREMENTS
## SCHOOL OF ECONOMICS
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I or MATH 1712 SURVEY OF CALCULUS | 4 |
| LAB SCIENCE (BIOL, CHEM, EAS, PHYS) | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| FREE ELECTIVE | 1 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II or MATH 1711 FINITE MATHEMATICS | 4 |
| LAB SCIENCE (BIOL, CHEM, EAS, PHYS) | 4 |
| COMPUTING REQUIREMENT | 3 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| ECON 2106 PRINCIPLES OF MICROECONOMICS | 3 |
| MGT 2250 MANAGEMENT STATISTICS or SUBSTITUTE | 3 |
| CS 1331 INTRO OBJECT ORIENTED PROGRAMMING or SUBSTITUTE | 3 |
| ENGINEERING, SCIENCE, or MATH ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| ECON 2105 PRINCIPLES OF MACROECONOMICS | 3 |
| ECON 3161 ECONOMETRIC ANALYSIS | 3 |
| HUMANITIES ELECTIVE | 3 |
| INTERNATIONAL AFFAIRS ELECTIVE | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-FALL | HRS |
|---|---|
| ECON 3110 ADVANCED MICROECONOMIC ANALYSIS | 3 |
| ECON 4160 ECONOMIC FORECASTING | 3 |
| NON MAJOR CLUSTER ELECTIVE | 3 |
| SOCIAL SCIENCE ELECTIVES | 6 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| ECON 3120 ADVANCED MACROECONOMIC ANALYSIS | 3 |
| ECONOMICS ELECTIVE | 3 |
| NON MAJOR CLUSTER ELECTIVE | 3 |
| FREE ELECTIVES | 6 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| ECONOMICS ELECTIVE | 3 |
| NON MAJOR CLUSTER ELECTIVE | 3 |
| FREE ELECTIVES | 9 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-SPRING | HRS |
|---|---|
| ECON 4610 SEMINAR ON ECONOMIC POLICY | 3 |
| ECON 4910 INDIVIDUAL RESEARCH IN ECONOMICS | 3 |

| | |
|---|---|
| ECONOMICS ELECTIVE | 3 |
| FREE ELECTIVES | 4 |
| NON MAJOR CLUSTER ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

**TOTAL PROGRAM HOURS = 120 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

## ELECTIVES AND REQUIREMENTS

### COMPUTING REQUIREMENT

Students must complete either CS 1315, CS 1301, or a computer programming course approved as satisfying the general education requirements in computer literacy. Students must also complete a second computing requirement that can be satisfied with several courses as listed below:

- AE 1770 Introduction to Engineering Graphics and Visualization
- ARCH 4420 Introduction to Design Computing
- BC 3630 Project Management I
- BIOL 3332 Statistical and Mathematical Biology
- CEE 1770 Introduction to Engineering Graphics and Visualization
- CHEM 1313 Quantitative Analysis
- CP 4510 Fundamentals of Geographic Information Systems
- CS 1301 Introduction to Computing
- CS 1315 Introduction to Media Computation
- CS 1316 Representing Structure and Behavior
- CS 1331 Introduction to Object-Oriented Programming
- CS 1332 Data Structures and Algorithms for Applications
- CS 4235 Introduction to Information Security
- EAS 4430 Remote Sensing and Data Analysis
- ECE 2030 Introduction to Computer Engineering
- ID 3103 Industrial Design Computing I
- ID 4103 Alias Studio I
- LCC 3402 Graphic and Visual Design
- LCC 3404 Designing for the Internet
- LCC 3410 The Rhetoric of Nonlinear Documents
- ME 1770 Introduction to Engineering Graphics and Visualization
- ME 2016 Computing Techniques
- MGT 2200 Information Technology
- MGT 4051 Decision Support and Expert Systems
- MGT 4052 Systems Analysis and Design
- MGT 4058 Database Management Systems
- MGT 4661 Database Management
- MUSI 4630 Music Recording and Mixing
- PHYS 3266 Computational Physics

### WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

### MATHEMATICS

The mathematics requirement may be satisfied by one of the following sequences: MATH 1711/MATH 1712; MATH 1501/MATH 1502. ECON Majors are encouraged to pursue the MATH 1501/1502, sequence as it will better prepare them for the upper level ECON courses.

If students take a combination of MATH 1712 and either MATH 1501/1502 they will only receive credit for one of the courses (not both).

### SCIENCE AND ENGINEERING ELECTIVES

Students must complete a laboratory sequence in biology, chemistry, physics, or earth and atmospheric sciences, along with three hours of electives chosen from engineering, science, or mathematics, for a total of eleven hours.

The ENG/SCI/MATH Elective requirement is only for ECON and GEML majors.  Please see the

academic advisor for classes that will satisfy this requirement.

### SOCIAL SCIENCES ELECTIVES

All students must complete twelve hours of electives in the social sciences, including three semester hours from HIST 2111, HIST 2112, POL 1101, PUBP 3000, or INTA 1200 to satisfy state requirements regarding coursework in the history and constitutions of the United States and Georgia. Also required are nine hours from the following list:

### ARCHITECTURE AND CITY PLANNING

ARCH 4331, 4335; CP 4010, 4020, 4030

### HISTORY, SOCIOLOGY, AND HISTORY, TECHNOLOGY, AND SOCIETY

All HIST, SOC, and HTS courses except 2927, 2928, 2929, 4925, 4926, 4927, 4928, 4929

### INTERNATIONAL AFFAIRS

INTA 1100, 2030, 2100, 2200, 2220, 2230, 3240, 3801, 3802, 3803, 4801, 4802, 4803

### POLITICAL SCIENCE AND PUBLIC POLICY

All POL and PUBP courses except 3113, 3600, 4530, 4532, 4901, 4902, 4903, 4951, 4952

### ECONOMICS

All ECON courses except 3160, 3200, 4170, 4910, 4990

### PSYCHOLOGY

PSYC 1101, 2015, 2020, 2103, 2210, 2220, 2230, 2240, 2260, 2300, 2400, 3060, 4070, 4770

### HUMANITIES ELECTIVES

Students are required to complete six hours of humanities from the following list:

### ARCHITECTURE, INDUSTRIAL DESIGN, AND CITY PLANNING

ARCH 2111, 2112; COA 2115, 2116, 2241, 2242; CP 4040; ID 2202; MUSI 3610, 3620

### LITERATURE, COMMUNICATION, AND CULTURE

All ENGL and LCC courses except LCC 2661, 2662, 3400, 3402, 3404, 3406, 3408, 3410, 3412, 3661, 3662, 4100, 4102, 4200, 4400, 4402, 4404, 4406, 4600, 4602, 4904, 4906

### MODERN LANGUAGES

- All CHIN courses beginning with CHIN 1002 except CHIN 4901, 4902
- All FREN courses beginning with FREN 1002 except FREN 4901, 4902
- All GRMN courses beginning with GRMN 1002 except GRMN 4901, 4902
- All JAPN courses beginning with JAPN 1002
- All LING courses except LING 4901, 4902
- All RUSS courses beginning with RUSS 1002 except RUSS 4901, 4902
- All SPAN courses beginning with SPAN 1002 except SPAN 4901, 4902

### PHILOSOPHY, SCIENCE, AND TECHNOLOGY

All PST courses except PST 4901, 4902, 4903

### INTERNATIONAL ELECTIVE

Any course offered by the School of International Affairs satisfies this requirement.

### CLUSTER ELECTIVES

Students must complete at least twelve hours of credit in a planned cluster in a discipline other than economics. This requirement is most easily satisfied through a certificate program. Any other concentration must be approved by the faculty of the School of Economics. The student must earn a *C* or better in these courses.  EIA and GEML students have different requirements to satisfy this area, please see the academic advisor for specifics of this requirement.

## INDIVIDUAL RESEARCH PROJECT

ECON and GEML students are required to take ECON 4910, producing a formal research paper in the senior year.  EIA students are required to take ECON/INTA 4740 & ECON/INTA 4741 rather than ECON 4910.

## FREE ELECTIVES

Students must complete free electives (normally bearing twenty hours of credit), bringing the number of credit hours received up to 122. Only free electives may be taken on a pass/fail basis, subject to Institute limitations. EIA students are required to take ten hours of Free Elective credit rather than the twenty hours required for ECON and GEML students.

## BACHELOR OF SCIENCE IN ECONOMICS - INTERNATIONAL PLAN

The program of study provides a thorough grounding in science, the humanities, and mathematics; a broad grasp of the tools of economic analysis and decision making; and an understanding of the institutional milieu in which tomorrow's leaders must operate. In addition, the curriculum provides ample opportunities for career-oriented studies in fields such as accounting, finance, management science, public policy, and international affairs; life-enriching studies in history and literature are also available

All degree programs offered by the School of Economics including the B.S. degree in Economics offer an International Plan (IP) Designation. In general the IP designation can be obtained by completing courses in three specified area:

1. Students are required to complete a general course in Global Economics. Economics 2101 has been approved by the IP committee to fulfill this requirement
2. Students are also required to complete a region specific course. Any number of International Affairs course can be used to fulfill this requirement
3. Student are also required to complete are capstone course rounding out the international experience. The IP designation also requires students to become proficient in a language as well as spending at least twenty-six week in a foreign culture enrolled School and/or participating in an internship experience

## BACHELOR OF SCIENCE IN ECONOMICS AND INTERNATIONAL AFFAIRS

The primary objectives of the Bachelor of Science degree in Economics and International Affairs are to provide students with:

1. a detailed understanding of economic theory and practice in the contemporary world;
2. an understanding of the global, interdependent, and multicultural environment in which they live; and
3. a set of quantitative and qualitative analytical skills centered around policy-oriented issue areas in economics and international affairs. These skills will provide graduates with the capabilities to engage in strategic planning and analysis efforts in economic and international contexts.

# BACHELOR OF SCIENCE IN ECONOMICS AND INTERNATIONAL AFFAIRS
## 2008 - 2009 DEGREE REQUIREMENTS
## SCHOOL OF ECONOMICS
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| INTA 1110 INTRODUCTION TO INTERNATIONAL RELATIONS | 3 |
| INTA 2030 ETHICS IN INTERNATIONAL AFFAIRS | 3 |
| MATH 1501 CALCULUS I or MATH 1712 SURVEY OF CALCULUS | 4 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| INTA 2100 GREAT POWER RELATIONS | 3 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| HTS 1031 or 2033 or 2036 or 2062 | 3 |
| MATH 1502 CALCULUS II or MATH 1711 FINITE MATHEMATICS | 4 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| ECON 2106 PRINCIPLES OF MICROECONOMICS | 3 |
| INTA 1001 ORIENTATION TO INTERNATIONAL AFFAIRS | 1 |
| INTA 2040 SCIENCE, TECHNOLOGY, & INTERNATIONAL AFFAIRS | 3 |
| LAB SCIENCE I | 4 |
| MGT 2250 MANAGEMENT STATISTICS | 3 |
| MODERN LANGUAGE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| ECON 2105 PRINCIPLES OF MACROECONOMICS | 3 |
| LAB SCIENCE II | 4 |
| INTA 3110 U.S. FOREIGN POLICY | 3 |
| INTA ELECTIVE | 3 |
| MODERN LANGUAGE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| CS 1315 INTRODUCTION TO MEDIA COMPUTATION or<br>CS 1301 INTRODUCTION TO COMPUTING | 3 |
| ECON 3110 ADVANCED MICROECONOMIC ANALYSIS | 3 |
| ECON 3161 ECONOMETRIC ANALYSIS | 3 |
| INTA 3203 COMPARATIVE POLITICS | 3 |
| NON MAJOR CLUSTER ELECTIVE* | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| ECON 3120 ADVANCED MACROECONOMIC ANALYSIS | 3 |
| ECONOMICS ELECTIVE | 3 |
| FREE ELECTIVE | 3 |
| NON MAJOR CLUSTER ELECTIVE* | 3 |
| TECHNICAL REQUIREMENT | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| ECON 4350 INTERNATIONAL ECONOMICS | 3 |
| ECON\INTA 4740 SEMINAR IN POLITICAL ECONOMY | 3 |
| INTA 3301 INTERNATIONAL POLITICAL ECONOMY | 3 |
| FREE ELECTIVE | 3 |
| NON MAJOR CLUSTER ELECTIVE* | 3 |

| | |
|---|---|
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| ECON\INTA 4741 THESIS IN POLITICAL ECONOMY | 3 |
| ECONOMICS ELECTIVE | 3 |
| FREE ELECTIVES | 4 |
| INTA ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **13** |

**TOTAL PROGRAM HOURS = 120 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

*** MUST BE APPROVED BY DEPARTMENT**

## ELECTIVES AND REQUIREMENTS

### COMPUTING REQUIREMENT

Students must complete either CS 1315, CS 1301, or a computer programming course approved as satisfying the general education requirements in computer literacy. Students must also complete a second computing requirement that can be satisfied with several courses as listed below:

- AE 1770 Introduction to Engineering Graphics and Visualization
- ARCH 4420 Introduction to Design Computing
- BC 3630 Project Management I
- BIOL 3332 Statistical and Mathematical Biology
- CEE 1770 Introduction to Engineering Graphics and Visualization
- CHEM 1313 Quantitative Analysis
- CP 4510 Fundamentals of Geographic Information Systems
- CS 1301 Introduction to Computing
- CS 1315 Introduction to Media Computation
- CS 1316 Representing Structure and Behavior
- CS 1331 Introduction to Object-Oriented Programming
- CS 1332 Data Structures and Algorithms for Applications
- CS 4235 Introduction to Information Security
- EAS 4430 Remote Sensing and Data Analysis
- ECE 2030 Introduction to Computer Engineering
- ID 3103 Industrial Design Computing I
- ID 4103 Alias Studio I
- LCC 3402 Graphic and Visual Design
- LCC 3404 Designing for the Internet
- LCC 3410 The Rhetoric of Nonlinear Documents
- ME 1770 Introduction to Engineering Graphics and Visualization
- ME 2016 Computing Techniques
- MGT 2200 Information Technology
- MGT 4051 Decision Support and Expert Systems
- MGT 4052 Systems Analysis and Design
- MGT 4058 Database Management Systems
- MGT 4661 Database Management
- MUSI 4630 Music Recording and Mixing
- PHYS 3266 Computational Physics

### WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

### MATHEMATICS

The mathematics requirement may be satisfied by one of the following sequences: MATH 1711/MATH 1712; MATH 1501/MATH 1502. ECON Majors are encouraged to pursue the MATH 1501/1502, sequence as it will better prepare them for the upper level ECON courses.

If students take a combination of MATH 1712 and either MATH 1501/1502 they will only receive credit for one of the courses (not both).

### SCIENCE AND ENGINEERING ELECTIVES

Students must complete a laboratory sequence in biology, chemistry, physics, or earth and atmospheric sciences, along with three hours of electives chosen from engineering, science, or mathematics, for a total of eleven hours.

The ENG/SCI/MATH Elective requirement is only for ECON and GEML majors.  Please see the

academic advisor for classes that will satisfy this requirement.

### SOCIAL SCIENCES ELECTIVES

All students must complete twelve hours of electives in the social sciences, including three semester hours from HIST 2111, HIST 2112, POL 1101, PUBP 3000, or INTA 1200 to satisfy state requirements regarding coursework in the history and constitutions of the United States and Georgia. Also required are nine hours from the following list:

### ARCHITECTURE AND CITY PLANNING

ARCH 4331, 4335; CP 4010, 4020, 4030

### HISTORY, SOCIOLOGY, AND HISTORY, TECHNOLOGY, AND SOCIETY

All HIST, SOC, and HTS courses except 2927, 2928, 2929, 4925, 4926, 4927, 4928, 4929

### INTERNATIONAL AFFAIRS

INTA 1100, 2030, 2100, 2200, 2220, 2230, 3240, 3801, 3802, 3803, 4801, 4802, 4803

### POLITICAL SCIENCE AND PUBLIC POLICY

All POL and PUBP courses except 3113, 3600, 4530, 4532, 4901, 4902, 4903, 4951, 4952

### ECONOMICS

All ECON courses except 3160, 3200, 4170, 4910, 4990

### PSYCHOLOGY

PSYC 1101, 2015, 2020, 2103, 2210, 2220, 2230, 2240, 2260, 2300, 2400, 3060, 4070, 4770

### HUMANITIES ELECTIVES

Students are required to complete six hours of humanities from the following list:

### ARCHITECTURE, INDUSTRIAL DESIGN, AND CITY PLANNING

ARCH 2111, 2112; COA 2115, 2116, 2241, 2242; CP 4040; ID 2202; MUSI 3610, 3620

### LITERATURE, COMMUNICATION, AND CULTURE

All ENGL and LCC courses except LCC 2661, 2662, 3400, 3402, 3404, 3406, 3408, 3410, 3412, 3661, 3662, 4100, 4102, 4200, 4400, 4402, 4404, 4406, 4600, 4602, 4904, 4906

### MODERN LANGUAGES

- All CHIN courses beginning with CHIN 1002 except CHIN 4901, 4902
- All FREN courses beginning with FREN 1002 except FREN 4901, 4902
- All GRMN courses beginning with GRMN 1002 except GRMN 4901, 4902
- All JAPN courses beginning with JAPN 1002
- All LING courses except LING 4901, 4902
- All RUSS courses beginning with RUSS 1002 except RUSS 4901, 4902
- All SPAN courses beginning with SPAN 1002 except SPAN 4901, 4902

### PHILOSOPHY, SCIENCE, AND TECHNOLOGY

All PST courses except PST 4901, 4902, 4903

### INTERNATIONAL ELECTIVE

Any course offered by the School of International Affairs satisfies this requirement.

### CLUSTER ELECTIVES

Students must complete at least twelve hours of credit in a planned cluster in a discipline other than economics. This requirement is most easily satisfied through a certificate program. Any other concentration must be approved by the faculty of the School of Economics. The student must earn a *C* or better in these courses.  EIA and GEML students have different requirements to satisfy this area, please see the academic advisor for specifics of this requirement.

## INDIVIDUAL RESEARCH PROJECT

ECON and GEML students are required to take ECON 4910, producing a formal research paper in the senior year. EIA students are required to take ECON/INTA 4740 & ECON/INTA 4741 rather than ECON 4910.

## FREE ELECTIVES

Students must complete free electives (normally bearing twenty hours of credit), bringing the number of credit hours received up to 122. Only free electives may be taken on a pass/fail basis, subject to Institute limitations. EIA students are required to take ten hours of Free Elective credit rather than the twenty hours required for ECON and GEML students.

## BACHELOR OF SCIENCE IN ECONOMICS AND INTA - INTERNATIONAL PLAN

The B.S. degree in Economics and International Affairs with the International Plan designator provide students with:

1. a detailed understanding of economic theory and practice in the contemporary world;
2. an understanding of the global, interdependent, and multicultural environment in which they live; and
3. a set of quantitative and qualitative analytical skills centered around policy-oriented issue areas in economics and international affairs. These skills will provide graduates with the capabilities to engage in strategic planning and analysis efforts in economic and international contexts

All degree programs offered by the School of Economics including the B.S. Degree Economics International Affairs offer an International Plan (IP) Designation. In general the IP designation can be obtained by completing courses in three specified area:

1. Students are required to complete a general course in Global Economics. Economics 2101 has been approved by the IP committee to fulfill this requirement
2. Students are also required to complete a region specific course. Any number of International Affairs course can be used to fulfill this requirement
3. Student are also required to complete are capstone course rounding out the international experience. The IP designation also requires students to become proficient in a language as well as spending at least twenty-six week in a foreign culture enrolled School and/or participating in an internship experience

## BACHELOR OF SCIENCE IN GLOBAL ECONOMICS AND MODERN LANGUAGE

In partnership with the School of Modern Languages, the Sam Nunn School offers the Bachelor of Science in International Affairs and Modern Language, with separate concentrations in French, German, Japanese, and Spanish. Students in this program receive intensive foreign language training and learn the fundamentals of dealing with foreign cultures and societies. A detailed description of the degree program is found in the School of Modern Languages section of this Catalog.

All degree programs offered by the School of Economics including the B.S. Degree Global Economics and Modern Languages offer an International Plan Designation (IP). In general the IP designation can be obtained by completing courses in three specified area: (1) Students are required to complete a general course in Global Economics. Economics 2101 has been approved by the IP committee to fulfill this requirement. (2) Students are also required to complete a region specific course. Any number of International Affairs course can be used to fulfill this requirement. (3) Student are also required to complete are capstone course rounding out the international experience. The IP designation also requires students to become proficient in a language as well as spending at least twenty-six week in a foreign culture enrolled School and/or participating in an internship experience.

# B.S. IN GLOBAL ECONOMICS AND MODERN LANGUAGES

## 2008 - 2009 DEGREE REQUIREMENTS

## MODERN LANGUAGE USED AS A MODEL; SUBSTITUTE CHINESE, FRENCH, GERMAN, JAPANESE, OR SPANISH AS APPROPRIATE

**SCHOOL OF ECONOMICS** AND **SCHOOL OF MODERN LANGUAGES**

Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| MATH 1501 CALCULUS I or MATH 1712 SURVEY OF CALCULUS | 4 |
| MODERN LANGUAGE or FREE ELECTIVE | 3 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| COMPUTING REQUIREMENT | 3 |
| ENGINEERING / SCIENCE / MATHEMATICS ELECTIVE | 3 |
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II or MATH 1711 FINITE MATHEMATICS | 4 |
| MODERN LANGUAGE or FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| ECON 2106 PRINCIPLES OF MICROECONOMICS | 3 |
| LAB SCIENCE (BIOL, CHEM, EAS, PHYS) | 4 |
| MGT 2250 MANAGEMENT STATISTICS | 3 |
| MODERN LANGUAGE | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| ECON 2105 PRINCIPLES OF MACROECONOMICS | 3 |
| LAB SCIENCE (BIOL, CHEM, EAS, PHYS) | 4 |
| MODERN LANGUAGE | 6 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| ECON 3110 ADVANCED MICROECONOMIC ANALYSIS | 3 |
| ECON 3161 ECONOMETRIC ANALYSIS | 3 |
| MODERN LANGUAGE | 6 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| ECON 3120 ADVANCED MACROECONOMIC ANALYSIS | 3 |
| ECON 3150 ECONOMIC & FINANCIAL MODELING | 3 |
| ECONOMICS ELECTIVE | 3 |
| FREE ELECTIVES | 5 |
| MODERN LANGUAGE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| ECON 4160 FORECASTING | 3 |
| MODERN LANGUAGE or FREE ELECTIVES | 9 |
| NON MAJOR CLUSTER ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-SPRING | HRS |
|---|---|
| ECON 4910 INDIVIDUAL RESEARCH IN ECONOMICS | 3 |

| | |
|---|---|
| ECONOMICS ELECTIVE | 3 |
| MODERN LANGUAGE or FREE ELECTIVES | 6 |
| **TOTAL SEMESTER HOURS =** | **12** |

**TOTAL PROGRAM HOURS = 120 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

## ELECTIVES AND REQUIREMENTS

### COMPUTING REQUIREMENT

Students must complete either CS 1315, CS 1301, or a computer programming course approved as satisfying the general education requirements in computer literacy. Students must also complete a second computing requirement that can be satisfied with several courses as listed below:

- AE 1770 Introduction to Engineering Graphics and Visualization
- ARCH 4420 Introduction to Design Computing
- BC 3630 Project Management I
- BIOL 3332 Statistical and Mathematical Biology
- CEE 1770 Introduction to Engineering Graphics and Visualization
- CHEM 1313 Quantitative Analysis
- CP 4510 Fundamentals of Geographic Information Systems
- CS 1301 Introduction to Computing
- CS 1315 Introduction to Media Computation
- CS 1316 Representing Structure and Behavior
- CS 1331 Introduction to Object-Oriented Programming
- CS 1332 Data Structures and Algorithms for Applications
- CS 4235 Introduction to Information Security
- EAS 4430 Remote Sensing and Data Analysis
- ECE 2030 Introduction to Computer Engineering
- ID 3103 Industrial Design Computing I
- ID 4103 Alias Studio I
- LCC 3402 Graphic and Visual Design
- LCC 3404 Designing for the Internet
- LCC 3410 The Rhetoric of Nonlinear Documents
- ME 1770 Introduction to Engineering Graphics and Visualization
- ME 2016 Computing Techniques
- MGT 2200 Information Technology
- MGT 4051 Decision Support and Expert Systems
- MGT 4052 Systems Analysis and Design
- MGT 4058 Database Management Systems
- MGT 4661 Database Management
- MUSI 4630 Music Recording and Mixing
- PHYS 3266 Computational Physics

### WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

### MATHEMATICS

The mathematics requirement may be satisfied by one of the following sequences: MATH 1711/MATH 1712; MATH 1501/MATH 1502. ECON Majors are encouraged to pursue the MATH 1501/1502, sequence as it will better prepare them for the upper level ECON courses.

If students take a combination of MATH 1712 and either MATH 1501/1502 they will only receive credit for one of the courses (not both).

### SCIENCE AND ENGINEERING ELECTIVES

Students must complete a laboratory sequence in biology, chemistry, physics, or earth and atmospheric sciences, along with three hours of electives chosen from engineering, science, or mathematics, for a total of eleven hours.

The ENG/SCI/MATH Elective requirement is only for ECON and GEML majors.  Please see the

academic advisor for classes that will satisfy this requirement.

### SOCIAL SCIENCES ELECTIVES

All students must complete twelve hours of electives in the social sciences, including three semester hours from HIST 2111, HIST 2112, POL 1101, PUBP 3000, or INTA 1200 to satisfy state requirements regarding coursework in the history and constitutions of the United States and Georgia. Also required are nine hours from the following list:

### ARCHITECTURE AND CITY PLANNING

ARCH 4331, 4335; CP 4010, 4020, 4030

### HISTORY, SOCIOLOGY, AND HISTORY, TECHNOLOGY, AND SOCIETY

All HIST, SOC, and HTS courses except 2927, 2928, 2929, 4925, 4926, 4927, 4928, 4929

### INTERNATIONAL AFFAIRS

INTA 1100, 2030, 2100, 2200, 2220, 2230, 3240, 3801, 3802, 3803, 4801, 4802, 4803

### POLITICAL SCIENCE AND PUBLIC POLICY

All POL and PUBP courses except 3113, 3600, 4530, 4532, 4901, 4902, 4903, 4951, 4952

### ECONOMICS

All ECON courses except 3160, 3200, 4170, 4910, 4990

### PSYCHOLOGY

PSYC 1101, 2015, 2020, 2103, 2210, 2220, 2230, 2240, 2260, 2300, 2400, 3060, 4070, 4770

### HUMANITIES ELECTIVES

Students are required to complete six hours of humanities from the following list:

### ARCHITECTURE, INDUSTRIAL DESIGN, AND CITY PLANNING

ARCH 2111, 2112; COA 2115, 2116, 2241, 2242; CP 4040; ID 2202; MUSI 3610, 3620

### LITERATURE, COMMUNICATION, AND CULTURE

All ENGL and LCC courses except LCC 2661, 2662, 3400, 3402, 3404, 3406, 3408, 3410, 3412, 3661, 3662, 4100, 4102, 4200, 4400, 4402, 4404, 4406, 4600, 4602, 4904, 4906

### MODERN LANGUAGES

- All CHIN courses beginning with CHIN 1002 except CHIN 4901, 4902
- All FREN courses beginning with FREN 1002 except FREN 4901, 4902
- All GRMN courses beginning with GRMN 1002 except GRMN 4901, 4902
- All JAPN courses beginning with JAPN 1002
- All LING courses except LING 4901, 4902
- All RUSS courses beginning with RUSS 1002 except RUSS 4901, 4902
- All SPAN courses beginning with SPAN 1002 except SPAN 4901, 4902

### PHILOSOPHY, SCIENCE, AND TECHNOLOGY

All PST courses except PST 4901, 4902, 4903

### INTERNATIONAL ELECTIVE

Any course offered by the School of International Affairs satisfies this requirement.

### CLUSTER ELECTIVES

Students must complete at least twelve hours of credit in a planned cluster in a discipline other than economics. This requirement is most easily satisfied through a certificate program. Any other concentration must be approved by the faculty of the School of Economics. The student must earn a *C* or better in these courses. EIA and GEML students have different requirements to satisfy this area, please see the academic advisor for specifics of this requirement.

## INDIVIDUAL RESEARCH PROJECT

ECON and GEML students are required to take ECON 4910, producing a formal research paper in the senior year. EIA students are required to take ECON/INTA 4740 & ECON/INTA 4741 rather than ECON 4910.

## FREE ELECTIVES

Students must complete free electives (normally bearing twenty hours of credit), bringing the number of credit hours received up to 122. Only free electives may be taken on a pass/fail basis, subject to Institute limitations. EIA students are required to take ten hours of Free Elective credit rather than the twenty hours required for ECON and GEML students.

## BACHELOR OF SCIENCE IN GLOBAL ECONOMICS & MODERN LANGUAGES - INTERNATIONAL PLAN

The degree requirements for the Global Economics and Modern Language (Chinese, French, German, Japanese and Spanish)-International Plan are basically the same as for the GEML degree, except that students are required to spend two terms abroad and then achieve Intermediate High (for Chinese and Japanese: Intermediate Low) on the standardized ACTFL testing scale during an oral interview. The costs of the test will be paid for by the School of Modern Languages for each student. The terms abroad may typically consist of one semester of study plus a significant amount of time spent with a research or work project abroad. Students may also opt for a second semester. GEML-IP majors are also strongly encouraged to enroll in the LBAT intensive summer programs offered by the School of Modern Languages.

In addition to gaining advanced global competence, the International Plan designation will set you apart from other applicants with recruiters from top companies and governmental agencies.

Other Required Courses include the following, and these can easily be obtained within the regular required curriculum offerings of ECON and Modern Languages. These requirements can also be met with courses taken abroad, upon consultation with ECON degree advisors.

5. At least one course focused on international relations historically and theoretically, including topics such as the role of state sovereignty and nationalism and non-state actors in the international system; international conflict, peace, security, intervention, and nation-building; international organizations, law, and ethics; transnational problems of the environment, terrorism, health, and migration; among other issues (see INTA courses).
6. At least one course that provides a historical and theoretical understanding of the global economy, including topics such as international trade, finance, investment, and production; regional economic integration (such as the EU); economic development and modernization; and questions of natural resource sustainability.
7. At least one course that provides familiarity with an area of the world or a country that allows them to make systematic comparisons with their own society and culture. This course could come from various disciplinary perspectives, including history, public policy, philosophy, international affairs, literature, economics, management, architecture, among others. Upper division Modern Language course will count here.
8. A culminating course, occurring either at the end of or after the international experience that integrates knowledge of the discipline and the international experience in a global context.

## MINOR IN ECONOMICS

The School of Economics offers a Minor in Economics for students in all disciplines at Georgia Tech. The minor program provides a general acquaintance with economic thought and is especially valuable for students considering graduate work in law or management. It should also be attractive to students who wish to broaden their education and to understand the forces that shape the modern world.

The minor requires a minimum of eighteen semester hours in economics, of which twelve semester hours are upper-level courses (numbered 3000 or above). All courses counting toward the minor must be taken on a letter-grade basis and must be completed with an overall grade point average of at least 2.0. Courses required by name and number in a student's major degree program may not be used toward the minor.

## CERTIFICATE IN ECONOMICS

The School of Economics offers a Certificate in Economics for students in all disciplines at Georgia Tech. The certificate program provides a general acquaintance with economic thought and is especially appropriate for students considering graduate work in law or business administration. The certificate program should also be attractive to students who want to apply the tools of economics toward a fuller understanding of the forces that shape the modern world.

The certificate requires a minimum of twelve semester hours of economics courses in which a *C* or better is earned. At least nine hours of credit must be at the 3000 level or above. Courses required in the student's major degree program may not be used toward the certificate.

## MASTER OF SCIENCE WITH A MAJOR IN ECONOMICS

The School of Economics offers a Master of Science degree for those desiring to pursue economics at an advanced level. Grounded in applied economic theory and econometrics, this is a three-semester program that prepares students for professional careers in the private and public sectors as well as for more advanced training in economics doctoral programs. Although the master's curriculum is flexible in allowing students to tailor areas of specialization to their specific interests, the program is particularly well suited to those interested in industrial organization, technology, innovation, international trade, and economic development.

Core courses in the program require that students take microeconomic and macroeconomic theory, research methods, probability and statistics, and econometrics. In addition to the core, students must also complete a total of four courses that reflect two areas of concentration consistent with students' interests. An advantage of the master's program is that it allows students to complete their areas of concentration by taking courses in units outside the School of Economics, including the Sam Nunn School of International Affairs, the School of Public Policy, the School of Industrial and Systems Engineering, and the College of Architecture.

Students admitted into the master's program are also encouraged to pursue a summer internship. This allows students to apply their economic knowledge and statistical tools to problems that are encountered in professional private and public sector environments.

The Master of Science degree requires a minimum of thirty-three semester credit hours of coursework with:

1. at least twelve hours of economic theory and applied economics;
2. at least one additional quantitative methods course beyond econometrics; and
3. a master's thesis or, for a nonthesis option, one additional course offered in the School of Economics.

# SCHOOL OF HISTORY, TECHNOLOGY, AND SOCIETY

Established in 1990
Location: D. M. Smith Building
Telephone: 404.894.3196
Fax: 404.894.0535
Web site: www.hts.gatech.edu

## GENERAL INFORMATION

The School of History, Technology, and Society (HTS), dedicated to the ideal of a well-rounded education at a technological university, provides instruction in the social sciences to every student at the Georgia Institute of Technology. The School offers courses in history and sociology leading to the degrees of Bachelor of Science in History, Technology, and Society; Master in History and Sociology of Technology and Science; and Doctor of Philosophy in History and Sociology of Technology and Science. HTS also offers a variety of minor and certificate programs for students in other undergraduate majors.

## FACULTY

### Chair and Professor

Ronald H. Bayor

### Melvin Kranzberg Professor of the History of Technology

John Krige

### Professors

Douglas Flamming, Lawrence Foster, August W. Giebelhaus, Hanchao Lu, Kristie Macrakis, Gregory H. Nobles, Carole E. Moore, Willie Pearson Jr., Sue V. Rosser (Dean of Ivan Allen College), Jonathan Schneer, John L. Tone

### Associate Professors

Eleanor Alexander, Wenda K. Bauchspies, Stephen W. Usselman

### Assistant Professors

Laura Bier, Amanda Damarin, Carla Gerona, Jennifer L. Smith, William Winders

## BACHELOR OF SCIENCE IN HISTORY, TECHNOLOGY, AND SOCIETY

The bachelor's degree in History, Technology, and Society is comparable to traditional degrees in history and sociology, but HTS has several attributes that make it unique and give our students an edge over other liberal arts majors. A degree in HTS requires broad-based training in humanities, mathematics, computing, science, and social sciences, giving our majors a truly rigorous and broad education. The program's focus on global issues related to the origin and impact of technology and science is also distinctive, providing students with the critical tools needed to understand the development of the modern world. Finally, the HTS curriculum allows more free electives than any major at Georgia Tech, giving our students a chance to pursue minor degrees, certificates, and other interests that prepare them for the broadest possible range of careers, from government and politics, to law and medicine, to journalism and business.

# BACHELOR OF SCIENCE IN HISTORY, TECHNOLOGY, AND SOCIETY
## 2008 - 2009 DEGREE REQUIREMENTS
### SCHOOL OF HISTORY, TECHNOLOGY, AND SOCIETY
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I or MATH 1712 SURVEY OF CALCULUS | 4 |
| LAB SCIENCE (BIOL, CHEM, EAS, PHYS) | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II or MATH 1711 FINITE MATHEMATICS | 4 |
| LAB SCIENCE (BIOL, CHEM, EAS, PHYS) | 4 |
| HTS 1001 INTRODUCTION TO HISTORY, TECHNOLOGY, AND SOCIETY | 3 |
| COMPUTING REQUIREMENT | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-FALL | HRS |
|---|---|
| HTS 1031 EUROPE SINCE THE RENAISSANCE | 3 |
| HTS 2101 RESEARCH METHODS | 3 |
| MODERN LANGUAGE HUMANITIES ELECTIVE | 3 |
| SOC 1101 INTRODUCTION TO SOCIOLOGY | 3 |
| NON-MAJOR CLUSTER | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| ECON 2105 or 2100 or 2106 | 3 |
| HTS ELECTIVE (Technology & Society) | 3 |
| MODERN LANGUAGE HUMANITIES ELECTIVE | 3 |
| NON-MAJOR CLUSTER | 3 |
| HIST 2111 THE UNITED STATES TO 1877 OR 2112 THE UNITED STATES SINCE 1877 | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-FALL | HRS |
|---|---|
| HTS ELECTIVE (Technology & Society) | 3 |
| HTS ELECTIVES | 6 |
| NON-MAJOR CLUSTER | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| HTS ELECTIVES | 6 |
| NON-MAJOR CLUSTER | 3 |
| FREE ELECTIVES | 6 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| HTS ELECTIVES | 6 |
| HTS SEMINAR | 4 |
| FREE ELECTIVES | 6 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FOURTH YEAR-SPRING | HRS |
|---|---|
| HTS ELECTIVE | 3 |
| HTS SEMINAR | 4 |
| FREE ELECTIVES | 6 |

| | |
|---|---|
| **TOTAL SEMESTER HOURS =** | **13** |

**TOTAL PROGRAM HOURS = 120 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

## REQUIREMENTS AND ELECTIVES

### COMPUTING REQUIREMENT

Students complete either CS 1315, CS 1301, or a computer programming course approved as satisfying the general education requirements in computer literacy.

### WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

### HUMANITIES AND FINE ARTS

HTS students take ENGL 1101 and 1102 and six credit hours in a single foreign language.

### SOCIAL SCIENCE ELECTIVES

The state of Georgia requires all students to take a course on the government and history of the United States and Georgia. Any one of the following courses will fulfill this requirement: HIST 2111, HIST 2112, INTA 1200, POL 1101, OR PUBP 3000. HTS students satisfy the additional required nine hours of social science courses with their HTS classes.

### MATHEMATICS

Students complete one of the following mathematics sequences: MATH 1711 and 1712; MATH 1501 and 1502; or MATH 1501 and 1711.

### SCIENCE

Students take two the following eight courses. BIOL 1510 and 1520, CHEM 1310 and 1312/1313, EAS 1600 and 1601, and PHYS 2211 and 2212. The courses need not be taken as a sequence.

### HISTORY, TECHNOLOGY, AND SOCIETY CORE

Students acquire a grounding in history and sociology by completing the following sequence of courses: HTS 1001, HTS 1031, SOC 1101, HIST 2111 or 2112, and HTS 2101. In addition, students take two Technology and Society courses from the following: HTS 2081, 2082, 2084, 3001, 3007, 3020, 3021, 3082, 3084, 3085, and 3086. They also take one economics course from the following: Econ 2100, 2105, or 2106. Students complete two HTS 4000 level research seminars in their junior and senior years.

### MAJOR ELECTIVES, NON-MAJOR CLUSTER, FREE ELECTIVES

HTS requires that students complete an additional 21 hours of HTS electives. Students are required to complete a 12-hour non-major cluster of courses outside HTS that constitute a coherent program of study approved by HTS. These courses need not all be offered by the same school. Students are encouraged to use the remaining 21 hours of free electives to broaden themselves, complete research projects, internships, and study abroad courses, and to prepare themselves for careers and postgraduate education.

### HONORS THESIS

Qualifying students may elect to complete the honor's thesis with approval of the department.

## BACHELOR OF SCIENCE IN HISTORY, TECHNOLOGY, AND SOCIETY - INTERNATIONAL PLAN

This degree program combines the traditional benefits of an HTS degree with the additional benefits of international education. HTS strongly encourages study abroad programs and believes that international experiences greatly enhance one's undergraduate education.

The number of credit hours needed for this degree (B.S. in History, Technology, and Society-International Plan) is the same as for the traditional bachelor's degree in HTS. However, the International Plan (IP) degree has different requirements. These requirements are discussed briefly in the next paragraph. In most cases, HTS majors will be able to use their free-elective hours to fulfill the HTS-IP requirements.

There are two IP tracks: the English Language Option, and the Foreign Language Option. HTS supports both options, which the Institute deems to be equal in difficulty and value. Both tracks require a total of twenty-six weeks in residence in a specific foreign country or region. These weeks must be accumulated in one or two trips abroad; any combination of coursework, research, internship, or work may apply to this twenty-six week total, given the approval of the HTS undergraduate coordinator. Both IP tracks require a minimum of twelve credit hours in one foreign language and demonstration of proficiency in that language. Both require participants to take a cluster of courses from a menu of IP-designated electives; both require completion of a "capstone" course, which will be offered through HTS.

For more complete information, see the official Institute IP Web site through Georgia Tech's Office of International Education.

## BACHELOR OF SCIENCE IN HISTORY, TECHNOLOGY, AND SOCIETY - RESEARCH OPTION

The HTS Research Option allows students to incorporate additional research, writing, and presentation experiences into the major program of study. Students interested in going on to graduate or professional school are encouraged to consider the research option, which allows a student to complete a significant scholarly work for presentation at a professional conference and/or publication.

In addition to the courses required of all HTS majors, including eight credit hours of research seminars and the three-credit HTS research methods course, students enrolled in the Research Plan will also complete LCC 4700 (thesis writing) and six hours of supervised individual undergraduate research.

## MINOR AND CERTIFICATE PROGRAMS

For students in other majors interested in broadening their educational experience at Georgia Tech, HTS offers minors in history and in sociology, and jointly administers a minor in Women, Science, and Technology (WST).

Alone or in conjunction with other units of the Ivan Allen College, HTS offers certificates in five fields:

- African American Studies
- Asian Affairs
- European Affairs
- History
- Sociology

The School of History, Technology, and Society also offers courses that are included in the Pre-Law certificate and minor offered by the School of Public Policy.

Minors are awarded upon completion of six approved courses. Certificates require four approved courses. Certificates and minors will be granted only to students who have satisfied requirements for an undergraduate major degree. For more information on HTS undergraduate programs, contact the director of Undergraduate Studies in HTS at 404.894.3196.

## MASTER OF SCIENCE IN HISTORY AND SOCIOLOGY OF TECHNOLOGY AND SCIENCE

The School offers a program of graduate study in the history and sociology of technology and science at both the master's and doctoral levels. The two-year master's program consists of foundation courses in history, social theory, and research methods, as well as more specialized reading and research seminars. The program emphasizes the understanding of technology and science within a broad social and historical context. Students develop a strong general background in history and sociology, and acquire skills in research, social analysis, and writing.

The basic curriculum of thirty hours (required of both M.S. and Ph.D. candidates) consists of nine hours of required fundamental courses, twelve hours of core electives within HTS, an advanced interdisciplinary seminar, and six hours of free electives. No more than six electives may be counted as an independent study. Students must also complete a major research paper. Comprehensive examinations are normally taken in the third academic year. The examinations will cover material from three fields of study, which will be determined by a student's selection of history or sociology as the area of concentration.

In addition to satisfactory performance in the comprehensive examinations, students must also pass a foreign language examination (normally in French, German, or Spanish) before being admitted to candidacy for the Ph.D. Having met these requirements, the candidate will submit a dissertation proposal, which must meet the approval of his or her dissertation committee. The candidate will then proceed to the final requirement for the degree: the completion of the Ph.D. dissertation and its successful defense by oral examination.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN HISTORY & SOCIOLOGY OF TECHNOLOGY & SCIENCE

The School offers a program of graduate study in the history and sociology of technology and science at both the master's and doctoral levels. The two-year master's program consists of foundation courses in history, social theory, and research methods, as well as more specialized reading and research seminars. The program emphasizes the understanding of technology and science within a broad social and historical context. Students develop a strong general background in history and sociology, and acquire skills in research, social analysis, and writing.

The basic curriculum of thirty hours (required of both M.S. and Ph.D. candidates) consists of nine hours of required fundamental courses, twelve hours of core electives within HTS, an advanced interdisciplinary seminar, and six hours of free electives. No more than six electives may be counted as an independent study. Students must also complete a major research paper. Comprehensive examinations are normally taken in the third academic year. The examinations will cover material from three fields of study, which will be determined by a student's selection of history or sociology as the area of concentration.

In addition to satisfactory performance in the comprehensive examinations, students must also pass a foreign language examination (normally in French, German, or Spanish) before being admitted to candidacy for the Ph.D. Having met these requirements, the candidate will submit a dissertation proposal, which must meet the approval of his or her dissertation committee. The candidate will then proceed to the final requirement for the degree: the completion of the Ph.D. dissertation and its successful defense by oral examination.

# THE SAM NUNN SCHOOL OF INTERNATIONAL AFFAIRS

Established in 1990
Location: Habersham Building
781 Marietta Street
Telephone: 404.894.3195
Fax: 404.894.1900
Web site: www.inta.gatech.edu

## GENERAL INFORMATION

The Sam Nunn School of International Affairs offers educational programs that provide an enhanced understanding of the factors that shape the world in which we live and work in the twenty-first century. The programs of study equip students with the quantitative and qualitative skills needed to engage in strategic planning and analysis in an international context. A unique interdisciplinary curriculum provides students with an understanding of the increasing importance of technology in a borderless world. Many graduates assume professional positions with business, government, and international organizations. Other graduates pursue postgraduate or professional education in a range of disciplines that includes law, business, international affairs, public administration, and economics.

The Sam Nunn School of International Affairs is the only one of its kind at a leading technological institute. The educational programs administered by the Sam Nunn School at Georgia Tech are designed to equip students with the skills, values, and experience to build bridges between the world of science and technology and the world of international relations.

## FACULTY

### Chair and Professor

William J. Long

### Director of Graduate Programs and Associate Professor

Brian Woodall

### Director of Undergraduate Programs and Associate Professor

Molly Cochran

### Professors

John W. Garver, Seymour Goodman, Robert Kennedy, Sam Nunn, Michael D. Salomone, Fei-Ling Wang

### Associate Professors

Vicki Birchfield, Kirk Bowman, Peter Brecke, Edward Keene, Adam Stulberg, Katja Weber

### Assistant Professors

Michael Best, Dan Breznitz, Michelle Dion, Mikulas Fabry, Justin Hastings, Margaret Kosal, Austin Long, Mark Zachary Taylor

### Jointly Appointed Professors

John R. McIntyre, Edmund B. Richmond (emeritus), Richard D. Teach (emeritus)

## UNDERGRADUATE PROGRAMS - GENERAL INFORMATION

The Sam Nunn School offers three outstanding undergraduate degree programs: the Bachelor of Science in International Affairs, the Bachelor of Science in International Affairs and Modern Language, and the Bachelor of Science in Economics and International Affairs. Please note that graduation checklists for these degrees are available on the Sam Nunn School Web site: www.inta.gatech.edu

## BACHELOR OF SCIENCE IN INTERNATIONAL AFFAIRS

The Bachelor of Science in International Affairs (B.S. IA) program includes instruction in international affairs, foreign languages, ethics and philosophy, social and natural sciences, and computer science. Upper-division coursework provides training in four substantive areas:

- technology, ethics, and scientific analysis;
- international security and diplomacy;
- comparative politics, cultures, and societies; and
- international political economy.

Graduates of the B.S. IA program are prepared for advanced graduate and professional study and are ready for employment in internationally oriented firms, government agencies, and nonprofit organizations.

International Affairs majors are strongly encouraged to enhance their education through participation in study abroad programs, internships, and a host of on- and off-campus programs. In addition to the numerous opportunities afforded through Georgia Tech's Office of International Education, the Sam Nunn School sponsors rigorous summer study abroad programs in the European Union (Brussels), East Asia (China, Japan, Taiwan), Argentina (Buenos Aires), and Mexico (Monterrey). Recognizing the importance of professional experience in enhancing a student's education, the Sam Nunn School encourages majors to pursue an internship or participate in the Cooperative Plan in their field of interest. In addition, students are strongly encouraged to get involved in a range of extracurricular activities, including Model United Nations; the European Union Center; AIESEC; Sigma Iota Rho (the International Affairs honor society); the Center for International Strategy, Technology, and Policy; the International Affairs Student Organization; and student conferences. Students are actively involved in the guest lecture series and participate in the biennial Sam Nunn/Bank of America Policy Forum.

# BACHELOR OF SCIENCE IN INTERNATIONAL AFFAIRS
## 2008 - 2009 DEGREE REQUIREMENTS
### SCHOOL OF INTERNATIONAL AFFAIRS
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| INTA 1110 INTRODUCTION TO INTERNATIONAL RELATIONS | 3 |
| MATH 1501 CALCULUS I or MATH 1712 SURVEY OF CALCULUS | 4 |
| MODERN LANGUAGE ELECTIVE | 3 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| CS 1315 INTRODUCTION TO MEDIA COMPUTATION or CS 1301 INTRODUCTION TO COMPUTING | 3 |
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| MATH 1502 CALCULUS II or MATH 1711 FINITE MATHEMATICS | 4 |
| MODERN LANGUAGE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| HTS REQUIREMENT | 3 |
| INTA 1001 ORIENTATION TO INTERNATIONAL AFFAIRS | 1 |
| INTA 2010 EMPIRICAL METHODS | 3 |
| INTA 2030 ETHICS IN INTERNATIONAL AFFAIRS | 3 |
| LAB SCIENCE (BIOL, CHEM, EAS, PHYS) | 4 |
| MODERN LANGUAGE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| INTA 2040 SCIENCE, TECHNOLOGY & INTERNATIONAL AFFAIRS | 3 |
| INTA 2100 GREAT POWER RELATIONS | 3 |
| INTA 2210 COMPARATIVE POLITICAL PHILOSOPHIES & IDEOLOGIES | 3 |
| LAB SCIENCE (BIOL, CHEM, EAS, PHYS) | 4 |
| MODERN LANGUAGE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| CLUSTER ELECTIVE | 3 |
| ECON 2100 or 2101 or 2105 or 2106 | 3 |
| INTA 3110 U.S. FOREIGN POLICY | 3 |
| INTA ELECTIVE | 3 |
| TECHNICAL REQUIREMENT | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| CLUSTER ELECTIVE | 3 |
| FREE ELECTIVE | 3 |
| INTA 3203 COMPARATIVE POLITICS | 3 |
| INTA 3301 INTERNATIONAL POLITICAL ECONOMY | 3 |
| INTA ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CLUSTER ELECTIVES | 6 |
| FREE ELECTIVE | 3 |
| INTA ELECTIVES | 6 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-SPRING | HRS |
|---|---|
| CLUSTER ELECTIVE | 3 |
| FREE ELECTIVES | 7 |
| INTA 4400 INTERNATIONAL STRATEGY & POLICY | 3 |
| **TOTAL SEMESTER HOURS =** | **13** |

**TOTAL PROGRAM HOURS = 120 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

***(DEPARTMENTAL APPROVAL REQUIRED)**

## REQUIREMENTS AND ELECTIVES

### WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

### THE INTERNATIONAL AFFAIRS CORE

Student majors acquire an understanding of the core issues in international affairs by completing the following required courses: INTA 1001, 1110, 2030, 2040, 2100, 3110, 3203, and 3301. Students are encouraged to complete INTA 1110, MGT 2250, and their U.S. History requirement early to make the most of their upper-division studies. In addition, student majors are required to round out their studies with INTA/ECON 4740/4741, a two-semester capstone senior seminar. Students must achieve a *C* or above in the international affairs core courses.

### HUMANITIES AND FINE ARTS

Students are required to complete six hours of English, including ENGL 1101 and 1102. All Tech students are required to complete an additional six hours of humanities and fine arts, which EIA students satisfy through their mandatory two-semester modern language requirement.

### SOCIAL SCIENCE ELECTIVES

In order to satisfy the United States/Georgia History and Constitution requirements, students must complete one of the following courses: INTA 1200, HIST 2111, HIST 2112, POL 1101, or PUBP 3000. Students are encouraged to take INTA 1200, which examines American government in relation to political and economic systems in countries around the world. EIA students satisfy a required nine hours of social science coursework with their INTA classes.

### HTS ELECTIVES

As is listed on the degree checklist, every student must complete one HTS course for the INTA degree. The goal of this course is a broad study of non-U.S. history. The following courses count towards this HTS requirement:

- AP (Advanced Placement) World History
- HTS 1031: Europe Since the Renaissance
- HTS 2033: Medieval Europe: 350 to 1400
- HTS 2036: Revolutionary Europe: 1789-1914
- HTS 2037: Twentieth Century Europe: 1914 to Present
- HTS 2041: History of the Modern Middle East
- HTS 2061: Traditional Asia and Its Legacy
- HTS 2062: Asia in the Modern World
- HTS 2823: History of the Islamic World to 1500
- HTS 3028: Ancient Greece: Gods, Heroes and Ruins
- HTS 3029: Ancient Rome: From Greatness to Ruins
- HTS 3030: Medieval Europe: 350 to 1400
- HTS 3035: Britain 1815 to 1914
- HTS 3036: Britain Since 1914
- HTS 3038: The French Revolution
- HTS 3039: Modern France
- HTS 3041: Modern Spain
- HTS 3043: Modern Germany
- HTS 3045: Nazi German and the Holocaust
- HTS 3061: Modern China
- HTS 3062: Modern Japan
- HTS 3063: Outposts of Empire: Comparative History of British Colonization
- HTS 3069: Modern Cuba
- HTS XXXX: Special topics: History of the Modern Middle East

Oftentimes, HTS will offer a special topics class (HTS 4000 level course) that may count towards the HTS requirement. If you would like to propose an alternate non-U.S. History course for this requirement or would like to use a non-GT course to fulfill this requirement, please speak with an advisor.

The Nunn School does not guarantee that our students can enroll in these classes, just that if enrollment is possible, the class will count towards our HTS requirement.

### MATHEMATICS AND SCIENCES

An understanding of scientific methodology and quantitative analytic skills is essential for practitioners and policymakers in today's international arena. The mathematics requirement may be satisfied by one of the following sequences: MATH 1501 and 1502; MATH 1501 and 1711; or MATH 1711 and 1712. In addition, students are required to complete eight hours of laboratory science courses. These courses do not need to be sequential. Any two of the following courses will satisfy the requirement: BIOL 1510, BIOL 1511, BIOL 1520, BIOL 1521, CHEM 1310, CHEM 1311 and 1312, EAS 1600, EAS 1601, EAS 2600, PHYS 2211, or PHYS 2212.

### TECHNOLOGY REQUIREMENT

All Nunn School undergraduates are required to complete two technology courses before graduation.

First technology requirement: Students should pick ONE of the following: CS 1301 or CS 1315. Students are allowed to take the unused course from the these two options as their second technology requirement. (For instance, if a student takes 1301 as her first technology requirement, she can take CS 1315 as her second technology requirement.)

Second technology requirement: Students should pick ONE of the following to fulfill the second technology requirement.

- AE 1770 Introduction to Engineering Graphics and Visualization
- ARCH 4420 Introduction to Design Computing
- BC 3630 Project Management I
- BIOL 3332 Statistical and Mathematical Biology
- BMED 2803 Introduction to Biostatistics
- CEE 1770 Introduction to Engineering Graphics and Visualization
- CHEM 1313 Quantitative Analysis
- CP 4510 Fundamentals of Geographic Information Systems
- CS 1315 Introduction to Media Computation
- CS 1301 Introduction to Computing
- CS 1331 Intro to Object-Oriented Programming
- CS 1316 Representing Structure and Behavior
- CS 1332 Data Structures and Algorithms for Applications
- CS 4235 Introduction to Information Security
- EAS 4430 Remote Sensing and Data Analysis
- EAS 4610 Earth Modeling Systems
- ECE 2030 Introduction to Computer Engineering
- ID 3103 Industrial Design Computing I
- ID 4103 Alias Studio I
- LCC 3402 Graphic and Visual Design
- LCC 3404 Designing for the Internet
- LCC 3410 The Rhetoric of Nonlinear Documents
- ME 1770 Introduction to Engineering Graphics and Visualization
- ME 2016 Computing Techniques
- MGT 2200 Information Technology
- MGT 4051 Decision Support and Expert Systems
- MGT 4052 Systems Analysis and Design
- MGT 4058 Database Management Systems
- MGT 4661 Database Management
- MUSI 4630 Music Recording and Mixing

- PHYS 3266 Computational Physics

**PLEASE NOTE:**
INTA does not guarantee that these classes will be offered every semester nor does INTA guarantee access to these classes since it cannot control enrollment in other departments. Some of these courses require prerequisite courses and permits. For availability of courses, prerequisites, and permits, check OSCAR or contact the permit/overload contact for the specific department or the departmental advisor.

## COURSES RELATED TO THE MAJOR

The B.S. INTA curriculum is interdisciplinary, and INTA students are required to complete a total of eighteen hours of courses in fields related to the major. This requirement is satisfied by completing the following courses: ECON 2100, 2101, 2105, or 2106; one of the courses that survey non-U.S. history listed above under HTS Electives; and twelve credit hours of foreign language study in a single language. Students who have taken foreign language in the past must take the online placement test before enrolling in that language at Georgia Tech. Language courses taken on a letter grade basis will only count toward the foreign language requirement if they are at a C or above. Students may not enroll in 1000 level language courses after the successful completion of any 2000 , 3000 , or 4000 level course. Courses at the 3000 and 4000 level do not need to be taken in chronological order provided prerequisites are fulfilled.

## MAJOR ELECTIVES, NON-MAJOR CLUSTER, AND FREE ELECTIVES

International Affairs majors are encouraged to use electives to tailor-fit the core education they receive with their own specific career and postgraduate objectives. Students are required to complete at least twelve hours of elective courses taught in the Sam Nunn School. Students must achieve a C or above in the major electives. Additionally, students must complete a fifteen-hour, non-major cluster taught outside the School. The non-major cluster elective is satisfied either through fifteen hours of coursework in one school or through fifteen hours of coursework comprising a coherent program approved by the School. Free electives are then used to fill the remaining credits needed to reach 122 credits to graduate. B.S. INTA students typically have thirteen hours of free elective credit.

### INTA MAJORS:

Completing a 15-credit Non-Major Cluster is MANDATORY.

### IAML MAJORS:

Completing a 12-credit cluster is OPTIONAL since IAML students already graduate with significant specializations in International Affairs AND modern language. For IAML students, completing the cluster is a bonus to include on the resume, a specialization in a third area. If IAML students do not want to complete a cluster, they can use the cluster electives as additional FREE electives, with no limitations on the type of courses.

### EIA MAJORS

Completing a nine-credit Non-Major Cluster is MANDATORY. Please see the Economics advisor for guidance with your cluster.

### POPULAR CLUSTERS

Some of the more popular clusters are management (combining MGMT and ECON classes), pre-law (combining PUBP and HTS classes), History (combining HIST and HTS classes), Psychology, Language and Economics. Some students have been very creative by creating clusters in journalism (with cross-enrollment at GSU), writing (combining writing intensive course from a variety of departments), sociology (with cross-enrollment from Emory), general sciences and engineering.

## BACHELOR OF SCIENCE IN INTERNATIONAL AFFAIRS - INTERNATIONAL PLAN

The Bachelor of Science in International Affairs (B.S. IA) program with International Plan includes instruction in international affairs, foreign languages, ethics and philosophy, social and natural sciences, and computer science. Upper-division coursework provides training in four substantive areas:

1. technology, ethics, and scientific analysis;
2. international security and diplomacy;
3. comparative politics, cultures, and societies; and
4. international political economy.

Graduates of the B.S. IA program with International Plan are prepared for advanced graduate and professional study and are ready for employment in internationally oriented firms, government agencies, and non- profit organizations.

While on the Atlanta campus, students are strongly encouraged to enhance their education through participation in domestic internships, and a host of on- and off-campus programs. In addition to the numerous opportunities afforded through Georgia Tech's Office of International Education, the Sam Nunn School sponsors rigorous summer study abroad programs in the European Union (Brussels), East Asia (China, Japan, Taiwan), Costa Rica, and Argentina (Buenos Aires). Recognizing the importance of professional experience in enhancing a student's education, the Sam Nunn School encourages majors to pursue an internship or participate in the Cooperative Plan in their field of interest. In addition, students are strongly encouraged to get involved in a range of extracurricular activities, including Model United Nations; the European Union Center; AIESEC; Sigma Iota Rho (the International Affairs honor society); the Center for International Strategy, Technology, and Policy; the International Affairs Student Organization; and student conferences. Students are actively involved in the guest lecture series and participate in the biennial Sam Nunn/Bank of America Policy Forum.

International Affairs majors with the International Plan are engaged in a combination of study, research, or internship abroad for a total of twenty-six weeks. This overseas experience must be obtained over two terms (a summer and semester, or two semesters). In addition to gaining advanced global competence, the International Plan designation will set INTA students apart from other applicants with recruiters from top companies and governmental agencies. Required coursework for the International Plan is easily satisfied by the International Affairs core curriculum as follows:

- At least one course focused on international relations historically and theoretically, including topics such as the role of state sovereignty and nationalism and non-state actors in the international system; international conflict, peace, security, intervention, and nation-building; international organizations, law, and ethics; transnational problems of the environment, terrorism, health, and migration; among other issues (Satisfied by INTA 1110.)
- At least one course that provides a historical and theoretical understanding of the global economy, including topics such as international trade, finance, investment, and production; regional economic integration (such as the EU); economic development and modernization; and questions of natural resource sustainability. (Satisfied by INTA 3301.)
- At least one course that provides familiarity with an area of the world or a country that allows them to make systematic comparisons with their own society and culture. This course could come from various disciplinary perspectives, including history, public policy, philosophy, international affairs, literature, economics, management, architecture, among others. Upper division Modern Language courses will count here. (Satisfied by INTA 3203.)
- A culminating course, occurring either at the end of or after the international experience that integrates knowledge of the discipline and the international experience in a global context. (Satisfied by INTA 4400.)

## BACHELOR OF SCIENCE IN ECONOMICS AND INTERNATIONAL AFFAIRS

In partnership with the School of Economics, the Sam Nunn School offers the Bachelor of Science degree in Economics and International Affairs. Students in this program are provided with an understanding of economic theory and practice in the contemporary world; an understanding of the global, interdependent, and multicultural environment in which they live; and a set of quantitative and qualitative analytical skills centered upon policy-relevant issues in the economic and international arenas. A detailed description of the degree program is found in the School of Economics section of this catalog.

# BACHELOR OF SCIENCE IN ECONOMICS AND INTERNATIONAL AFFAIRS
## 2008 - 2009 DEGREE REQUIREMENTS
### SCHOOL OF ECONOMICS
Suggested Schedule

| FIRST YEAR-FALL | HRS |
| --- | --- |
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| INTA 1110 INTRODUCTION TO INTERNATIONAL RELATIONS | 3 |
| INTA 2030 ETHICS IN INTERNATIONAL AFFAIRS | 3 |
| MATH 1501 CALCULUS I or MATH 1712 SURVEY OF CALCULUS | 4 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FIRST YEAR-SPRING | HRS |
| --- | --- |
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| INTA 2100 GREAT POWER RELATIONS | 3 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| HTS 1031 or 2033 or 2036 or 2062 | 3 |
| MATH 1502 CALCULUS II or MATH 1711 FINITE MATHEMATICS | 4 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
| --- | --- |
| ECON 2106 PRINCIPLES OF MICROECONOMICS | 3 |
| INTA 1001 ORIENTATION TO INTERNATIONAL AFFAIRS | 1 |
| INTA 2040 SCIENCE, TECHNOLOGY, & INTERNATIONAL AFFAIRS | 3 |
| LAB SCIENCE I | 4 |
| MGT 2250 MANAGEMENT STATISTICS | 3 |
| MODERN LANGUAGE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
| --- | --- |
| ECON 2105 PRINCIPLES OF MACROECONOMICS | 3 |
| LAB SCIENCE II | 4 |
| INTA 3110 U.S. FOREIGN POLICY | 3 |
| INTA ELECTIVE | 3 |
| MODERN LANGUAGE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
| --- | --- |
| CS 1315 INTRODUCTION TO MEDIA COMPUTATION or<br>CS 1301 INTRODUCTION TO COMPUTING | 3 |
| ECON 3110 ADVANCED MICROECONOMIC ANALYSIS | 3 |
| ECON 3161 ECONOMETRIC ANALYSIS | 3 |
| INTA 3203 COMPARATIVE POLITICS | 3 |
| NON MAJOR CLUSTER ELECTIVE* | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-SPRING | HRS |
| --- | --- |
| ECON 3120 ADVANCED MACROECONOMIC ANALYSIS | 3 |
| ECONOMICS ELECTIVE | 3 |
| FREE ELECTIVE | 3 |
| NON MAJOR CLUSTER ELECTIVE* | 3 |
| TECHNICAL REQUIREMENT | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
| --- | --- |
| ECON 4350 INTERNATIONAL ECONOMICS | 3 |
| ECON\INTA 4740 SEMINAR IN POLITICAL ECONOMY | 3 |
| INTA 3301 INTERNATIONAL POLITICAL ECONOMY | 3 |
| FREE ELECTIVE | 3 |
| NON MAJOR CLUSTER ELECTIVE* | 3 |

| | |
|---|---|
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| ECON\INTA 4741 THESIS IN POLITICAL ECONOMY | 3 |
| ECONOMICS ELECTIVE | 3 |
| FREE ELECTIVES | 4 |
| INTA ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **13** |

**TOTAL PROGRAM HOURS = 120 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

*** MUST BE APPROVED BY DEPARTMENT**

## REQUIREMENTS AND ELECTIVES

### WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

### THE INTERNATIONAL AFFAIRS CORE

Student majors acquire an understanding of the core issues in international affairs by completing the following required courses: INTA 1001, 1110, 2030, 2040, 2100, 3110, 3203, and 3301. Students are encouraged to complete INTA 1110, MGT 2250, and their U.S. History requirement early to make the most of their upper-division studies. In addition, student majors are required to round out their studies with INTA/ECON 4740/4741, a two-semester capstone senior seminar. Students must achieve a *C* or above in the international affairs core courses.

### HUMANITIES AND FINE ARTS

Students are required to complete six hours of English, including ENGL 1101 and 1102. All Tech students are required to complete an additional six hours of humanities and fine arts, which EIA students satisfy through their mandatory two-semester modern language requirement.

### SOCIAL SCIENCE ELECTIVES

In order to satisfy the United States/Georgia History and Constitution requirements, students must complete one of the following courses: INTA 1200, HIST 2111, HIST 2112, POL 1101, or PUBP 3000. Students are encouraged to take INTA 1200, which examines American government in relation to political and economic systems in countries around the world. EIA students satisfy a required nine hours of social science coursework with their INTA classes.

### HTS ELECTIVES

As is listed on the degree checklist, every student must complete one HTS course for the INTA degree. The goal of this course is a broad study of non-U.S. history. The following courses count towards this HTS requirement:

- AP (Advanced Placement) World History
- HTS 1031: Europe since the Renaissance
- HTS 2033: Medieval Europe: 350 to 1400
- HTS 2036: Revolutionary Europe: 1789 to 1914
- HTS 2037: Twentieth Century Europe: 1914 to Present
- HTS 2041: History of the Modern Middle East
- HTS 2061: Traditional Asia and Its Legacy
- HTS 2062: Asia in the Modern World
- HTS 2823: History of the Islamic World to 1500
- HTS 3028: Ancient Greece: Gods, Heroes and Ruins
- HTS 3029: Ancient Rome: From Greatness to Ruins
- HTS 3030: Medieval Europe: 350 to 1400
- HTS 3035: Britain 1815 to 1914
- HTS 3036: Britain since 1914
- HTS 3038: The French Revolution
- HTS 3039: Modern France
- HTS 3041: Modern Spain
- HTS 3043: Modern Germany
- HTS 3045: Nazi German and the Holocaust
- HTS 3061: Modern China
- HTS 3062: Modern Japan
- HTS 3063: Outposts of Empire: Comparative History of British Colonization
- HTS 3069: Modern Cuba
- HTS XXXX: Special Topics: History of the Modern Middle East

Oftentimes, HTS will offer a special topics class (HTS 4000 level course) that may count towards the HTS requirement. If you would like to propose an alternate non-U.S. History course for this requirement or would like to use a non-Georgia Tech course to fulfill this requirement, please speak with an advisor.

The Nunn School does not guarantee that our students can enroll in these classes, just that if enrollment is possible, the class will count towards our HTS requirement.

## MATHEMATICS AND SCIENCES

An understanding of scientific methodology and quantitative analytic skills is essential for practitioners and policymakers in today's international arena. The mathematics requirement may be satisfied by one of the following sequences: MATH 1501 and 1502; MATH 1501 and 1711; or MATH 1711 and 1712. In addition, students are required to complete eight hours of laboratory science courses. These courses do not need to be sequential. Any two of the following courses will satisfy the requirement: BIOL 1510, BIOL 1511, BIOL 1520, BIOL 1521, CHEM 1310, CHEM 1311 and 1312, EAS 1600, EAS 1601, EAS 2600, PHYS 2211, or PHYS 2212.

## TECHNOLOGY REQUIREMENT

All Nunn School undergraduates are required to complete two technology courses before graduation.

First technology requirement: Students should pick ONE of the following: CS 1301 or CS 1315. Students are allowed to take the unused course from the these two options as their second technology requirement. (For instance, if a student takes 1301 as her first technology requirement, she can take CS 1315 as her second technology requirement.)

Second technology requirement: Students should pick ONE of the following to fulfill the second technology requirement.

- AE 1770 Introduction to Engineering Graphics and Visualization
- ARCH 4420 Introduction to Design Computing
- BC 3630 Project Management I
- BIOL 3332 Statistical and Mathematical Biology
- BMED 2803 Introduction to Biostatistics
- CEE 1770 Introduction to Engineering Graphics and Visualization
- CHEM 1313 Quantitative Analysis
- CP 4510 Fundamentals of Geographic Information Systems
- CS 1315 Introduction to Media Computation
- CS 1301 Introduction to Computing
- CS 1331 Intro to Object-Oriented Programming
- CS 1316 Representing Structure and Behavior
- CS 1332 Data Structures and Algorithms for Applications
- CS 4235 Introduction to Information Security
- EAS 4430 Remote Sensing and Data Analysis
- EAS 4610 Earth Modeling Systems
- ECE 2030 Introduction to Computer Engineering
- ID 3103 Industrial Design Computing I
- ID 4103 Alias Studio I
- LCC 3402 Graphic and Visual Design
- LCC 3404 Designing for the Internet
- LCC 3410 The Rhetoric of Nonlinear Documents
- ME 1770 Introduction to Engineering Graphics and Visualization
- ME 2016 Computing Techniques
- MGT 2200 Information Technology
- MGT 4051 Decision Support and Expert Systems
- MGT 4052 Systems Analysis and Design
- MGT 4058 Database Management Systems
- MGT 4661 Database Management
- MUSI 4630 Music Recording and Mixing

- PHYS 3266 Computational Physics

**PLEASE NOTE:**
INTA does not guarantee that these classes will be offered every semester nor does INTA guarantee access to these classes since it cannot control enrollment in other departments. Some of these courses require prerequisite courses and permits. For availability of courses, prerequisites, and permits, check OSCAR or contact the permit/overload contact for the specific department or the departmental advisor.

## COURSES RELATED TO THE MAJOR

The B.S. EIA curriculum is multidisciplinary, and EIA students are required to complete a total of twelve hours of courses in fields related to the major. This requirement is satisfied by completing the following courses: a statistics course, MGT 2250; one of the courses that survey non-U.S. history listed above under HTS Electives; and six credit hours of foreign language study in a single language. Students who have taken foreign language in the past must take the online placement test before enrolling in that language at Georgia Tech. Language courses taken on a letter grade basis will only count toward the foreign language requirement if they are at a *C* or above. Students may not enroll in 1000 level language courses after the successful completion of any 2000 , 3000 , or 4000 level course. Courses at the 3000 and 4000 level do not need to be taken in chronological order provided prerequisites are fulfilled.

## MAJOR ELECTIVES, NON-MAJOR CLUSTER, AND FREE ELECTIVES

Economics and International Affairs majors are encouraged to use electives to tailor-fit the core education they receive with their own specific career and postgraduate objectives. Students are required to complete at least six hours of elective courses taught in the Sam Nunn School and six hours of elective courses taught in the School of Economics. Students must achieve a C or above in the major electives. Additionally, students must complete a nine-hour, non-major cluster taught outside the School. The non-major cluster elective is satisfied either through nine hours of coursework in one school or through nine hours of coursework comprising a coherent program approved by the School. Free electives are then used to fill the remaining credits needed to reach 122 credits to graduate. B.S. EIA students typically have ten hours of free elective credit.

### INTA MAJORS:

Completing a fifteen-credit non-major cluster is MANDATORY.

### IAML MAJORS:

Completing a twelve-credit cluster is OPTIONAL since IAML students already graduate with significant specializations in International Affairs and Modern Language. For IAML students, completing the cluster is a bonus to include on the resume, a specialization in a third area. If IAML students do not want to complete a cluster, they can use the cluster electives as additional FREE electives, with no limitations on the type of courses.

### EIA MAJORS

Completing a nine-credit non-major cluster is MANDATORY. Please see the Economics advisor for guidance with your cluster.

### POPULAR CLUSTERS

Some of the more popular clusters are management (combining MGMT and ECON classes), pre-law (combining PUBP and HTS classes), History (combining HIST and HTS classes), Psychology, Language and Economics. Some students have been very creative by creating clusters in journalism (with cross-enrollment at GSU), writing (combining writing intensive courses from a variety of departments), sociology (with cross-enrollment from Emory), general sciences and engineering.

# BACHELOR OF SCIENCE IN ECONOMICS AND INTA

## INTERNATIONAL PLAN #1

Option 1 (including foreign language proficiency):

- Two terms abroad: Options include the following:
  - Summer program plus a semester of study
    - LBAT or other faculty-led program plus language immersion program
    - Semester at a foreign university: courses taken in target language
  - One semester of study at a foreign university plus an internship abroad
    - LBAT recommended as language preparation plus foreign university intensive program
    - Semester at a foreign university: courses taken in target language
    - Three-to-six month internship with an organization or company abroad or a faculty-led international research experience
  - Two semesters of study at a foreign university
    - LBAT recommended as language preparation plus foreign university intensive program
    - Coursework completed in target language
- Intermediate High proficiency level in a foreign language
  - Testing based on ACTFL oral proficiency testing in Speaking

## IMPLEMENTATION:

- Degree requirements remain the same
- Students earn credit abroad towards ECON/INTA degree with courses approved by Economics
  - Students advised by host university and request approval of semester schedule from ECON undergraduate director and academic advisor
  - ECON undergraduate director and academic advisor facilitate appropriate credit transfer
- Students may elect to earn limited credits (generally a maximum of three credits) with the internship by:
  - agreeing with an ECON or INTA faculty on a written project related to the internship;
  - agreeing that credit on the language side of the project would be completed in the target language with supervision from either ECON, INTA or IAML faculty; and
  - coordinating the internship with the academic curriculum of the host university (example: Monterrey Tech provides short in-semester internships for academic credit).

## INTERNATIONAL PLAN #2

Option 2: (including partial conversation skills in a foreign language)

- Two terms abroad with an option to spend time in an English-speaking, foreign country. Possibilities include an all-English speaking, foreign experience or a combination of your choosing of English and foreign language speaking experiences abroad:
  - Summer program plus a semester of study
    - Semester at a foreign, English-speaking university or at a university where a language other than English is spoken
    - A faculty-led summer program in a foreign, English-speaking country or in a country where a language other than English is spoken
  - One semester of study at a foreign university plus an internship abroad
    - Semester at a foreign university: courses taken in target language
    - Three-to-six month internship with an organization or company abroad or a faculty-led international research experience
  - Two semesters of study at a foreign university
- Partial Conversational Skills in a foreign language

    - Required to complete two years of college-level study (or equivalent) in a single foreign language with a grade of at least *B* in every course

## IMPLEMENTATION:

- Degree requirements remain the same
- Students earn credit abroad towards ECON/INTA degree with courses approved by Economics
    - Students advised by host university and request approval of semester schedule from ECON undergraduate director and academic advisor
    - ECON undergraduate director and academic advisor facilitate appropriate credit transfer
- Students may elect to earn limited credits (generally a maximum of three credits) with the internship by;
    - agreeing with an ECON or INTA faculty on a written project related to the internship;
    - agreeing that credit on the language side of the project would be completed in the target language with supervision from either ECON, INTA or IAML faculty; and
    - coordinating the internship with the academic curriculum of the host university (example: Monterrey Tech provides short in-semester internships for academic credit).

## BACHELOR OF SCIENCE IN INTERNATIONAL AFFAIRS AND MODERN LANGUAGES

In partnership with the School of Modern Languages, the Sam Nunn School offers the Bachelor of Science in International Affairs and Modern Languages, with separate concentrations in Chinese, French, German, Japanese, and Spanish. Students in this program receive intensive foreign language training and learn the fundamentals of dealing with foreign cultures and societies. A detailed description of the degree program is found in the School of Modern Languages section of this catalog, www.catalog.gatech.edu/colleges/cola/ml/ugrad/bsintaml/geninfo.php.

# BACHELOR OF SCIENCE IN INTERNATIONAL AFFAIRS AND MODERN LANGUAGES

## 2008 - 2009 DEGREE REQUIREMENTS

## MODERN LANGUAGE USED AS A MODEL; SUBSTITUTE CHINESE, FRENCH, GERMAN, JAPANESE, OR SPANISH AS APPROPRIATE

### SCHOOL OF INTERNATIONAL AFFAIRS & SCHOOL OF MODERN LANGUAGES

Suggested Schedule

| **FIRST YEAR-FALL** | **HRS** |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| INTA 1110 INTRODUCTION TO INTERNATIONAL RELATIONS | 3 |
| MATH 1501 CALCULUS I or MATH 1712 SURVEY OF CALCULUS | 4 |
| MODERN LANGUAGE | 3 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **FIRST YEAR-SPRING** | **HRS** |
|---|---|
| CS 1315 INTRODUCTION TO MEDIA COMPUTATION or<br>CS 1301 INTRODUCTION TO COMPUTING | 3 |
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| MATH 1502 CALCULUS II or MATH 1711 FINITE MATHEMATICS | 4 |
| MODERN LANGUAGE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| **SECOND YEAR-FALL** | **HRS** |
|---|---|
| HTS REQUIREMENT * | 3 |
| INTA 1001 ORIENTATION TO INTERNATIONAL AFFAIRS | 1 |
| INTA 2010 EMPIRICAL METHODS | 3 |
| INTA 2030 ETHICS IN INTERNATIONAL AFFAIRS | 3 |
| LAB SCIENCE (BIOL, CHEM, EAS, PHYS) | 4 |
| MODERN LANGUAGE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| **SECOND YEAR-SPRING** | **HRS** |
|---|---|
| INTA 2040 SCIENCE, TECHNOLOGY & INTERNATIONAL AFFAIRS | 3 |
| INTA 2100 GREAT POWER RELATIONS | 3 |
| INTA 2210 COMPARATIVE POLITICAL PHILOSOPHIES & IDEOLOGIES | 3 |
| LAB SCIENCE (BIOL, CHEM, EAS, PHYS) | 4 |
| MODERN LANGUAGE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| **THIRD YEAR-FALL** | **HRS** |
|---|---|
| ECON 2100 or 2105 or 2106 | 3 |
| INTA 3110 U.S. FOREIGN POLICY | 3 |
| MODERN LANGUAGE | 6 |
| TECHNOLOGY REQUIREMENT ** | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **THIRD YEAR-SPRING** | **HRS** |
|---|---|
| CLUSTER ELECTIVE *** | 3 |
| INTA 3301 INTERNATIONAL POLITICAL ECONOMY | 3 |
| INTA 3203 COMPARATIVE POLITICS | 3 |
| MODERN LANGUAGE | 6 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-FALL** | **HRS** |
|---|---|
| CLUSTER ELECTIVES *** | 6 |
| FREE ELECTIVES or MODERN LANGUAGE | 6 |
| INTA 4400 INTERNATIONAL STRATEGY & POLICY | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-SPRING | HRS |
|---|---|
| CLUSTER ELECTIVES *** | 10 |
| FREE ELECTIVE or MODERN LANGUAGE | 3 |
| **TOTAL SEMESTER HOURS =** | **13** |

**TOTAL PROGRAM HOURS = 120 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

* Select "Electives" menu item on the left to view HTS requirements.

** Select "Electives" menu item on the left to view Technology requirements.

***
The non-major cluster elective is 12 units of additional approved coursework (INTA or ML classes may count if approved)

## REQUIREMENTS AND ELECTIVES

### WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

### THE MODERN LANGUAGES CORE

Student majors must complete a program of twenty-four hours of language courses beyond 2002 (beyond 2001 for CHIN and JAPN) in a single language; in addition, students entering Georgia Tech with little or no language preparation in high school may need to complete the 1000 or 2000 sequence(s). Students who have taken foreign language in the past must take the online placement test (www.modlangs.gatech.edu/student_resources/registration/placement_test.php) before enrolling in that language at Georgia Tech. Students may not enroll in 1000 or any 2000 level language courses after the successful completion of 3000 or 4000 level courses. Courses at the 3000 and 4000 level do not need to be taken in chronological order provided prerequisites are fulfilled. IAML majors are strongly encouraged to enroll in the intensive summer programs (LBAT) offered by the School of Modern Languages (CHIN 3691-2-3, taught in Yangzhou, China; FREN 3691-2-3, taught in Toulouse, France; GRMN 3695-6-7, taught in Weimar and Munich, Germany; JAPN 3691-2-3, taught in Fukuoka, Japan; and SPAN 3691-2-3-4, taught in Mexico City, Mexico and Madrid, Spain) or a comparable study, work, or research abroad experience. Classes taken in the Modern Languages core will only count toward degree requirements if they are at a grade of B or above.

### THE INTERNATIONAL AFFAIRS CORE

Student majors acquire an understanding of the core issues in international affairs by completing the following required courses: INTA 1001, 1110, 2010, 2030, 2040, 2100, 2210, 3110, 3203, and 3301. Students are encouraged to complete INTA 1110, INTA 2010, and their U.S. History requirement early to make the most of their upper-division studies. In addition, student majors are required to round out their studies with INTA 4400, a capstone senior seminar. Students must achieve a C or above in the international affairs core courses.

### HUMANITIES AND FINE ARTS

Students are required to complete six hours of English, including ENGL 1101 and 1102. All Tech students are required to complete an additional six hours of humanities and fine arts, which IAML students satisfy through their modern languages requirements.

### SOCIAL SCIENCE ELECTIVES

In order to satisfy the United States/Georgia History and Constitution requirements, students must complete one of the following courses: INTA 1200, HIST 2111, HIST 2112, POL 1101, or PUBP 3000. IAML majors are encouraged to take INTA 1200, which examines American government in relation to political and economic systems in countries around the world. IAML students satisfy a required nine hours of social science coursework with their INTA classes.

### MATHEMATICS AND SCIENCES

An understanding of scientific methodology and quantitative analytic skills is essential for practitioners and policymakers in today's international arena. The mathematics requirement may be satisfied by one of the following sequences: MATH 1501 and 1502; MATH 1501 and 1711; or MATH 1711 and 1712. In addition, students are required to complete eight hours of laboratory science courses. These courses do not need to be sequential. Any two of the following courses will satisfy the requirement: BIOL 1510, BIOL 1511, BIOL 1520, BIOL 1521, CHEM 1310, CHEM 1311 and 1312, EAS 1600, EAS 1601, EAS 2600, PHYS 2211, or PHYS 2212.

### TECHNOLOGY REQUIREMENT

All IAML undergraduates are required to complete two technology courses before graduation.

First technology requirement: Students should pick ONE of the following: CS 1301 or CS 1315. Students are allowed to take the unused course from the these two options as their second technology requirement. (For instance, if a student takes 1301 as her first technology requirement, she can take CS 1315 as her second technology requirement.)

Second technology requirement: Students should pick ONE of the following to fulfill the second technology requirement.

- AE 1770: Introduction to Engineering Graphics and Visualization
- ARCH 4420: Introduction to Design Computing
- BC 3630: Project Management I

- BIOL 3332: Statistical and Mathematical Biology
- CEE 1770: Introduction to Engineering Graphics and Visualization
- CHEM 1313: Quantitative Analysis
- CP 4510: Fundamentals of Geographic Information Systems
- CS 1315: Introduction to Media Computation
- CS 1301: Introduction to Computing
- CS 1316: Representing Structure and Behavior
- CS 1331: Introduction to Object-Oriented Programming
- CS 1332: Data Structures and Algorithms for Applications
- CS 4235: Introduction to Information Security
- EAS 4430: Remote Sensing and Data Analysis
- ECE 2030: Introduction to Computer Engineering
- ID 3103: Industrial Design Computing I
- ID 4103: Alias Studio I
- LCC 3402: Graphic and Visual Design
- LCC 3404: Designing for the Internet
- LCC 3410: The Rhetoric of Nonlinear Documents
- ME 1770: Introduction to Engineering Graphics and Visualization
- ME 2016: Computing Techniques
- MGT 2200: Information Technology
- MGT 4051: Decision Support and Expert Systems
- MGT 4052: Systems Analysis and Design
- MGT 4058: Database Management Systems
- MGT 4661: Database Management
- MUSI 4630: Music Recording and Mixing
- PHYS 3266: Computational Physics

**PLEASE NOTE:**
INTA/ML does not guarantee that these classes will be offered every semester nor does INTA/ML guarantee access to these classes since they cannot control enrollment in other departments. Some of these courses require prerequisite courses and permits. For availability of courses, prerequisites, and permits, check OSCAR or contact the permit/overload contact for the specific department or the departmental advisor.

### HTS ELECTIVES

As is listed on the degree checklist, every student must complete one HTS course for the INTA degree. The goal of this course is a broad study of non-U.S. history. The following courses count towards this HTS requirement:

- AP (Advanced Placement) World History
- HTS 1031: Europe since the Renaissance
- HTS 2033: Medieval Europe: 350 to 1400
- HTS 2036: Revolutionary Europe: 1789 to 1914
- HTS 2037: Twentieth Century Europe: 1914 to Present
- HTS 2041: History of the Modern Middle East
- HTS 2061: Traditional Asia and Its Legacy
- HTS 2062: Asia in the Modern World
- HTS 2823: History of the Islamic World to 1500
- HTS 3028: Ancient Greece: Gods, Heroes and Ruins
- HTS 3029: Ancient Rome: From Greatness to Ruins
- HTS 3030: Medieval Europe: 350 to 1400
- HTS 3035: Britain 1815 to 1914
- HTS 3036: Britain Since 1914

- HTS 3038: The French Revolution
- HTS 3039: Modern France
- HTS 3041: Modern Spain
- HTS 3043: Modern Germany
- HTS 3045: Nazi German and the Holocaust
- HTS 3061: Modern China
- HTS 3062: Modern Japan
- HTS 3063: Outposts of Empire: Comparative History of British Colonization
- HTS 3069: Modern Cuba
- HTS XXXX: Special Topics: History of the Modern Middle East

## COURSES RELATED TO THE MAJOR

The B.S. IAML curriculum is multidisciplinary, and IAML students are required to complete a total of six hours of courses in fields related to the major. This requirement is satisfied by completing the following courses: ECON 2100, 2101, 2105, or 2106; and one of the courses that survey non-U.S. history listed under the HTS Electives.

## NON-MAJOR CLUSTER AND FREE ELECTIVES

IAML majors are encouraged to use electives to tailor-fit the core education they receive with their own specific career and postgraduate objectives. Students are strongly encouraged to complete a twelve-hour, non-major cluster taught outside the School. The non-major cluster elective is satisfied either through twelve hours of coursework in one school or through twelve hours of coursework comprising a coherent program approved by both INTA and ML. Free electives are then used to fill the remaining credits needed to reach 122 credits to graduate. B.S. IAML students typically have sixteen hours of free elective credit.

## B.S. IN INTERNATIONAL AFFAIRS & MODERN LANGUAGES - INTERNATIONAL PLAN

In partnership with the School of Modern Languages, the Sam Nunn School offers the Bachelor of Science in International Affairs and Modern Languages - International Plan, with separate concentrations in Chinese, French, German, Japanese, and Spanish. Students in this program receive intensive foreign language training and learn the fundamentals of dealing with foreign cultures and societies. A detailed description of the degree program is found in the School of Modern Languages section of this catalog, www.catalog.gatech.edu/colleges/cola/ml/ugrad/bsintamlintl/geninfo.php.

## MINOR PROGRAM

The School offers a Minor in International Affairs. This program is designed for students who want a concentration outside their major that provides a greater depth of study than a certificate program. The Minor in International Affairs requires a minimum of eighteen hours of coursework, including INTA 1110 (Introduction to International Relations), one 2000 level course (not to include INTA 2010), and at least twelve hours of upper-division (3000 level or higher) coursework. No more than six hours of Special Topics coursework and three credits of Special Problems coursework may be included in the minor program.

All courses must be taken on a letter-grade basis, and a *C* or better must be received in each course. Courses required by name and number in a student's major degree program may not be included. A student may petition to allow three hours of upper-division non-INTA coursework to count toward completion of the minor if that coursework is clearly relevant to international affairs. More information concerning this program and its requirements is available through the School.

## CERTIFICATE PROGRAMS

The Sam Nunn School, often in conjunction with other units of the Ivan Allen College, administers five certificate programs. These programs enable students to pursue a focused program of study in a specific area of regional/international specialization. The School awards the following certificates:

- Asian Affairs Certificate (available to majors and non-majors)
- Latin American Affairs Certificate (available to majors and non-majors)
- European Affairs Certificate (available to majors and non-majors)
- European Union Certificate (available to majors and non-majors)
- International Affairs Certificate (available only to non-majors)

A certificate is awarded upon successful completion of a predetermined twelve-hour cluster of courses approved by the academic advisor or a specific faculty member. All courses must be taken on a letter-grade basis, and a *C*
or better must be received in each course. Certificates will be granted only to students who, in addition to the Certificate program requirements, have satisfied requirements for an undergraduate degree. Detailed information concerning these programs and their requirements is available through the School.

## GRADUATE COURSE OPTION

Under the Graduate Course Option, undergraduate students with a final grade point average of 3.5 or higher may count six hours of their undergraduate credits toward a master's degree at Georgia Tech in the same field. This means that qualified students could complete the Master of Science in International Affairs with thirty additional hours rather than thirty-six hours.

## GRADUATE COURSE OPTION

Under the Graduate Course Option, undergraduate students with a final grade point average of 3.5 or higher may count six hours of their undergraduate credits toward a master's degree at Georgia Tech in the same field. This means that qualified students could complete the Master of Science in International Affairs with thirty additional hours rather than thirty-six hours.

## MASTER OF SCIENCE IN INTERNATIONAL AFFAIRS

The Master of Science in International Affairs degree program is an eighteen-month program that is adaptable to the interests and needs of a student who intends to immediately enter a professional career requiring advanced training in international affairs or who intends to continue studying at the doctoral level. The program emphasizes both traditional theoretical knowledge of international relations and strategic planning and analysis. The program includes core courses in the following:

- International relations theory and strategy
- Comparative politics
- International political economy
- International security
- Empirical research methods
- Modeling, forecasting, and decision making

Students also have the opportunity to design the program to meet their individual interests through elective offerings in the School and interdisciplinary work in the Schools of Economics and Public Policy; and the Colleges of Computing, Engineering, Management, and others. Overseas programs and internships are encouraged and facilitated by the School.

In addition to thirty-six semester hours of coursework, students must demonstrate foreign language familiarity and economics and computer literacy. These abilities are essential tools for professional or scholarly work in international affairs. Students must satisfy these requirements upon admission or during the program.

Foreign language familiarity is defined as a minimum of one year of college-level work in a single language. This requirement can be fulfilled while in residence or can be demonstrated through an examination taken in the School of Modern Languages.

Economics literacy is satisfied by successful completion of a course or courses in microeconomic and macroeconomic principles and a course in international economics undertaken while at Georgia Tech, or by successful completion of equivalent courses at another institution.

Computer literacy is satisfied by either:

1. Successfully completing (*B* or higher) at least one semester of classes with content including at least one of the following:
    - programming computers;
    - database design and operation;
    - development and operation;
    - data analysis (if part of statistics courses, at least two quarters or two semesters);
    - simulation model design and use;
    - development and use of geographic information or cartography systems; or
    - operation of large computer systems/ computer networks.
2. Having held a job for at least six months in which a significant component of the work entailed one of the activities listed above.

The School's master's degree requirements supplement the Institute's master's degree requirements listed in the *General Catalog*. Students must achieve a grade point average of at least 3.0 to graduate, and no course below grade *C*
will count toward graduation. For more information about the M.S. IA program, visit www.inta.gatech.edu/academic-programs/graduate/.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN INTERNATIONAL AFFAIRS, SCIENCE, & TECHNOLOGY

### DOCTORAL PROGRAM

The Ph.D. program will provide an unparalleled opportunity for students with backgrounds in either politics or science and technology to deepen their understanding of international affairs through the advanced study of sub-fields such as international relations theory, international security, international political economy, comparative politics, and methods for social scientific research.

The Sam Nunn School of International Affairs exceptional faculty conduct research on a range of topics in the fields of international political economy, comparative politics, and international security policy. In addition, faculty members possess strong regional expertise in East Asia, Europe, and Latin America. The level of experience and diversity of interests among the faculty offer an extensive and enriching educational experience. The Nunn School also hosts a variety of programs that allow close interaction with scholars and practitioners of international affairs.

### ADMISSION OVERVIEW

All qualified persons are equally welcome to seek admission to the Ph.D. in International Affairs, Science and Technology (IAST) Program at the Sam Nunn School of International Affairs. The School admits approximately three-five doctoral students each year. Since the number of eligible applicants generally far exceeds the number of admission spots available, satisfying minimum admissions standards does not guarantee admission. Many well-qualified applicants cannot be accommodated. The Graduate Review Committee will examine each applicant and determine the admissions decision. Notification of admission will be sent to all applicants via mail. Please include a functional e-mail address on your admission application. The School does not discriminate on the basis of race, religion, sex, or national origin. The criteria used in determining each applicant's eligibility for consideration shall include:

### PRE-MASTER'S LEVEL:

- Completion of a B.A. or B.S. degree in any discipline from an accredited institution
- Official Graduate Record Exam (GRE) test scores (GRE test scores are valid for five years)
- Completion of introductory courses in general economics, political science, and science or engineering
- Demonstrated capability with information technology through coursework in computer programming, web design, human-computer interaction, geographic information systems, or other acceptable coursework or work experience
- Demonstrated proficiency in foreign language through two years study in a single language or if English is not the applicant's native language, a paper-TOEFL score of 550 or computer score of 213

### POST-MASTER'S LEVEL:

- Completion of a M.A. or M.S. degree in any discipline from an accredited institution
- Official Graduate Record Exam (GRE) test scores (GRE test scores are valid for five years)
- Completion of introductory courses in general economics, political science, and science or engineering
- Demonstrated capability with information technology through coursework in computer programming, web design, human-computer interaction, geographic information systems, or other acceptable coursework or work experience
- Demonstrated proficiency in foreign language through two years study in a single language or if English is not the applicant's native language, a paper-TOEFL score of 550 or computer score of 213

The committee makes the final admission decisions based on a combination of factors, including academic degrees and records, the statement of purpose, letters of recommendation, test scores, and relevant work experience. Additional information about tuition, GRE and TOEFL scores, the application process, financial aid, and international student information is available via the graduate admissions Web site.

### DEGREE REQUIREMENTS

We are committed to a broad, rigorous, and student-centered curriculum. As we expect students to come from a wide range of backgrounds, we will be open to flexibility, allowing students to substitute or pass-out of core requirements based upon previous experiences and coursework and under the guidance and approval of their committee. Reduction in credit is limited to nine hours total. Supported by over 20 outstanding faculty members in their fields of specialty, the Ph.D. program will specifically offer training to improve dual competency in several key areas, including:

- International security
- Cyber security
- Information communications technology (ICT)
- Innovation and economic welfare

### Core Classes:

- INTA 6003 Empirical Research Methods
- INTA 6004 Modeling, Forecasting, and Decision Making
- INTA 6102 International Relations Theory
- INTA 6103 International Security Policy
- INTA 6202 Comparative Politics
- INTA 6302 International Political Economy
- INTA 7010 Introduction to International Affairs Pro-Seminar
- INTA 8000 Seminar in Science, Technology, and International Affairs
- INTA 8001 Seminar in Science, Technology, and International Affairs II

## MINOR CONCENTRATION:

Students must complete a minor concentration that complements the student's pre-existing competencies enforcing their broad understanding in the areas of science, technology, and international affairs. Three related INTA courses at the 6000 and 8000 levels in international innovation or security or three courses in other Schools of the Ivan Allen College, or in colleges or interdisciplinary fields of the Institute or elsewhere.

Example of a minor concentration with the School (security):

- INTA 6105 Technology and Military Organization
- INTA 6132 Korean Security Policy
- INTA 8803 Problems of Proliferation

Example of a minor concentration with College of Computing (security):

- CS 6250 Computer Networks
- CS 6262 Network Security
- CS 6725 Information Security Strategies and Policies

## LANGUAGE/ADVANCED METHODS:

All students must satisfy either the language or advanced methods requirement.

### Language:

Demonstrated competency (reading proficiency only) in one language other than English (equivalent of four semesters of college-level coursework or an equivalent exam).

### Advanced Methods:

Two semesters of coursework (in addition to core requirements) of advanced statistics, methods, and/or computer science taken either within the School or in other colleges of the Institute.

## COMPREHENSIVE EXAMS:

At the end of year two, students will be required to complete two written Field Exam Papers (reading list approved by faculty).

## THEORIES OF INTERNATIONAL RELATIONS

- International Relations Theory
- Comparative Politics

**FUNCTIONAL ISSUES IN INTERNATIONAL RELATIONS**

- International Security Policy
- International Political Economy

**PH.D. THESIS AND DEFENSE:**

After passing the comprehensive exams and S&T paper, the student will submit a dissertation prospectus that must be approved by the dissertation committee. the dissertation committee will be composed of relevant experts in the fields and should include a member external to the institute. when the committee chair deems that student is ready, a public oral defense of the final written dissertation will be scheduled.

# SCHOOL OF LITERATURE, COMMUNICATION, AND CULTURE

Established in 1990
Location: 335 Skiles Building
Telephone: 404.894.2730 or 404.894.2731
Fax: 404.894.1287
Web site: www.lcc.gatech.edu

## GENERAL INFORMATION

The School of Literature, Communication, and Culture (LCC) is engaged in rethinking the role of humanities education in an increasingly technological and multicultural environment. The faculty is committed to interdisciplinary research in cultural studies and new media studies at the theoretical and applied levels. In providing humanities and communication courses for all Georgia Tech undergraduates, LCC's curriculum focuses on the scientific and technologically oriented aspects of the humanities, as well as on the incorporation of new electronic media (visual, aural, and textual) into humanities and communication education.

LCC offers a B.S. in Science, Technology, and Culture (STAC), which includes the options of Media Studies, Gender Studies, and Biomedicine and Culture, a B.S. in Computational Media jointly administered with the College of Computing, and an M.S. and a Ph.D. in Digital Media (DM). Graduates from LCC's undergraduate and graduate programs are positioned to assume important roles as leaders in the exciting new fields developing in the interface between technology and culture. STAC majors receive a rigorous, well-rounded education that equips them not only for careers in government, education, and the private sector, but also for postgraduate study in medicine, law, communication, literature and literary studies, or cultural studies. In addition, they find themselves well prepared for the continual learning necessary for their future lives and careers.

DM M.S. graduates work as information architects, game designers, interaction designers, project managers, interface designers, and at other emerging professional positions in the changing world of digital media. The Ph.D. in Digital Media, begun in fall 2004, prepares students for research and teaching positions in the academy and industry with specialties such as experimental games, interactive narrative, tangible computing, digital art, and design.

## FACULTY

**Chair and McEver Professor**

Kenneth Knoespel

**Associate Chair and Professor**

Carol Senf

**Director of Graduate Studies and Professor**

Janet Murray

**Director of Undergraduate Studies and Professor**

Jay Telotte

**Director of Communications Programs**

Rebecca Burnett

**Wesley Professor of New Media**

Jay David Bolter

**Bourne Professor of Poetry**

Thomas Lux

**Professors Emeritus**

Annabelle Jenkins, Maxine Turner

**Professors**

Philip Auslander, Carol A. Colatrella

**Associate Professors Emeriti**

Edith H. Blicksilver, James Bynum, Sarah E. Jackson

**Associate Professors**

T. Hugh Crawford, Angela DalleVacche, TyAnna K. Herrington, Blake T. Leland, Robert E. Wood, Lisa Yaszek

**Assistant Professors**

Ian Bogost, Ron Broglio, Carl DiSalvo, Nihad Farooq, Fox Harrell, Narin Hassan, Brian Magerko, Alexandra Mazalek, Michael Nitsche, Anne Pollack, Eugene Thacker

**Brittain Fellows**

Alexander Ames, Fernando Arenas, Scott Banville, Olin Bjork, Andrew Cooper, Emma Crandall, Francis Desiderio, Terry Easton, Jason Embry, Lori Emerson, Kathryn Farley, Daryl Farmer, Jurgen Grandt, Jared Johnson, Karissa McCoy, Derek Merrill, Matt Paproth, Chad Pearson, Manuel Perez-Tejada, Ruben Ramirez, J.C. Reilly, Todd Reynolds, Benjamin Robertson, Lisa Schneider, Melissa Stevenson, Kent Still, Allison Whitney, Andrew Wood

**Technical Communication Fellows**

Michael Fournier

**Research Scientists**

Ute Fischer

**Academic Professionals**

Shannon Dobranski, Matthew McIntyre

## ADVANCED PLACEMENT

Students with a score of 4 or 5 on the College Board Advanced Placement Exam (taken in conjunction with high school classes) in Composition and Literature or Language and Composition receive credit for English 1101. Students with a score of 750 or higher on the SAT II Subject Test in English receive credit for English 1101. Students with a score of four or higher on the International Baccalaureate Exam receive credit for English 1101. Advanced placement credit is not ordinarily given for English 1102.

## REGENTS' EXAMINATION

This exam measures proficiency in reading and English composition; a passing score is required by the Board of Regents for graduation. Students who have not passed the exam by the time they have completed forty-five hours of degree credit must schedule RGTR 0198 or RGTE 0199 in their next semester in residence. In addition to RGTR 0198 and RGTE 0199, LCC offers short workshops in preparation for the exam, consultation with those who have failed, and an appeal system for those who fail.

## WRITING AND COMMUNICATION INTENSIVE COURSES

A number of majors require students to complete writing intensive and communication intensive courses. Several LCC classes may be counted toward this requirement. Consult course offerings each semester to determine which courses may be counted toward this requirement.

## BACHELOR OF SCIENCE IN COMPUTATIONAL MEDIA

The B.S. in Computational Media is a collaborative effort by the College of Computing and the School of Literature, Communication, and Culture. The program offers a thorough education in all aspects of the computer as a medium: the technical, the historical-critical, and the applied. Program graduates will have both significant hands-on and theoretical knowledge of computing and an understanding of visual design and the history of media. Graduates will be uniquely positioned to plan, create, and critique new digital media forms for entertainment, education, and business communication.

The program requires thirty-six semester hours of courses in computer science and thirty hours of courses in LCC (in addition to the humanities requirement). A substantial number of required courses in each unit ensures that every student has basic competence in:

- computational principles;
- the representation and manipulation of digital media, including graphics and sound;
- software design;
- visual and interactive design;
- digital arts; and
- media theory and history.

After completing required courses, students specialize in a specific area of media computing. Typical specialty areas include:

- Interactive games design: This is one of the fastest growing areas of digital media production and is already a $7 billion industry.
- Special effects: As special effects become more complex and focused on computer-generated imagery, employment in this area will increasingly require expertise in both media and computer science.
- Culturally informed program design: As programming work is increasingly outsourced to nations offering lower labor costs, programming that adds value through a sophisticated response to the needs of specific corporate and group cultures will offer job security to American programmers.

Depending on their coursework within the B.S. program, students will also be qualified to enter graduate studies in computer science, digital arts, digital media studies, and human-computer interface.

# BACHELOR OF SCIENCE IN COMPUTATIONAL MEDIA
## 2008 - 2009 DEGREE REQUIREMENTS
**INTERDISCIPLINARY DEGREE** WITH THE COLLEGE OF COMPUTING AND IVAN ALLEN COLLEGE

Suggested Schedule

| **FIRST YEAR-FALL** | **HRS** |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| CS 1315 or 1301 or 1371 | 3 |
| **TOTAL SEMESTER HOURS =** | **13** |

| **FIRST YEAR-SPRING** | **HRS** |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| CS 1331 INTRO TO OBJECT ORIENTED PROGRAMMING | 3 |
| LCC 2720 PRINCIPLES OF VISUAL DESIGN | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| **SECOND YEAR-FALL** | **HRS** |
|---|---|
| CS 2261 MEDIA DEVICE ARCHITECTURES | 4 |
| LCC 2400 or 2500 or 2600 | 3 |
| LCC 2700 INTRODUCTION TO COMPUTATIONAL MEDIA | 3 |
| MATH 2605 CALCULUS III FOR COMPUTER SCIENCE | 4 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| **SECOND YEAR-SPRING** | **HRS** |
|---|---|
| CS 1050 UNDERSTANDING AND CONSTRUCTING PROOFS | 3 |
| CS 2340 OBJECTS AND DESIGN | 3 |
| LCC 2730 or 3705 or 3710 (STUDIO) | 3 |
| LAB SCIENCE (BIOL, CHEM, EAS, PHYS) | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| **THIRD YEAR-FALL** | **HRS** |
|---|---|
| CS SPECIALTY COURSE (3000 OR 4000 LEVEL, FROM CS MEDIA THREAD OR CS PEOPLE THREAD) | 3 |
| LCC SPECIALTY COURSE (MUST BE APPROVED BY ADVISOR) | 3 |
| LCC 2730 OR 3705 OR 3710 (STUDIO) | 3 |
| LCC 3206 OR 3314 | 3 |
| LAB SCIENCE (BIOL, CHEM, EAS, PHYS) | 4 |
| **TOTAL SEMESTER HOURS =** | **16** |

| **THIRD YEAR-SPRING** | **HRS** |
|---|---|
| CS SPECIALTY COURSE (3000 OR 4000 LEVEL, FROM CS MEDIA THREAD OR CS PEOPLE THREAD) | 3 |
| LCC SPECIALTY COURSE (MUST BE APPROVED BY ADVISOR) | 3 |
| LCC ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-FALL** | **HRS** |
|---|---|
| CS SPECIALTY COURSE (3000 OR 4000 LEVEL, FROM CS MEDIA THREAD OR CS PEOPLE THREAD) | 3 |
| LCC SPECIALTY COURSE (MUST BE APPROVED BY ADVISOR) | 3 |
| CS 4001 COMPUTING, SOCIETY, AND PROFESSIONALISM | 3 |
| LCC 4699 OR 4720 OR 4725 OR 4730 OR 4731 OR 4732 (ADVANCED STUDIO) | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |

| | |
|---|---|
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| CAPSTONE | 4 |
| CS SPECIALTY COURSE (3000 OR 4000 LEVEL, FROM CS MEDIA THREAD OR CS PEOPLE THREAD) | 3 |
| FREE ELECTIVES | 8 |
| **TOTAL SEMESTER HOURS =** | **15** |

**TOTAL PROGRAM HOURS = 120 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

## REQUIREMENTS AND ELECTIVES

### Computing Requirement

Students must complete either CS 1315, CS 1301, or a computer programming course approved as satisfying the general education requirements in computer literacy.

### Wellness Requirement

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

### Other Requirements

Modern Language at the 2000 level or higher-three hours
Philosophy of Science (PST 3115 or 3127)-three hours

### Designated Courses in the STAC Major

All students must take forty-two hours of STAC courses including the following groups:

1. LCC 2100
2. Six hours of STAC historical courses (LCC 2102, 2104, 2106, 2108, 2110, 2112, 2114, 2116, 2118)
3. Nine hours of STAC literary/cultural courses (LCC 2202, 2204, 2206, 2208, 2210, 2212, 2214, 2216, 2218, 3202, 3204, 3206, 3208, 3210, 3212, 3214, 3216, 3218, 3220, 3222, 3224, 3226, 3252, 3254, 3256, 3262, 4200, 4600)
4. Nine hours of STAC issues courses (LCC 3302, 3304, 3306, 3308, 3310, 3314, 3316, 3318, 3352, 3362)
5. Nine hours of STAC media/communications courses (LCC 3402, 3404, 3406, 3408, 3410, 3412, 4400, 4402, 4404, 4406)
6. Two additional STAC (LCC) courses

With the permission of the School, a student may substitute up to six hours of LCC special topics courses for any of these courses except LCC 2100.

### Mathematics

The mathematics requirement may be satisfied by one of the following sequences: MATH 1711 and 1712, MATH 1501 and 1502, or MATH 1501 and 1711.

### Science and Computing

The laboratory science sequence may be satisfied with any two lab science courses offered in chemistry, biology, physics, or earth and atmospheric sciences. Courses need not form a sequence. All LCC students are required to take CS 1315 or CS 1301. In addition, STAC majors must take eight additional hours in science or computing.

### Freshman Composition/Humanities/Fine Arts

Students are required to complete six hours in humanities or fine arts in addition to six hours in freshman composition (ENGL 1101 and 1102), for a total of twelve hours.

### Social Sciences

Students are required to complete twelve hours of social science credit. These include: a) one course from HIST 2111, HIST 2112, POL 1101, PUBP 3000, or INTA 1200 to satisfy state requirements concerning coursework on the history and constitutions of the United States and Georgia; b) one course with an international focus; and c) two additional social science courses.

### Non-major Cluster

All students must take a nine-hour concentration from a unit other than Literature, Communication, and Culture. This requirement may be met through an existing certificate program or by a nine-hour concentration approved by LCC and meeting the following requirements:

1. All courses must be above the required courses and distribution requirements in the course curriculum.
2. All courses must be either in one discipline or part of an interdisciplinary cluster grouped around a particular topic.
3. Students in the Media Studies track must choose courses in CS or a related field as approved by LCC advisors.
4. The cumulative average for the concentration must be at least 2.0.

### Senior Seminars/Thesis

Each student must complete a senior seminar (LCC 4100, 4400, 4500) or senior thesis (LCC 4102). A student must have a signed contract with a thesis advisor in order to receive permission to register for thesis credit.

### Free Electives

Each student must accumulate at least 122 hours of credit toward the Bachelor of Science in Science, Technology, and Culture. Therefore, in addition to the requirements listed here, a student must complete a sufficient number of elective courses either within or outside LCC to complete 122 hours. Typically, this will be nine hours.

## BACHELOR OF SCIENCE IN COMPUTATIONAL MEDIA - INTERNATIONAL PLAN

The CM International Plan follows the Institute model to develop a global competence within the student's major program of study. It thus integrates international studies and experiences with work in all aspects of the computer as a medium, preparing graduates to plan, create, and critique new digital media forms within an international professional environment.

As in the basic CM program, students following the International Plan will take thirty-six hours of courses in CS and thirty hours of courses in LCC (in addition to the basic humanities requirement). Students will also:

1. take three international courses, including one from each of the following categories: international relations, global economics, and a course on a specific country or region;
2. spend two terms abroad engaged in any combination of study abroad, research, or internship;
3. demonstrate language proficiency equivalent to two years of college-level language study (to be determined by testing); and
4. complete a CM capstone course that links international studies with the major.

## BACHELOR OF SCIENCE IN COMPUTATIONAL MEDIA - RESEARCH OPTION

The CM Research Plan follows the Institute model to allow students to incorporate research experiences into the major program of study. Students will complete nine hours of credit research work on various aspects of the computer as a medium, working in such areas as computational principles, the representation and manipulation of digital media, software design, visual and interactive design, digital art, and media theory and history.

As in the basic CM program, students following the Research Plan will take thirty-six hours of courses in CS and thirty hours of courses in LCC (in addition to the basic humanities requirement). Students will also:

1. complete nine hours of undergraduate research; and
2. complete LCC 4700 Writing the Undergraduate Thesis.

## BACHELOR OF SCIENCE IN SCIENCE, TECHNOLOGY, AND CULTURE

| Requirements of the B.S. in Science, Technology, and Culture: | |
|---|---|
| **Basic Distribution** | 59 hours |
| **Major Hours** | 45 hours |
| **Non-major Cluster** | 9 hours |
| **Free Electives** | 9 hours |
| **TOTAL** | 122 hours |

| Basic Distribution/Core Requirements | |
|---|---|
| **Freshman Composition** | 6 hours |
| **Mathematics** | 8 hours |
| **Laboratory Science** | 8 hours |
| **Computing** | 3 hours |
| **Science or Computing** | 8 hours |
| **Humanities and Fine Arts** | 6 hours |
| **Social Sciences** | 12 hours<br>• HIST 2111, HIST 2112, POL 1101, PUBP 3000, or INTA 1200<br>• an internationally oriented course from an approved list<br>• two additional social science courses |
| **Modern Language at the 2000 level or higher** | 3 hours |
| **Philosophy of Science (PST 3115 or 3127)** | 3 hours |
| **Wellness** | 2 hours |

# BACHELOR OF SCIENCE IN SCIENCE, TECHNOLOGY, AND CULTURE
## 2008 - 2009 DEGREE REQUIREMENTS
### SCHOOL OF LITERATURE, COMMUNICATION, AND CULTURE
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I or MATH 1712 SURVEY OF CALCULUS | 4 |
| LAB SCIENCE (BIOL, CHEM, EAS, PHYS) | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II or MATH 1711 FINITE MATHEMATICS | 4 |
| LAB SCIENCE (BIOL, CHEM, EAS, PHYS) | 4 |
| COMPUTING REQUIREMENT | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-FALL | HRS |
|---|---|
| LCC 2100 INTRODUCTION TO SCIENCE, TECHNOLOGY, & CULTURE | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| PST 3115 PHILOSOPHY OF SCIENCE or 3127 SCIENCE, TECHNOLOGY, & HUMAN VALUES | 3 |
| SCIENCE or COMPUTER SCIENCE ELECTIVES | 4 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| LCC ELECTIVE (2100 Series) | 3 |
| MODERN LANGUAGE ELECTIVE (2000 Level or Higher) | 3 |
| HUMANITIES ELECTIVE | 3 |
| SOCIAL SCIENCE ELECTIVE (International) | 3 |
| SCIENCE or COMPUTER SCIENCE ELECTIVES | 4 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| LCC ELECTIVE (2100 Series) | 3 |
| LCC ELECTIVE (2200 or 3200 Series) | 3 |
| LCC ELECTIVE (3400 Series) | 3 |
| FREE ELECTIVE | 3 |
| NON MAJOR CLUSTER ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| FREE ELECTIVE | 3 |
| LCC ELECTIVE (2200 or 3200 Series) | 3 |
| LCC ELECTIVE (3300 Series) | 3 |
| LCC ELECTIVE (3400 Series) | 3 |
| NON MAJOR CLUSTER ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| LCC ELECTIVE (2200 or 4200 Series) | 3 |
| LCC ELECTIVE (3300 Series) | 3 |
| LCC ELECTIVE (2000 Level or Higher) | 3 |
| NON MAJOR CLUSTER | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-SPRING | HRS |
|---|---|
| LCC ELECTIVE (3400 or 4400 Series) | 3 |
| LCC ELECTIVE (3300 Series) | 3 |
| LCC ELECTIVE (2000 Level or Higher) | 3 |
| LCC 4100 SEMINAR IN SCIENCE, TECHNOLOGY, & CULTURE or 4102 SENIOR THESIS | 3 |
| **TOTAL SEMESTER HOURS =** | **12** |

**TOTAL PROGRAM HOURS = 120 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

### Computing Requirement

Students must complete either CS 1315, CS 1301, or a computer programming course approved as satisfying the general education requirements in computer literacy.

### Wellness Requirement

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

### Other Requirements

Modern Language at the 2000 level or higher-three hours
Philosophy of Science (PST 3115 or 3127)-three hours

### Designated Courses in the STAC Major

All students must take forty-two hours of STAC courses including the following groups:

1. LCC 2100
2. Six hours of STAC historical courses (LCC 2102, 2104, 2106, 2108, 2110, 2112, 2114, 2116, 2118)
3. Nine hours of STAC literary/cultural courses (LCC 2202, 2204, 2206, 2208, 2210, 2212, 2214, 2216, 2218, 3202, 3204, 3206, 3208, 3210, 3212, 3214, 3216, 3218, 3220, 3222, 3224, 3226, 3252, 3254, 3256, 3262, 4200, 4600)
4. Nine hours of STAC issues courses (LCC 3302, 3304, 3306, 3308, 3310, 3314, 3316, 3318, 3352, 3362)
5. Nine hours of STAC media/communications courses (LCC 3402, 3404, 3406, 3408, 3410, 3412, 4400, 4402, 4404, 4406)
6. Two additional STAC (LCC) courses

With the permission of the School, a student may substitute up to six hours of LCC special topics courses for any of these courses except LCC 2100.

### Mathematics

The mathematics requirement may be satisfied by one of the following sequences: MATH 1711 and 1712, MATH 1501 and 1502, or MATH 1501 and 1711.

### Science and Computing

The laboratory science sequence may be satisfied with any two lab science courses offered in chemistry, biology, physics, or earth and atmospheric sciences. Courses need not form a sequence. All LCC students are required to take CS 1315 or CS 1301. In addition, STAC majors must take eight additional hours in science or computing.

### Freshman Composition/Humanities/Fine Arts

Students are required to complete six hours in humanities or fine arts in addition to six hours in freshman composition (ENGL 1101 and 1102), for a total of twelve hours.

### Social Sciences

Students are required to complete twelve hours of social science credit. These include: a) one course from HIST 2111, HIST 2112, POL 1101, PUBP 3000, or INTA 1200 to satisfy state requirements concerning coursework on the history and constitutions of the United States and Georgia; b) one course with an international focus; and c) two additional social science courses.

### Non-major Cluster

All students must take a nine-hour concentration from a unit other than Literature, Communication, and Culture. This requirement may be met through an existing certificate program or by a nine-hour concentration approved by LCC and meeting the following requirements:

1. All courses must be above the required courses and distribution requirements in the course curriculum.
2. All courses must be either in one discipline or part of an interdisciplinary cluster grouped around a particular topic.
3. Students in the Media Studies track must choose courses in CS or a related field as approved by LCC advisors.
4. The cumulative average for the concentration must be at least 2.0.

### Senior Seminars/Thesis

Each student must complete a senior seminar (LCC 4100, 4400, 4500) or senior thesis (LCC 4102). A student must have a signed contract with a thesis advisor in order to receive permission to register for thesis credit.

### Free Electives

Each student must accumulate at least 122 hours of credit toward the Bachelor of Science in Science, Technology, and Culture. Therefore, in addition to the requirements listed here, a student must complete a sufficient number of elective courses either within or outside LCC to complete 122 hours. Typically, this will be nine hours.

## BACHELOR OF SCIENCE IN STAC - BIOMEDICINE AND CULTURE OPTION

Students who desire to follow careers in the healthcare and medical professions, medical education, science journalism and communications, or in bioethics, public policy, and law as they pertain to medicine are advised to take the Biomedicine and Culture Option of the STaC curriculum. This option also serves as a foundation for graduate work in science and literature, and in a variety of humanities, communications, and public policy-related areas.

This option is designed to provide students with a broad background in the significant concepts, developments, and events in the history of biomedicine and biomedical ethics, and to develop their abilities to think critically and to communicate effectively about the interactions among medicine, science, and social change.

Students selecting the Biomedicine and Culture Option must complete the normal course requirements for the B.S. In addition, they must also:

1. Select their nine hours of STaC literary/cultural courses from among LCC 3206, 3208, 3210, 3212, 3224, 3252, 3256, and 3262,
2. Include in their nine hours of STaC issues courses LCC 3318, and two courses chosen from among LCC 3302, 3304, 3306, 3308, 3310, 3314, and 3316,
3. Take LCC 2300 and LCC 3219 (in place of two LCC electives),
4. Select the non-major cluster from among CS, BIOL, BIOMED, PSYCH, or a related field, or create an interdisciplinary cluster grouped around specific biomedical issues.

## BACHELOR OF SCIENCE IN STAC - MEDIA STUDIES OPTION

Students choosing to follow the Media Studies track must distribute classes required for the major by choosing from among the following options:

- History classes must include two classes chosen from 21XX.
- Literary/cultural studies must include three classes chosen from 2600, 3206, 3214, 3252, 3254, 3256, 3262.
- Issues classes must include: 1) 3352 and 3314; and 2) one additional class chosen from 3302, 3304, 3306, 3316, or 3318.
- Media classes must include three classes chosen from 3402, 3404, 3406, 4402, and 4404.
- Two additional STAC classes must include:
  - 2400 or 2500 taken in the second year; and
  - an additional class chosen from 3408, 3410, 3450, 4400, or 4406 (Media).
- Thesis or seminar must be chosen from 4400, 4500, or 4102.
- Non-major cluster must be chosen from CS or other areas approved by LCC faculty.
- Science and Computing electives must be chosen from CS.

## BACHELOR OF SCIENCE IN STAC - GENDER STUDIES OPTION

Students choosing to follow the Gender Studies track must distribute classes required for the major by choosing from among the following options:

- History classes must include: two classes chosen from 21XX.
- Literary/cultural studies must include LCC 3225 or LCC 3212 plus two classes chosen from 22XX, 32XX, and 42XX.
- LCC issues classes must include 3304 and two additional classes from 33XX; LCC 3302, 3306, 3308, 3316, and 3318 are recommended.
- LCC media classes must include three classes chosen from 34XX and 44XX.
- Additional STAC classes must include: 2200 - Introduction to Gender Studies.
- Thesis or seminar must be chosen from 4100 or 4102.
- Non-major cluster must be approved by LCC faculty advisor.

## BACHELOR OF SCIENCE IN SCIENCE, TECHNOLOGY, & CULTURE RESEARCH OPTION (ALL TRACKS)

This degree option offers STAC students on all degree tracks the opportunity for a substantial, in-depth research experience. Students who pursue this degree option will learn how to design and complete advanced, multi-semester research projects through a combination of independent research, group writing instruction, and one-to-one work with a faculty mentor. Students are strongly encouraged at the end of their experience to work with their faculty mentor to develop a journal publication or conference presentation on the research in addition to the actual thesis. All students who successfully complete the research thesis option will receive the “research option” designation on their transcripts.

To fulfill the requirements of the STAC Research Option, students must:

- Complete 6 hours of LCC 2699/4699: Undergraduate Research*
- Complete 2 hours of LCC 4700: Writing the Undergraduate Thesis
- Complete 3 hours of LCC 4102: Senior Thesis.

Students will meet these requirements without adding additional hours to their schedules by

- Dedicating six hours of undefined LCC elective and/or free elective hours to undergraduate research
- Dedicating two more hours of free elective credit to LCC 4700
- Dedicating three hours of capstone coursework in the STAC major to LCC 4102: Senior Thesis.

*
Students may substitute audit hours of 2698/4698 for equivalent hours of 2699/4699. If they elect this option, they must add corresponding hours of an elective, for-credit class.

While all four of the STAC degree options provide students with nine credit hours of free electives, different options provide students with different numbers of free LCC elective hours. Students should contact the STAC coordinator to learn about options for particular degree tracks.

## FIVE-YEAR B.S./M.S. DEGREE PROGRAM

Students who wish to pursue the five-year B.S./M.S. combination in STAC and DM must apply to the School after completing at least seventy-five hours of work toward the STAC Media Studies degree. Applicants should have a 3.5 GPA.

Students admitted to the five-year program will select the 4400 seminar option and also take a total of twelve hours of graduate coursework during their final undergraduate year. Six hours of that work, in DM media courses, will replace the STAC free electives and will count for both undergraduate and graduate credit. During the summer term after their fourth year, students will participate in an approved internship program. During the fifth year, students will take a total of twenty-four hours, including either LCC 6800 (Project) or LCC 7000 (Thesis), and with no more than three courses taken outside the DM program.

## MINORS AND CERTIFICATES

LCC provides minors in Film and Media Studies, Performance Studies, and together with the Schools of History, Technology, and Society (HTS) and Public Policy (PubPol), co-sponsors a minor in Women, Science, and Technology (WST). Students wishing to pursue any of these minors should consult LCC (or, in the case of the WST minor, LCC, HTS, or PubPol) for detailed information concerning requirements. Courses for all minors are selected from “Courses of Instruction” and, in the case of the WST minor, from a special list of courses offered by LCC, HTS, PubPol, ECON, International Affairs, and Modern Languages.

LCC also sponsors a series of certificate programs: in American Literature and Culture, Film Studies, and Literary and Cultural Studies. Students should consult the LCC director of undergraduate studies for detailed information on requirements. The courses for these certificates are among those listed in "Courses of Instruction," and all fulfill humanities requirements.

LCC and HTS also cooperate in providing a certificate in African American Studies. Students should consult LCC
or HTS for detailed information concerning requirements. Courses for this certificate are selected from among those listed in "Courses of Instruction" and from the list offered by HTS.

## MASTER OF SCIENCE IN DIGITAL MEDIA

Georgia Tech's M.S. in Digital Media (DM) is a graduate program of humanities-based professional education for the digital age. M.S. DM students follow a studio- and seminar-based curriculum that places digital design within technical, cultural, aesthetic, and historical contexts. The program rests on the assumption that digital media belong to an historical, aesthetic, and conceptual continuum whose legacy and future must be addressed in order to understand the digital artifact in its own right.

Georgia Tech's M.S. DM program is helping to establish the standard for professional education in information design and to raise the level of professional practice. It is aimed at providing a principled-based education that will guide its graduates over the course of their careers in a rapidly changing technical environment.

Because of its technical and disciplinary diversity, the M.S. DM program can offer students both the practical skills and the theoretical foundation they need to assume leadership roles as designers, producers, and critical analysts of digital media. Graduates of the program pursue careers in commerce, entertainment, art, and education with a variety of national and international organizations. Some go on to Ph.D. work in computer science or the humanities.

The M.S. DM program accepts roughly twenty-five full-time students each fall term. M.S. DM students come from a range of educational backgrounds and have diverse intellectual and creative objectives. Most have significant work experience in a professional field. Students come with academic backgrounds from such fields as acting, anthropology, architecture, communications, computer science, engineering, English studies, graphic design, history, journalism, law, library science, management, marketing, philosophy, social work, software development, technical writing, and television production. The program welcomes a socially diverse and international student body.

# MASTER OF SCIENCE IN HUMAN - COMPUTER INTERACTION

## OVERVIEW

The interdisciplinary Master of Science in Human-Computer Interaction (HCI) degree program is a cooperative effort of the College of Computing; the School of Literature, Communication, and Culture; and the School of Psychology. The program provides students with the practical, interdisciplinary skills and theoretical understanding they will need to become leaders in the design, implementation, and evaluation of the computer interfaces of the future.

## COURSE OF STUDY

The HCI master's degree is a four-semester program consisting of a total of thirty-six semester hours. Each student will be required to complete a set of core courses, a set of area specialization courses, and a master's project. The core is divided into fixed and flexible sets of courses. Students are required to complete three courses in the fixed core and a subset of courses in the flexible core based upon their academic background. The specific courses for each student will be determined by the HCI program coordinator in consultation with the academic unit. The area specialization courses are determined by the academic unit in which the student resides. The areas of specialization are Computing; Digital Media (DM, through the School of Literature, Communication, and Culture); and Psychology.

## FIXED CORE (NINE HOURS)

CS/PSYC 6750, Human-Computer Interaction (must be taken during the first semester)
PSYC 6018, Principles of Research Design
PSYC 7101, Engineering Psychology I: Methods and Controls

## FLEXIBLE CORE (12 HRS COMPUTING AND PSYCHOLOGY SPECIALIZATIONS; 9 HRS IDT)

All specialization courses may also be taken as part of the Flexible Core, but at least nine hours of the Flexible Core must be taken outside your specialization. A maximum of three hours of CS 8903 may count toward the Flexible Core.

## COMPUTING

COA/CS 6763, Design of Environments
COA 8901, Special Problems: Network Music
COA 8903, Special Problems: Project Studio in Music Technology
COA 8903, Special Problems: Computer Music Composition
CS 7467, Computer-Supported Collaborative Learning
CS 8803, Special Topics: Computer Audio
CS/PSYC 6795, Introduction to Cognitive Science

## INTERNATIONAL AFFAIRS

INTA 8803, Special Topics: Computers, Communications, and International Development
INTA 8803 / PUBP 8803, Special Topics: Information Technology Policy

## INDUSTRIAL AND SYSTEMS ENGINEERING

ISYE 6205 / AE 8803, Cognitive Engineering
ISYE 6215, Models in Human-Machine Systems
ISYE 6224, Topics in Human-Integrated Systems
ISYE 6231, Design of Human-Integrated Systems
ISYE 6413, Design and Analysis of Experiments
ISYE 6414, Statistical Modeling and Regression Analysis
ISYE 6739, Basic Statistical Methods

## LITERATURE, COMMUNICATION, AND CULTURE

LCC 6213, Educational Applications of New Media
LCC 6215, Issues in Media Studies
LCC 6314, Design of Networked Media
LCC 6315, Project Production
LCC 6316, Historical Approaches to Digital Media
LCC 6317, Interactive Fiction
LCC 6318, Experimental Media
LCC 6319, Intellectual Property Policy and Law
LCC 6320, Globalization and New Media
LCC 6321, The Architecture of Responsive Spaces
LCC 6325, Game Design and Analysis

LCC 6330, Expressive Virtual Space
LCC 6350 / ARCH 8821 / COA 8904, Spatial Constructions of Meaning
LCC 8000, Proseminar in Media Theory

### MUSIC

COA 8901, Network Music
COA 8903, Special Problems: Computer Music Composition
COA 8903, Special Problems: Music Technology Research
COA 8903, Special Problems: Project Studio in Music Technology
MUSI 4803, Special Topics: Interactive Music

### PSYCHOLOGY

PSYC 7104, Psychomotor and Cognitive Skills
PSYC 8040, Seminar in Engineering Psychology: Assistive Technologies
PSYC 8040, Seminar in Engineering Psychology: The Psychology of HCI

### PUBLIC POLICY

PUBP 8803, Special Topics: The Internet and Public Policy
Certificate Option for the Flexible Core
Certificate in Management of Technology, http://mgt.gatech.edu/programs/mba/concen_cert.html
MGT 6056, Electronic Commerce
MGT 6057, Business Process Analysis and Design
MGT 6111, Innovation and Entrepreneurial Behavior
MGT 6165, Venture Creation
MGT 6326, Collaborative Product Development
MGT 6351, Operations Resource Planning and Execution
MGT 6353, Operations Strategy
MGT 6772, Managing Resources of the Technological Firm
MGT 8803, Special Topics in Management: Database and Customer-Relationship Marketing
MGT 8803, Special Topics in Management: Seminar on Emerging Technologies
PUBP 6401, Science, Technology, and Public Policy

### COMPUTING SPECIALIZATION (11 HOURS)

Software (3 hours):
CS 4452, Human-Centered Computing Concepts
CS 6300, Software Development Process
CS 6452, Prototyping Interactive Systems
CS 6456, Principles of User Interface Software
CS 7470, Mobile and Ubiquitous Computing
CS 8803, Special Topics: Adaptive Personalized Information Environments
CS 8803, Special Topics: Augmented Reality Design

### DESIGN, EVALUATION, AND COGNITIVE MODELING (6 HOURS):

CS 6010, Principles of Design
CS 6451, Introduction to Human-Centered Computing
CS 6455, User Interface Design and Evaluation
CS 6460, Educational Technology: Conceptual Foundations
CS 6470, Design of Online Communities
CS 7450, Information Visualization
CS 7460, Collaborative Computing
CS 7610, Modeling and Design
CS/PSYC 7790, Cognitive Modeling
CS 8902, Special Problems

The remaining two credit hours may be taken from either section. A maximum of three hours of CS 8903 may count toward the Computing specialization. The master's degree requirements for students in the College of Computing supplement those of the Institute. Students must achieve a grade point average of at least 3.0 to graduate, and no course grade below C will count toward graduation.

### DIGITAL MEDIA (DM) SPECIALIZATION (12 HOURS)

Required (may be repeated; up to six hours of LCC 6650 may be applied toward the specialization) LCC 6650, Project Studio (enrollment by permission of instructor)

One of the following courses, preferably taken in the first year of study:
LCC 6310, The Computer as an Expressive Medium
LCC 6311, Visual Culture and Design
LCC 6312, Design, Technology, and Representation
LCC 6313, Principles of Interactive Design

Students may fulfill the rest of the required hours with any other LCC 6000 or 8000 level course.

## PSYCHOLOGY SPECIALIZATION (11 HOURS)

Required:
PSYC 6019, Statistical Analysis of Psychological Data I (5 hours)
PSYC 7102, Engineering Psychology II: Displays and Stressors

## AT LEAST 3 HOURS FROM THE FOLLOWING COURSES:

PSYC 6011, Cognitive Psychology
PSYC 6014, Sensation and Perception
PSYC 6020, Statistical Analysis of Psychological Data II (5 hours)

## PROJECT (4 HOURS; 6 HOURS FOR STUDENTS IN THE DM SPECIALIZATION)

Each student should complete this requirement, under the supervision of a faculty member, during the last two semesters of the program. Students should also submit a brief written report to their project supervisors at the end of each semester of work and present their work during the MS-HCI student seminar during the semester of graduation.

CS 8902, Special Problems (repeatable; variable semester hours)
or
PSYC 8903, Special Problems in HCI (repeatable; variable semester hours)

## FIVE-YEAR B.S./M.S. DEGREE PROGRAM

Students who wish to pursue the five-year B.S./M.S. combination in STAC and DM must apply to the School after completing at least seventy-five hours of work toward the STAC Media Studies degree. Applicants should have a 3.5 GPA.

Students admitted to the five-year program will select the 4400 seminar option and also take a total of twelve hours of graduate coursework during their final undergraduate year. Six hours of that work, in DM media courses, will replace the STAC free electives and will count for both undergraduate and graduate credit. During the summer term after their fourth year, students will participate in an approved internship program. During the fifth year, students will take a total of twenty-four hours, including either LCC 6800 (Project) or LCC 7000 (Thesis), and with no more than three courses taken outside the DM program.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN DIGITAL MEDIA

The Digital Media Ph.D. was inaugurated in fall 2004 and is one of the first of its kind worldwide. The program educates research-oriented theorists/practitioners who bring the traditions of the humanities and arts to the design of digital media. Graduates of the program are prepared to work in industry, public service, and universities, shaping the emerging digital genres and expanding our understanding and mastery of the representational power of the computer.

### CURRICULUM AND COURSE OF STUDY

#### Required Courses: (36 hours)

- LCC 6310 - The Computer as an Expressive Medium (3 hours)
- LCC 6311 - Visual Culture and Design (3 hours)
- LCC 6312 - Design, Technology, and Representation (3 hours)
- LCC 6313 - Principles of Interactive Design (3 hours)
- LCC 6316 - Historical Approaches to New Media (3 hours)
- LCC 6650 - Project Studio (3 hours)
- LCC 6800 - Master's Project (6 hours)
- LCC 8000 Pro-Seminar in Media Theory (New Course) (3 hours)
- LCC 8001 - Pro-Seminar I Pro-Seminar in Digital Media Studies (New Course) (3 hours)
- LCC 8002 - Pro-Seminar II (New Course) (3 hours)
- LCC 9000 Doctoral Thesis (6 hours)

### MINOR CONCENTRATION (NINE HOURS)

Three related courses outside the School of Literature, Communication, and Culture. These courses may be in other schools of the Ivan Allen College, or in colleges or in interdisciplinary fields of the Institute. Example of a minor concentration in Computer Science:

- CS 6750 - Human Computer Interactions
- CS 6460 - Foundations of Educational Technology
- CS 6470 - Online Communities

#### 5 Elective Courses (15 hours)

- LCC 6213 - Educational Applications of New Media (3 hours)
- LCC 6215 - Issues in Media Studies (3 hours)
- LCC 6314 - Design of Networked Media (3 hours)
- LCC 6315 - Project Production (3 hours)
- LCC 6317 - Interactive Fiction (3 hours)
- LCC 6318 - Experimental Media (3 hours)
- LCC 6319 - Intellectual Property Policy and Law (3 hours)
- LCC 6320 - Globalization and New Media (3 hours)
- LCC 6321 - Architecture of Responsive Spaces (3 hours)
- LCC 6330 - Expressive Virtual Space (3 hours)
- LCC 6650 - Project Studio (repeatable) (3 hours)
- LCC 7999 - Preparation for Qualifying Examination (variable credit)
- LCC 8803 - Special Topics (variable credit)
- LCC 8813 - Advanced Issues in Interactive Narrative (New Course)
- LCC 8823 - Special Topics in Game Design and Analysis (New Course)
- LCC 8910 - Special Problems (variable credit)
- LCC 7999 - Preparation for Qualifying Examination (variable credit)
- LCC 8999 - Preparation of Ph.D. Dissertation (variable credit)

Courses from other units may be substituted with approval of advisor.

## PORTFOLIO REVIEW

- Demonstration of programming competency with grounding in foundational principles of software engineering (can be fulfilled with coursework)
- Digital media project design and implementation at level of outstanding Digital Media master's project

## COMPREHENSIVE EXAMINATION

- Taken only after passing portfolio review
- Based on list of works drawn from the Comprehensive Exam List (see Appendix), with additions proposed as appropriate by candidates in consultation with their Advisory Committees
- Students must obtain approval of their list by the Graduate Faculty Committee by the end of the semester preceding the semester in which they will be examined.
- Examinations include a four-part written component, given over a two-week period, with a two-hour oral to be given within ten days of the last completed written segment.
- The four parts of the examination (based on the four-part Exam List) are:
    1. Media Theory and Related Theoretical Contexts
    2. Traditional Media Technologies and Forms
    3. Digital Media Technologies and Forms
    4. A specialty of the student's choosing

A composite sample examination list is available online at www.idt.gatech.edu/phd/phD_exam_list.php.

## PH.D. THESIS AND DEFENSE

After passing the Comprehensive Exam, the student will submit a Thesis Topic Proposal. When the committee chair deems the student is ready, a public oral thesis defense will be scheduled.

## FULL-TIME RESIDENCY

The program requires a minimum of two semesters in residence with full-time study.

**Note:**
Ph.D. students who choose to can participate in the established internship program of the M.S. program, which customarily takes place between the first and second year.

## SCHOOL OF MODERN LANGUAGES

Established in 1904
Location: Swann Building
Telephone: 404.894.7327
Fax: 404.894.0955
Web site: www.modlangs.gatech.edu

### GENERAL INFORMATION

The School of Modern Languages collaborates as an interdisciplinary partner with other units in the Ivan Allen College and across campus to prepare future participants in the global workforce through applied studies in foreign languages that are designed to develop advanced communication skills, creative thinking, and professional competency in the language. The School is building bridges between the languages it teaches and engineering as well as technology units at Georgia Tech by integrating into its programs the kind of professional and social language students expect to use after entering the workforce. At the same time, the School offers an opportunity to develop a broad understanding of culture and literature, and of daily life in the countries whose languages are taught. In this task, the School works closely with other units in the Ivan Allen College.

## FACULTY

### Professor and Chair

Phil McKnight

### Professor and Associate Chair for Research and Assessment

Vicki B. Galloway

### Associate Professor and Director of Undergraduate Studies

David J. Shook

### Professors

Bettina Cothran, Angela Labarca, Frank Pilipp, Rumiko Shinzato-Simonds

### Associate Professors

Barbara L. Blackbourn-Jansma, Nora Cottille-Foley, Paul Foster, Masato Kikuchi, Xiaoliang Li

### Assistant Professors

Stephanie Boulard, Kelly Comfort, Stuart Goldberg, Christophe Ippolito, Britta Kallin, Marianne Mason, Kyoko Masuda, Cecilia Montes-Alcala

### Instructors

Lionel Gall, Masako Kanno, Chao Li, Ragheda Nassereddine, Angelika Oswalt, Melissa Pilkington, Delia Tyler, Kimiaki Yamaguchi

### Professors Emeriti

Jerry Carroll Brooks, William W. Johnson, Edmun Richmond, Heidi Rockwood

## GRADUATE COURSE OPTION

Under the Graduate Course Option, undergraduate students with a final grade point average of 3.5 or higher may count six hours of their undergraduate credits toward a master's degree at Georgia Tech in the same field. This means that qualified IAML students could complete the Master of Science in International Affairs with thirty additional hours rather than thirty-six hours if they chose to further their study in International Affairs; likewise, qualifed GEML students could complete the M.S. in Economics with thirty additional hours in ECON courses.

## STUDY ABROAD

The School of Modern Languages offers special summer immersion programs in China, France, Germany, Japan, Mexico, and Spain. These intensive programs in Languages for Business and Technology (LBAT) consist of six to eight weeks of study abroad in which classroom lessons in business, culture, and technology are combined with field work, cultural events, excursions, and visits to area businesses — all conducted in the target language. The LBAT experience offers a unique opportunity for rapid growth in proficiency, to build a deeper appreciation for the cultures and lifestyle patterns of other peoples, and to make lifelong social and professional contacts. Students will earn nine to fifteen semester hours (depending on the language program and the options available) at the 3000 level. These credits count toward a certificate, a minor, or the joint major with International Affairs or Economics. Program costs vary according to the country visited and the length of the program.

## STUDY ABROAD AND INTERNSHIPS

In collaboration with the Colleges of Engineering and Computing, the School of Modern Languages has initiated a Study Abroad and International Internship program that incorporates intensive applied language acquisition and cultural study. Students who participate in this program can expect to become versed in a foreign culture, fluent in a second language on professional and social levels, and gain advanced practical experience in their field. This program will prepare students for leadership positions in the global workforce in business, industry, and government.

Modern Languages works with international companies and with the Georgia Tech Division of Professional Practice to establish internships and jobs abroad. Programs generally include one semester of study followed by a six month internship with a global company (some limitations as to language and field of study exist). The LBAT summer immersion course or equivalent is recommended, since students will need to take classes in the language spoken. HOPE scholarships and other financial aid apply. Additional language classes are available abroad. Students retain regular status at Georgia Tech by enrolling in FS 4000 during the semester of study and in INTN 3011, 3015, 3018, and in the Modern Language or Co-op International Internship (ITN 3011 or COOP 3011) during the internship. Students participating in this program are encouraged to contact their academic advisors, the International Division in the Division of Professional Practice, the Office of International Education, and Modern Languages advisors. See www.modlangs.gatech.edu for more information.

## SUGGESTED PLACEMENT

Students who have never had any course in the language should choose a 1001 course. Students with previous study in Chinese, French, German, Japanese, Russian, and Spanish should take the placement test found at www.modlangs.gatech.edu/student_resources/registration/placement_test.php in order to determine their optimal beginning placement. Students interested in any of the other languages should consult with a language advisor for beginning placement. See www.modlangs.gatech.edu for more information.

## HUMANITIES CREDITS

Each course is essentially a unit in itself, but beginning students are encouraged to pursue at least the elementary two-semester sequence (1001 and 1002) in order to achieve a minimum level of proficiency and to receive humanities credit for both courses. Students enrolled in 1001 may receive humanities credit if and when they complete 1002 (students who start in SPAN 1101 may receive humanities credit if and when they complete 1102). Students may not enroll in or receive advanced standing for 1000 or 2000 level courses after the successful completion of any 3000 or 4000 level course. Courses at the 3000 and 4000 level do not have to be taken in chronological order, provided prerequisites are fulfilled.

With minor exceptions, students can fulfill their humanities requirement for graduation by taking courses in the School of Modern Languages, including linguistics courses and courses taught as ML courses (courses in a language not yet included in the General Catalog). Students should consult the Catalog course descriptions and the section of this catalog titled "Humanities and Social Sciences Requirements," in order to determine which courses are classified as humanities in their respective colleges. With the approval of their major schools, students may take any course offered by the School of Modern Languages on a pass/fail basis.

## COLLEGE CREDIT FOR HIGH SCHOOL STUDY

Modern Languages will grant six hours of elective credit in Chinese, French, German, Japanese, Russian, or Spanish for high school study in a foreign language, provided the student has two or more years of high school credit in the language in question and has completed six semester hours at the 2000, 3000, or 4000 level with an average *C* or higher.

Students submitting a score of four or five on the Advanced Placement (AP) Examination in French, German, or Spanish "Language Level III" or "Literature Level III" may receive free elective credit for courses numbered 2001-2 in the respective language. Students who submit language scores of five or above for courses taken at the higher level from a certified high school International Baccalaureate program may also receive free elective credit for courses numbered 2001-2 in the respective language.

The School will not grant credit for high school study in a foreign language to students who have taken 1000 level courses or the equivalent at Georgia Tech, or at other college-level institutions for which they have received transfer credit. To have the free elective credit entered on their records, students must request that the appropriate form be submitted by the School of Modern Languages to the registrar. This elective credit is not applicable toward fulfillment of the humanities requirement for graduation. No grade is attached to this credit.

## BACHELOR OF SCIENCE IN GLOBAL ECONOMICS AND MODERN LANGUAGES

The School of Modern Languages and the School of Economics offer a joint Bachelor of Science degree in Global Economics and Modern Languages, with separate language concentrations in Chinese, French, German, Japanese, and Spanish. Students in this program take the same required core courses as for the Bachelor of Science in Economics, but also receive intensive foreign language training and learn the fundamentals of dealing with foreign cultures and societies. The degree will serve the requirements of industry and government agencies with graduates capable of understanding the global, economically interdependent, multilingual, and multicultural environments in which we exist, and who have in-depth knowledge of not just their own cultures, but the capacity to function effectively in a second culture. Language requirements for the degree are the same as those for the International Affairs and Modern Languages (IAML) degree. Students must earn twenty-four credit hours of language electives in a single language (Chinese, French, German, Japanese, or Spanish) and beyond the level of the 2002 course (beyond 2001 for Japanese and Chinese). Courses that count toward the major will be approved by advisors.

## REQUIREMENTS AND ELECTIVES

### WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

### THE MODERN LANGUAGES CORE

Student majors must complete a program of twenty-four hours of language courses beyond 2002 (beyond 2001 for CHIN and JAPN) in a single language; in addition, students entering Georgia Tech with little or no language preparation in high school may need to complete the 1000 or 2000 sequence(s). Students who have taken foreign language in the past must take the online placement test (www.modlangs.gatech.edu/student_resources/registration/placement_test.php) before enrolling in that language at Georgia Tech. Students may not enroll in 1000 or any 2000 level language courses after the successful completion of 3000 or 4000 level courses. Courses at the 3000 and 4000 level do not need to be taken in chronological order provided prerequisites are fulfilled. IAML majors are strongly encouraged to enroll in the intensive summer programs (LBAT) offered by the School of Modern Languages (CHIN 3691-2-3, taught in Yangzhou, China; FREN 3691-2-3, taught in Toulouse, France; GRMN 3695-6-7, taught in Weimar and Munich, Germany; JAPN 3691-2-3, taught in Fukuoka, Japan; and SPAN 3691-2-3-4, taught in Mexico City, Mexico and Madrid, Spain) or a comparable study, work, or research abroad experience. Classes taken in the Modern Languages core will only count toward degree requirements if they are at a grade of B or above.

### THE INTERNATIONAL AFFAIRS CORE

Student majors acquire an understanding of the core issues in international affairs by completing the following required courses: INTA 1001, 1110, 2010, 2030, 2040, 2100, 2210, 3110, 3203, and 3301. Students are encouraged to complete INTA 1110, INTA 2010, and their U.S. History requirement early to make the most of their upper-division studies. In addition, student majors are required to round out their studies with INTA 4400, a capstone senior seminar. Students must achieve a C or above in the international affairs core courses.

### HUMANITIES AND FINE ARTS

Students are required to complete six hours of English, including ENGL 1101 and 1102. All Tech students are required to complete an additional six hours of humanities and fine arts, which IAML students satisfy through their modern languages requirements.

### SOCIAL SCIENCE ELECTIVES

In order to satisfy the United States/Georgia History and Constitution requirements, students must complete one of the following courses: INTA 1200, HIST 2111, HIST 2112, POL 1101, or PUBP 3000. IAML majors are encouraged to take INTA 1200, which examines American government in relation to political and economic systems in countries around the world. IAML students satisfy a required nine hours of social science coursework with their INTA classes.

### MATHEMATICS AND SCIENCES

An understanding of scientific methodology and quantitative analytic skills is essential for practitioners and policymakers in today's international arena. The mathematics requirement may be satisfied by one of the following sequences: MATH 1501 and 1502; MATH 1501 and 1711; or MATH 1711 and 1712. In addition, students are required to complete eight hours of laboratory science courses. These courses do not need to be sequential. Any two of the following courses will satisfy the requirement: BIOL 1510, BIOL 1511, BIOL 1520, BIOL 1521, CHEM 1310, CHEM 1311 and 1312, EAS 1600, EAS 1601, EAS 2600, PHYS 2211, or PHYS 2212.

### TECHNOLOGY REQUIREMENT

All IAML undergraduates are required to complete two technology courses before graduation.

First technology requirement: Students should pick ONE of the following: CS 1301 or CS 1315. Students are allowed to take the unused course from the these two options as their second technology requirement. (For instance, if a student takes 1301 as her first technology requirement, she can take CS 1315 as her second technology requirement.)

Second technology requirement: Students should pick ONE of the following to fulfill the second technology requirement.

- AE 1770: Introduction to Engineering Graphics and Visualization
- ARCH 4420: Introduction to Design Computing
- BC 3630: Project Management I

- BIOL 3332: Statistical and Mathematical Biology
- CEE 1770: Introduction to Engineering Graphics and Visualization
- CHEM 1313: Quantitative Analysis
- CP 4510: Fundamentals of Geographic Information Systems
- CS 1315: Introduction to Media Computation
- CS 1301: Introduction to Computing
- CS 1316: Representing Structure and Behavior
- CS 1331: Introduction to Object-Oriented Programming
- CS 1332: Data Structures and Algorithms for Applications
- CS 4235: Introduction to Information Security
- EAS 4430: Remote Sensing and Data Analysis
- ECE 2030: Introduction to Computer Engineering
- ID 3103: Industrial Design Computing I
- ID 4103: Alias Studio I
- LCC 3402: Graphic and Visual Design
- LCC 3404: Designing for the Internet
- LCC 3410: The Rhetoric of Nonlinear Documents
- ME 1770: Introduction to Engineering Graphics and Visualization
- ME 2016: Computing Techniques
- MGT 2200: Information Technology
- MGT 4051: Decision Support and Expert Systems
- MGT 4052: Systems Analysis and Design
- MGT 4058: Database Management Systems
- MGT 4661: Database Management
- MUSI 4630: Music Recording and Mixing
- PHYS 3266: Computational Physics

**PLEASE NOTE:**
INTA/ML does not guarantee that these classes will be offered every semester nor does INTA/ML guarantee access to these classes since they cannot control enrollment in other departments. Some of these courses require prerequisite courses and permits. For availability of courses, prerequisites, and permits, check OSCAR or contact the permit/overload contact for the specific department or the departmental advisor.

### HTS ELECTIVES

As is listed on the degree checklist, every student must complete one HTS course for the INTA degree. The goal of this course is a broad study of non-U.S. history. The following courses count towards this HTS requirement:

- AP (Advanced Placement) World History
- HTS 1031: Europe since the Renaissance
- HTS 2033: Medieval Europe: 350 to 1400
- HTS 2036: Revolutionary Europe: 1789 to 1914
- HTS 2037: Twentieth Century Europe: 1914 to Present
- HTS 2041: History of the Modern Middle East
- HTS 2061: Traditional Asia and Its Legacy
- HTS 2062: Asia in the Modern World
- HTS 2823: History of the Islamic World to 1500
- HTS 3028: Ancient Greece: Gods, Heroes and Ruins
- HTS 3029: Ancient Rome: From Greatness to Ruins
- HTS 3030: Medieval Europe: 350 to 1400
- HTS 3035: Britain 1815 to 1914
- HTS 3036: Britain Since 1914

- HTS 3038: The French Revolution
- HTS 3039: Modern France
- HTS 3041: Modern Spain
- HTS 3043: Modern Germany
- HTS 3045: Nazi German and the Holocaust
- HTS 3061: Modern China
- HTS 3062: Modern Japan
- HTS 3063: Outposts of Empire: Comparative History of British Colonization
- HTS 3069: Modern Cuba
- HTS XXXX: Special Topics: History of the Modern Middle East

## COURSES RELATED TO THE MAJOR

The B.S. IAML curriculum is multidisciplinary, and IAML students are required to complete a total of six hours of courses in fields related to the major. This requirement is satisfied by completing the following courses: ECON 2100, 2101, 2105, or 2106; and one of the courses that survey non-U.S. history listed under the HTS Electives.

## NON-MAJOR CLUSTER AND FREE ELECTIVES

IAML majors are encouraged to use electives to tailor-fit the core education they receive with their own specific career and postgraduate objectives. Students are strongly encouraged to complete a twelve-hour, non-major cluster taught outside the School. The non-major cluster elective is satisfied either through twelve hours of coursework in one school or through twelve hours of coursework comprising a coherent program approved by both INTA and ML. Free electives are then used to fill the remaining credits needed to reach 122 credits to graduate. B.S. IAML students typically have sixteen hours of free elective credit.

# B.S. IN GLOBAL ECONOMICS AND MODERN LANGUAGES

## 2008 - 2009 DEGREE REQUIREMENTS

## MODERN LANGUAGE USED AS A MODEL; SUBSTITUTE CHINESE, FRENCH, GERMAN, JAPANESE, OR SPANISH AS APPROPRIATE

**SCHOOL OF ECONOMICS** AND **SCHOOL OF MODERN LANGUAGES**

Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| MATH 1501 CALCULUS I or MATH 1712 SURVEY OF CALCULUS | 4 |
| MODERN LANGUAGE or FREE ELECTIVE | 3 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| COMPUTING REQUIREMENT | 3 |
| ENGINEERING / SCIENCE / MATHEMATICS ELECTIVE | 3 |
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II or MATH 1711 FINITE MATHEMATICS | 4 |
| MODERN LANGUAGE or FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| ECON 2106 PRINCIPLES OF MICROECONOMICS | 3 |
| LAB SCIENCE (BIOL, CHEM, EAS, PHYS) | 4 |
| MGT 2250 MANAGEMENT STATISTICS | 3 |
| MODERN LANGUAGE | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| ECON 2105 PRINCIPLES OF MACROECONOMICS | 3 |
| LAB SCIENCE (BIOL, CHEM, EAS, PHYS) | 4 |
| MODERN LANGUAGE | 6 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| ECON 3110 ADVANCED MICROECONOMIC ANALYSIS | 3 |
| ECON 3161 ECONOMETRIC ANALYSIS | 3 |
| MODERN LANGUAGE | 6 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| ECON 3120 ADVANCED MACROECONOMIC ANALYSIS | 3 |
| ECON 3150 ECONOMIC & FINANCIAL MODELING | 3 |
| ECONOMICS ELECTIVE | 3 |
| FREE ELECTIVES | 5 |
| MODERN LANGUAGE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| ECON 4160 FORECASTING | 3 |
| MODERN LANGUAGE or FREE ELECTIVES | 9 |
| NON MAJOR CLUSTER ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-SPRING | HRS |
|---|---|
| ECON 4910 INDIVIDUAL RESEARCH IN ECONOMICS | 3 |

| | |
|---|---|
| ECONOMICS ELECTIVE | 3 |
| MODERN LANGUAGE or FREE ELECTIVES | 6 |
| **TOTAL SEMESTER HOURS =** | **12** |

**TOTAL PROGRAM HOURS = 120 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

## BACHELOR OF SCIENCE IN GLOBAL ECONOMICS & MODERN LANGUAGES - INTERNATIONAL PLAN

The degree requirements for the Global Economics and Modern Language (Chinese, French, German, Japanese and Spanish)-International Plan are basically the same as for the GEML degree, except that students are required to spend two terms abroad and then achieve Intermediate High (for Chinese and Japanese: Intermediate Low) on the standardized ACTFL testing scale during an oral interview. The costs of the test will be paid for by the School of Modern Languages for each student. The terms abroad may typically consist of one semester of study plus a significant amount of time spent with a research or work project abroad. Students may also opt for a second semester. GEML-IP majors are also strongly encouraged to enroll in the LBAT intensive summer programs offered by the School of Modern Languages.

In addition to gaining advanced global competence, the International Plan designation will set you apart from other applicants with recruiters from top companies and governmental agencies.

Other Required Courses include the following, and these can easily be obtained within the regular required curriculum offerings of ECON and Modern Languages. These requirements can also be met with courses taken abroad, upon consultation with ECON degree advisors.

- At least one course focused on international relations historically and theoretically, including topics such as the role of state sovereignty and nationalism and non-state actors in the international system; international conflict, peace, security, intervention, and nation-building; international organizations, law, and ethics; transnational problems of the environment, terrorism, health, and migration; among other issues (see INTA courses).
- At least one course that provides a historical and theoretical understanding of the global economy, including topics such as international trade, finance, investment, and production; regional economic integration (such as the EU); economic development and modernization; and questions of natural resource sustainability.
- At least one course that provides familiarity with an area of the world or a country that allows them to make systematic comparisons with their own society and culture. This course could come from various disciplinary perspectives, including history, public policy, philosophy, international affairs, literature, economics, management, architecture, among others. Upper division Modern Language courses will count here.
- A culminating course, occurring either at the end of or after the international experience that integrates knowledge of the discipline and the international experience in a global context.

## BACHELOR OF SCIENCE IN INTERNATIONAL AFFAIRS AND MODERN LANGUAGES

In partnership with the Sam Nunn School of International Affairs, the School of Modern Languages offers a joint Bachelor of Science in International Affairs and Modern Languages (IAML) with separate concentrations in Chinese, French, German, Japanese, and Spanish. Students in this program take the same required core courses as for the Bachelor of Science in International Affairs, but also receive intensive foreign language training and learn the fundamentals of dealing with foreign cultures and societies. IAML students learn how to formulate the policy decisions that must be made in an increasingly multlingual and multicultural global forum. Our graduates are prepared for advanced graduate and professional study and are ready for employment in a large arena of globally oriented businesses, government agencies, as well as social service and not-for-profit organizations.

# BACHELOR OF SCIENCE IN INTERNATIONAL AFFAIRS AND MODERN LANGUAGES

## 2008 - 2009 DEGREE REQUIREMENTS

## MODERN LANGUAGE USED AS A MODEL; SUBSTITUTE CHINESE, FRENCH, GERMAN, JAPANESE, OR SPANISH AS APPROPRIATE

**SCHOOL OF INTERNATIONAL AFFAIRS & SCHOOL OF MODERN LANGUAGES**

Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| INTA 1110 INTRODUCTION TO INTERNATIONAL RELATIONS | 3 |
| MATH 1501 CALCULUS I or MATH 1712 SURVEY OF CALCULUS | 4 |
| MODERN LANGUAGE | 3 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| CS 1315 INTRODUCTION TO MEDIA COMPUTATION or CS 1301 INTRODUCTION TO COMPUTING | 3 |
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| MATH 1502 CALCULUS II or MATH 1711 FINITE MATHEMATICS | 4 |
| MODERN LANGUAGE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| HTS REQUIREMENT * | 3 |
| INTA 1001 ORIENTATION TO INTERNATIONAL AFFAIRS | 1 |
| INTA 2010 EMPIRICAL METHODS | 3 |
| INTA 2030 ETHICS IN INTERNATIONAL AFFAIRS | 3 |
| LAB SCIENCE (BIOL, CHEM, EAS, PHYS) | 4 |
| MODERN LANGUAGE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| INTA 2040 SCIENCE, TECHNOLOGY & INTERNATIONAL AFFAIRS | 3 |
| INTA 2100 GREAT POWER RELATIONS | 3 |
| INTA 2210 COMPARATIVE POLITICAL PHILOSOPHIES & IDEOLOGIES | 3 |
| LAB SCIENCE (BIOL, CHEM, EAS, PHYS) | 4 |
| MODERN LANGUAGE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| ECON 2100 or 2105 or 2106 | 3 |
| INTA 3110 U.S. FOREIGN POLICY | 3 |
| MODERN LANGUAGE | 6 |
| TECHNOLOGY REQUIREMENT ** | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| CLUSTER ELECTIVE *** | 3 |
| INTA 3301 INTERNATIONAL POLITICAL ECONOMY | 3 |
| INTA 3203 COMPARATIVE POLITICS | 3 |
| MODERN LANGUAGE | 6 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CLUSTER ELECTIVES *** | 6 |
| FREE ELECTIVES or MODERN LANGUAGE | 6 |
| INTA 4400 INTERNATIONAL STRATEGY & POLICY | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-SPRING | HRS |
| --- | --- |
| CLUSTER ELECTIVES *** | 10 |
| FREE ELECTIVE or MODERN LANGUAGE | 3 |
| **TOTAL SEMESTER HOURS =** | **13** |

**TOTAL PROGRAM HOURS = 120 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

* Select "Electives" menu item on the left to view HTS requirements.

** Select "Electives" menu item on the left to view Technology requirements.

***
The non-major cluster elective is 12 units of additional approved coursework (INTA or ML classes may count if approved)

## REQUIREMENTS AND ELECTIVES

## WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

## THE MODERN LANGUAGES CORE

Graduates of the GEML program are prepared for advanced graduate and professional study and are ready for employment in internationally oriented firms, government agencies, and nonprofit organizations. Student majors must complete a program of twenty-four hours of language courses beyond 2002 (beyond 2001 for CHIN and JAPN) in a single language. In addition, students entering Georgia Tech with little or no language preparation in high school may need to complete the 1000 or 2000 sequence(s). Students who have taken foreign language in the past must take the online placement test (www.modlangs.gatech.edu/student_resources/registration/placement_test.php) before enrolling in that language at Georgia Tech. Students may not enroll in 1000 or any 2000 level language courses after the successful completion of 3000 or 4000 level courses. Courses at the 3000 and 4000 level do not need to be taken in chronological order provided prerequisites are fulfilled. GEML majors are strongly encouraged to enroll in the intensive summer programs (LBAT) offered by the School of Modern Languages: CHIN 3691-92-93 taught in Yangzhou, China; FREN 3691-92-93, taught in Toulouse, France; GRMN 3695-96-97, taught in Weimar and Munich, Germany; JAPN 3691-92-93, taught in Fukuoka, Japan; and SPAN 3691-92-93-94, taught in Madrid, Spain, and Mexico City, Mexico. GEML majors are also strongly encouraged to take a capstone class taught jointly by faculty members of the schools of Economics and Modern Languages in the language of their major. Classes taken in the Modern Languages core will only count toward degree requirements if they are at a grade of *B* or higher.

## THE ECONOMICS CORE

Student majors acquire an understanding of the core issues in economics by completing the following required courses: ECON 2105, 2106, 3110, 3120, 3150, 3161, 4160, plus two additional ECON electives, in addition to MGT 2250 (Management Statistics). Students must achieve a *C* or above in the ECON core courses.

## MATHEMATICS

The mathematics requirement may be satisfied by one of the following sequences: MATH 1711-2; MATH 1501-2. Students will not receive credit for MATH 1712 and either MATH 1501 or 1502.

## SCIENCE AND ENGINEERING ELECTIVES

Students must complete a laboratory sequence in biology, chemistry, physics, or earth and atmospheric sciences, along with three hours of electives chosen from engineering, science, or mathematics, for a total of eleven hours.

## SOCIAL SCIENCES ELECTIVES

All students must complete twelve hours of electives in the social sciences, including three semester hours from HIST 2111, HIST 2112, POL 1101, PUBP 3000, or INTA 1200 to satisfy state requirements regarding coursework in the history and constitutions of the United States and Georgia. Also required are nine hours from the following list:

### Architecture and City Planning
ARCH 4331, 4335; CP 4010, 4020, 4030

### History, Sociology, and History, Technology, and Society
All HIST, SOC, and HTS courses except 2927, 2928, 2929, 4925, 4926, 4927, 4928, 4929

### International Affairs
INTA 1100, 2030, 2100, 2200, 2220, 2230, 3240, 3801, 3802, 3803, 4801, 4802, 4803

### Political Science and Public Policy
All POL and PUBP courses except 3113, 3600, 4530, 4532, 4901, 4902, 4903, 4951, 4952

### Economics
All ECON courses except 3160, 3200, 4170, 4910, 4990

### Psychology
PSYC 1101, 2015, 2020, 2103, 2210, 2220, 2230, 2240, 2260, 2300, 2400, 3060, 4070, 4770

## HUMANITIES ELECTIVES

Students are required to complete six hours of English, including ENGL 1101 and 1102. All Tech students are required to complete an additional six hours of humanities and fine arts, which GEML students satisfy through their modern languages requirements.

## INDIVIDUAL RESEARCH PROJECT

Each student is required to take ECON 4901 for three hours of credit, producing a formal research paper in the senior year.

## FREE ELECTIVES

Students must complete free electives (normally bearing fourteen hours of credit), bringing the number of credit hours received up to 122. At least three credit hours of these electives must be earned outside of ECON courses. Only free electives may be taken on a pass/fail basis, subject to Institute limitations.

## BACHELOR OF SCIENCE IN INTERNATIONAL AFFAIRS AND MODERN LANGUAGES - INT'L PLAN

The degree requirements for the International Affairs and Modern Languages (Chinese, French, German, Japanese and Spanish)-International Plan are basically the same as for the IAML degree, except that students are required to spend two terms abroad and then achieve Intermediate High (for Chinese and Japanese: Intermediate Low) on the standardized ACTFL testing scale during an oral interview. The costs of the test will be paid for by the School of Modern Languages for each student. The terms abroad must total a minimum of 26 weeks; typically these consist of one semester of study plus a significant amount of time spent with a research or work project abroad; only one summer semester abroad will count in this total. IAML-IP majors are strongly encouraged to enroll in the LBAT intensive summer programs offered by the School of Modern Languages.

In addition to gaining advanced global competence, the International Plan designation will set IAML majors apart from other applicants with recruiters from top companies and governmental agencies. Other required courses include the following, and these can easily be obtained within the regular required curriculum offerings of INTA and Modern Languages (these requirements can also be met with courses taken abroad, upon consultation with IAML degree advisors):

1. At least one course focused on international relations historically and theoretically, including topics such as the role of state sovereignty and nationalism and non-state actors in the international system; international conflict, peace, security, intervention, and nation-building; international organizations, law, and ethics; transnational problems of the environment, terrorism, health, and migration; among other issues (satisfied by INTA 1110).
2. At least one course that provides a historical and theoretical understanding of the global economy, including topics such as international trade, finance, investment, and production; regional economic integration (such as the EU); economic development and modernization; and questions of natural resource sustainability (satisfied by INTA 3301).
3. At least one course that provides familiarity with an area of the world or a country that allows them to make systematic comparisons with their own society and culture. (Satisfied by many upper-division Modern Language courses or INTA 3203.)

## MINOR PROGRAMS

The School of Modern Languages offers minors in Chinese, French, German, Japanese, and Spanish as well as in Russian Studies. This program is designed for students who wish to develop their language skills to at least an intermediate level and to provide themselves with a greater depth than possible with a certificate program.

1. Students must earn 18 credit hours of language electives in a single language:
   a. French, German, and Spanish
      i. Beyond the 2002 course for students enrolled at GT through Spring 2007
      ii. Beyond the 2001 course for new students enrolled at GT after Spring 2007
   b. Chinese, Japanese, and Russian Studies, beyond the 2001 course
   c. Students pursuing a minor in Russian Studies should take their electives in at least two different departments/schools (Modern Languages, International Affairs, and/or Literature, Communication, and Culture)
2. A maximum of 6 semester hours of Special Topics is allowed in each minor except for Russian Studies which allows a maximum of 9 semester hours.
3. A maximum of 9 semester hours of transfer credit is allowed in each minor.

Students wishing to pursue one or more of these minors should consult with the Director of Undergraduate Studies in Modern Languages for detailed information and for approval at the completion of the coursework. All courses counting toward a minor must be taken on a letter-grade basis, and a grade of *C* or better must be received in each course.

## CERTIFICATE PROGRAMS

Certificates are available in Chinese, French, German, Japanese, Russian Studies, and Spanish. To receive a certificate in one of these options, students must take twelve semester hours of courses beyond the 2001 course. Students may transfer a maximum of six credit hours towards the certificate requirements with the approval of the Director of Undergraduate Studies. All courses counting toward a certificate must be taken on a letter grade basis, and a grade of *C* or better must be received in each course.

The Linguistics Certificate consists of twelve credit hours. The courses that the School will accept for the twelve hours of the certificate are as follows:

- LING 2001 or LING 2002 Introduction to Linguistics I and II
- LING 3010 Language Evolution
- LING 4002 Current Trends in Linguistics
- SPAN 3170 Spanish Phonetics and Phonology
- SPAN 4170 Spanish Applied Linguistics
- PSYCH 2760 Human Language Processing
- PSYCH 3011 Cognitive Psychology
- PSYCH 3790 Introduction to Cognitive Science
- PSYCH 4200 Advanced Topics in Cognitive Psychology

One LING 3813/4813 course will also count for the twelve hours of the certificate. The School of Modern Languages will also accept one linguistics course on the 3000 or 4000 level taken at Emory University or Georgia State University. Students wanting to take such a course at either university need to clear its acceptability with the linguistics advisor at Georgia Tech. All courses counting toward a certificate must be taken on a letter grade basis, and a grade of *C* or better must be received in each course.

# SCHOOL OF PUBLIC POLICY

Established in 1990
Location: 107 D. M. Smith Building
685 Cherry Street
Telephone: 404.894.6822
Fax: 404.385.0504
Web site: www.spp.gatech.edu

## GENERAL INFORMATION

Who will govern the Internet, and by what rules? Which new reproductive technologies will be developed and which prohibited by law? How do we balance economic growth and the needs of ecological systems? How can we map a knowledge economy to plan investments in new technology. Public Policy is the process of defining, debating, and deciding issues like these. At Georgia Tech, the study of public policy centers on such issues; that is, policy issues concerning science and technology. This enables us to provide our graduates with the specialized knowledge that is increasingly essential for effective policy making in a technical world.

At Georgia Tech, public policy students learn how to analyze, study, and solve problems that affect us all. Students explore controversies over technology-intensive issues, and learn how to bring data and analysis into the decision process. Graduates can be found in government, nonprofit organizations, business, or law working as consultants, policy analysts, managers, and lawyers.

The School of Public Policy offers B.S., M.S., and Ph.D. degrees in Public Policy, and there is a five-year program for earning both the B.S./M.S. degrees. Students interested in public policy in the urban context will also find relevant courses offered by the City and Regional Planning Program in the College of Architecture.

## FACULTY

### Chair and Professor

Diana Hicks

### Professors

Barry Bozeman, Susan Cozzens, Bryan G. Norton, Georgia Persons, Philip Shapira

### Associate Professors

Richard P. Barke, Roberta M. Berry, Ann Bostrom, Michael Hoffmann, Gordon Kingsley, Hans Klein, Cheryl Leggon, Juan Rogers

### Assistant Professors

Marco Castillo, Jennifer Clark, Monica Gaughan, Jon J. Johnston, Robert Kirkman, Douglas Noonan, Chris Weible

### Joint Professors

Michael Elliott, Nancy Nersessian, Michael Rodgers, Sue V. Rosser, David Sawicki

### Joint Associate Professors

Valerie Thomas

### Joint Assistant Professors

Danny Breznitz

### Professors Emeriti

Stanley Carpenter, Alan Porter, J. David Roessner

## BACHELOR OF SCIENCE IN PUBLIC POLICY

The Bachelor of Science in Public Policy (B.S. PP) is designed to provide an education that combines strong analytical skills with understanding of a range of substantive policy issues and the political, social, and cultural forces that shape public policies. The B.S. PP core courses provide students with the broad political and philosophical foundations of thought pertinent to public policy, a base of rigorous quantitative and qualitative analytical approaches, and a solid understanding of the political, social, and cultural dynamics that structure policy debates and policy outcomes. Elective courses are offered in such areas as environmental policy, science and technology policy, information and telecommunication policy, and regional development policy. The program's emphasis on the development of problem-solving and analytical skills constitutes a strong comparative advantage for B.S. PP graduates.

## BACHELOR OF SCIENCE IN PUBLIC POLICY
### 2008 - 2009 DEGREE REQUIREMENTS
### SCHOOL OF PUBLIC POLICY
Suggested Schedule

| **FIRST YEAR-FALL** | **HRS** |
| --- | --- |
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I or MATH 1712 SURVEY OF CALCULUS | 4 |
| LAB SCIENCE (BIOL, CHEM, EAS, PHYS) | 4 |
| POL 1101 AMERICAN GOVERNMENT | 3 |
| **TOTAL SEMESTER HOURS =** | **14** |

| **FIRST YEAR-SPRING** | **HRS** |
| --- | --- |
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II or MATH 1711 FINITE MATHEMATICS | 4 |
| LAB SCIENCE (BIOL, CHEM, EAS, PHYS) | 4 |
| COMPUTING REQUIREMENT | 3 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| **SECOND YEAR-FALL** | **HRS** |
| --- | --- |
| PST 2050 PHILOSOPHY & POLITICAL THEORY | 3 |
| PUBP 2012 FOUNDATIONS OF PUBLIC POLICY | 3 |
| SCIENCE / ENGINEERING ELECTIVE * | 3 |
| HIST 2111 THE UNITED STATES to 1877 OR 2112 THE UNITED STATES since 1877 | 3 |
| ECON 2105 PRINCIPLES OF MACROECONOMICS | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **SECOND YEAR-SPRING** | **HRS** |
| --- | --- |
| PUBP 3010 ORGANIZATIONS & POLICY IMPLEMENTATION | 3 |
| PST 2068 SCIENCE & VALUES IN THE POLICY PROCESS | 3 |
| SCIENCE / ENGINEERING ELECTIVE * | 3 |
| HISTORY ELECTIVE | 3 |
| ECON 2106 PRINCIPLES OF MICROECONOMICS | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **THIRD YEAR-FALL** | **HRS** |
| --- | --- |
| PUBP 3201 INTRODUCTION TO SOCIAL POLICY | 3 |
| PUBP 4113 STATISTICAL ANALYSIS | 3 |
| PUBLIC POLICY ELECTIVE* | 3 |
| HUMANITIES ELECTIVE | 3 |
| FREE ELECTIVES | 4 |
| **TOTAL SEMESTER HOURS =** | **16** |

| **THIRD YEAR-SPRING** | **HRS** |
| --- | --- |
| PUBP 3110 RESEARCH METHODS & PROBLEM SOLVING | 3 |
| PUBP 3600 SUSTAINABILITY, TECHNOLOGY, & POLICY | 3 |
| PUBLIC POLICY ELECTIVE * | 3 |
| HUMANITIES ELECTIVE | 3 |
| FREE ELECTIVES | 4 |
| **TOTAL SEMESTER HOURS =** | **16** |

| **FOURTH YEAR-FALL** | **HRS** |
| --- | --- |
| PUBLIC POLICY ELECTIVES | 6 |
| FREE ELECTIVES | 9 |
| **TOTAL SEMESTER HOURS =** | **15** |

| **FOURTH YEAR-SPRING** | **HRS** |
| --- | --- |
| PUBP 4600 SENIOR THESIS | 3 |
| PUBP ELECTIVE (3000 or 4000 Level) | 3 |
| FREE ELECTIVES | 9 |

| | |
|---|---|
| **TOTAL SEMESTER HOURS =** | **15** |

**TOTAL PROGRAM HOURS = 120 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

***(DEPARTMENTAL APPROVAL REQUIRED)**

## REQUIREMENTS AND ELECTIVES

### Computing Requirement

Students must complete either CS 1315, CS 1301, or a computer programming course approved as satisfying the general education requirements in computer literacy.

### Wellness Requirement

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

### Designated Courses in the Major

The core curriculum for the major consists of:

| | |
|---|---|
| POL 1101 | Government of the United States |
| PST 2050 | Philosophy and Political Theory |
| PST 2068 | Science and Values in the Policy Process |
| PUBP 2012 | Foundations of Public Policy |
| PUBP 3010 | Organizations and Policy Implementation |
| PUBP 3110 | Research Methods and Problem Solving |
| PUBP 3201 | Introduction to Social Policy |
| PUBP 3600 | Sustainability, Technology, and Policy |
| PUBP 4113 | Statistical Analysis for Public Policy |
| PUBP 4600 | Senior Seminar/Thesis |

A *C* or better is required in all B.S.PP core courses. No core courses may be taken on a pass/fail basis.

### Elective Courses in the Major

Students must take an additional fifteen hours of courses in public policy as electives, usually focusing on a concentration in a substantive area of public policy or in policy analytic methods. These courses are selected from among those with PUBP, POL, and PST prefixes, in consultation with an advisor.

### Non-major Cluster

Students must take a minimum of twelve hours of courses related to the study of public policy. These courses include HIST 2112, ECON 2105, ECON 2106, and another course chosen in consultation with the student's advisor.

### Senior Seminar/Thesis

A capstone course usually taken in the student's last year before graduation, the Senior Seminar and Thesis (PUBP 4600) involves writing an original policy analysis relevant to a public or nonprofit agency.

### Mathematics

Previous coursework in calculus is assumed in the core statistics course for majors as well as in economics courses in public policy. To prepare, students are advised to fulfill the mathematics requirement by taking MATH 1501-2, MATH 1711-12, or MATH 1711 with either 1501 or 1502, will also satisfy the requirement. Students cannot receive credit for both MATH 1712 and MATH 1501 or 1502.

### Science and Engineering

Public policy majors must take two laboratory science courses and two additional courses in science- or engineering-related fields. These courses must be chosen in consultation with the student's advisor.

### Social Sciences

The twelve-hour social sciences requirement may be satisfied by courses in history, economics, international affairs, political science, public policy, sociology, and selected courses in psychology. Public Policy majors must take one of the following: HIST 2111, HIST 2112, POL 1101, or PUBP 3000 (to satisfy state requirements regarding coursework on the history and constitutions of the United States and Georgia.) Public Policy majors are strongly urged to take POL 1101 or PUBP 3000. POL 1101 can be counted both as a designated course for the degree and as a social science requirement. Courses must be chosen in consultation with the student's advisor.

### Humanities and Fine Arts

Students are required to complete ENGL 1101-2 and an additional six hours in the humanities and fine arts. Additional courses may be chosen from the list of approved humanities courses in this catalog. Public policy majors may not count PST courses for both their degree requirements and the humanities and fine arts requirements.

### Free Electives

To graduate, each student must have accumulated at least 120 semester hours of credit toward the Bachelor of Science in Public Policy degree. Therefore, in addition to the requirements listed previously, the student must take a sufficient number of elective courses either within or outside Public Policy to reach 120 hours. Typically, this will allow the student approximately twenty-six hours of free electives.

## B.S./M.S. PUBLIC POLICY - FIVE-YEAR

The School of Public Policy offers a five-year B.S./M.S. program for students enrolled in the undergraduate program who demonstrate an interest in and ability for additional education beyond the B.S. degree.

Students in the B.S./M.S. program will remain undergraduates until they meet requirements for the undergraduate degree, at which point they will receive their B.S. degree and be changed to graduate status. Students will be eligible to apply for the program after completion of thirty semester credit hours at Georgia Tech (i.e., at the end of their first year), and if they show appropriate progress in their degree program thereafter. Any student in good standing in the B.S. PP program is eligible to apply to the five-year program. Admissions decisions will be based on GPA and judgments of the faculty who have served as advisors or instructors. Continuation in the program will require the student to maintain a GPA of 3.0 or higher in public policy courses. The program will not penalize students who opt out after the bachelor's degree. Students participating in this program will be eligible for the six semester credit-hour Graduate Course Option.

### THE GRADUATE-LEVEL CREDITS REQUIRED IN THE FIVE-YEAR B.S./M.S. PROGRAM ARE USUALLY AS FOLLOWS:

- Core-twenty-two hours
- Electives-twelve hours
- Research paper-three hours

**Total 37 hours**

### SPECIFIC REQUIREMENTS FOR THE FIVE-YEAR PROGRAM INCLUDE:

- PUBP 6001 Introduction to Public Policy
  (1 semester hour, all other courses are 3 semester hours)
- PUBP 6010 Ethics, Epistemology, and Public Policy
- PUBP 6112 Research Design in Policy Science
  [NOTE: This course should be taken as an undergraduate instead of PUBP 3110 and will count for both programs]
- PUBP 6114 Applied Policy Methods and Data Analysis
  [NOTE: PUBP 4113 is a prerequisite]
- PUBP 6116 Microeconomics in Policy Analysis
- PUBP 6118 Public Finance and Policy
- PUBP 6210 Public Policy Analysis

### STUDENTS MUST ALSO TAKE ONE OF THE FOLLOWING THREE COURSES:

- PUBP 6014 Organization Theory
- PUBP 6017 Public Management
- PUBP 6018 Policy Implementation

Students are required to develop, in consultation with their advisor, a six-hour concentration in an area or specialty relevant to public policy and management (e.g. environmental policy, science and technology policy, urban policy, economic development, information and communications policy, policy evaluation, public management).

Contact the B.S. PP program director for further information.

## LAW, SCIENCE, AND TECHNOLOGY PROGRAM/MINOR/CERTIFICATE

Established in 1998
Location: 107 D. M. Smith Building,
685 Cherry Street
Telephone: 404.894.6822
Fax: 404.385.0504
Web site: www.spp.gatech.edu

### GENERAL INFORMATION

The School of Public Policy is home to Georgia Tech's Law, Science, and Technology/Pre-Law Program. This program offers a wide range of curricular opportunities as well as pre-law advising and support services for students considering law school and careers in law.

The program introduces students to selected areas of law that they are likely to study in law school. Students will begin to develop the skills that they will need to succeed in law school and in law practice. Some of the courses are taught by full-time faculty, while others are taught by attorneys from the Atlanta area, thereby exposing students to academic and practical perspectives on the practice of law.

The program welcomes students from every college and major. Students majoring in the sciences and engineering may be surprised to learn that their undergraduate background gives them a strong start toward specializations such as intellectual property law, products liability law, and construction law. The pre-law program can supplement a student's scientific or engineering background by developing the reading and writing skills that are fundamental to a successful legal career.

### LAW, SCIENCE AND TECHNOLOGY MINORS AND PRE-LAW CERTIFICATES

Students working toward the minor or certificate must take one of the following core menu courses:

- PUBP 3000 American Constitutional Issues
- PUBP 3016 Judicial Process
- PUBP 3610 Pre-Law Seminar
- PUBP 4609 Legal Practice

Students working toward the certificate must take a total of twelve semester hours of applicable credit (nine semester hours at the 3000 level or above). Students working toward the minor must take a total of eighteen semester hours of applicable credit (fifteen semester hours at the 3000 level or above). For additional requirements or any other information, see the pre-law section of the Web site www.spp.gatech.edu; or contact the pre-law program director (contact information listed at Web site ).

## MINORS AND CERTIFICATES

The School of Public Policy offers undergraduate certificates and minors in five areas:

- **Public Policy:**
  featuring courses on government and business decision processes, especially those involving science, technology, environment, or regional development.
- **Law, Science, and Technology/Pre-Law:** preparing students for decisions about law school and careers in law through selection of a course from a core menu of four courses, plus selected courses in computer science, economics, history, international affairs, management, philosophy, and public policy.
- **Philosophy, Science, and Technology:** providing broad perspectives and critical thinking about science and technology, emphasizing values and ethics.
- **Political Science:** focusing on how government works, from the local to the national level.
- **Women, Science, and Technology:** Links science and technology issues with those issues associated with the study of women and gender in society.

The certificates enrich any Georgia Tech degree and particularly serve students who are planning graduate studies in law, medicine, business, or the social sciences. All the certificates require a minimum of twelve semester hours of concentration.

Minors are for students wishing a concentration outside their major that provides greater depth than the certificate programs. Each minor requires a minimum of eighteen hours of credit (twelve semester hours at the 3000 level or higher; however, the law, science, and technology minor requires fifteen semester hours at the 3000 level or higher) with a *C* or better in each. Completion of a minor will be recognized on the student's final university transcript.

Students interested in planning a certificate or minor program in one of the five areas should contact the School of Public Policy for further information. A faculty advisor assists each student in planning a program of study to meet his or her needs and interests.

## FACULTY

### Director and Assistant Professor

Robert Kirkman

### PST PHILOSOPHY FACULTY

#### Professors

Nancy J. Nersessian, Bryan G. Norton

#### Associate Professors

Roberta M. Berry, Michael Hoffman

### PST ETHICS PROGRAM FACULTY

#### Professor

Susan Cozzens

#### Associate Professors

Alice Bullard, Molly Cochran, Carol Colatrella, Hans Klein, Juan Rogers, Stephen Usselman

## PHILOSOPHY, SCIENCE, AND TECHNOLOGY

Established in 1990
Location: 107 D. M. Smith Building
685 Cherry Street
Telephone: 404.894.6822
Fax: 404.385.0504
Web site: www.spp.gatech.edu

### GENERAL INFORMATION

Georgia Tech offers undergraduate courses in philosophy with a particular focus on science and technology. The courses are intended to enable Georgia Tech students to reflect on the nature of their disciplines and to focus their understanding on the context of their lives as professionals and citizens. Philosophy, Science, and Technology (PST) courses can be used to satisfy the distribution requirement in humanities.

Certificate and minor programs in philosophy are available for students who wish to concentrate coursework in this field. The certificate program consists of twelve hours of coursework, and the minor consists of eighteen hours of coursework. PST 3115 and PST 3127 are required for either the certificate or the minor.

### ETHICS COURSES FOR ENGINEERS

The PST program is responsible for offering a menu of courses that meet an ethics course requirement in several programs in the College of Engineering. PST courses recommended to fulfill the ethics requirement include the following:

- PST 3105 Ethical Theories
- PST 3109 Ethics for Technical Professions
- PST 3127 Science, Technology, and Human Values
- PST 4176 Environmental Ethics

Courses offered in other Ivan Allen College schools recommended to fulfill the ethics requirement include the following:

- INTA 2030 Ethics and International Affairs
- LCC 3318 Biomedicine and Culture
- HTS 1028/EE 1823 Electrical Engineering in American Life

Students should consult the director concerning the schedule of course offerings.

## PHILOSOPHY, SCIENCE, AND TECHNOLOGY MINORS AND CERTIFICATES

Certificate and minor programs in philosophy are available for students who wish to concentrate coursework in this field. The certificate program consists of twelve hours of coursework, and the minor consists of eighteen hours of coursework. PST 3115 and PST 3127 are required for either the certificate or the minor.

## FACULTY

### Professors

Barry Bozeman, John E. Endicott, John W. Garver, Robert Kennedy, William J. Long, Georgia Persons, Michael D. Salomone

### Associate Professors

Richard P. Barke, Peter Brecke, Molly Cochran, John Havick, Gordon Kingsley, Hans Klein, Katja Weber, Brian Woodall

### Assistant Professors

Kirk Bowman, Adam Stulberg, Fei-Ling Wang

# POLITICAL SCIENCE

Established in 1990
Location: 107 D. M. Smith Building,
685 Cherry Street
Telephone: 404.894.6822
Fax: 404.385.0504
Web site: www.spp.gatech.edu

## GENERAL INFORMATION

The discipline of political science is included within the Ivan Allen College within the School of Public Policy and the Sam Nunn School of International Affairs. Undergraduate courses in political science are intended to broaden students' perceptions of political processes and governmental institutions. Many of these courses are taught under the PUBP or INTA prefix. Students should consult with the political science faculty concerning course offerings.

Political science courses may be used to satisfy the distribution requirement in social sciences, including the state-mandated requirement on constitutions of the United States and Georgia. This requirement may be satisfied by completion of POL 1101 or PUBP 3000, or INTA 1200, or HIST 2111 or 2112. The requirement also may be satisfied by examination.

Certificate and minor programs in political science, administered by the School of Public Policy, are available for students who wish to concentrate coursework in this discipline. The certificate in political science requires twelve hours of coursework (at least nine hours at the 3000 level), chosen in consultation with the faculty coordinator. The minor in political science requires eighteen hours of coursework (at least twelve hours at the 3000 level), also chosen with the advice of the faculty coordinator.

## POLITICAL SCIENCE MINORS AND CERTIFICATES

Certificate and minor programs in political science, administered by the School of Public Policy, are available for students who wish to concentrate coursework in this discipline. The certificate in political science requires twelve hours of coursework (at least nine hours at the 3000 level), chosen in consultation with the faculty coordinator. The minor in political science requires eighteen hours of coursework (at least twelve hours at the 3000 level), also chosen with the advice of the faculty coordinator.

## FACULTY

### Faculty Coordinator

Carol Colatrella, Professor, School of Literature, Communication, and Culture

### Professors

Lawrence Foster, John Krige, Sue Rosser

### Associate Professors

Michael Allen, Alice Bullard, Angela Dalle Vacche, Carol Senf

### Assistant Professors

Deborah Grayson, Narin Hassan, Maren Klawiter, Cynthia Klestinec, Colleen Terrell, Lisa Yaszek

## WOMEN, SCIENCE, AND TECHNOLOGY PROGRAM

The Women, Science, and Technology (WST) program does what no other gender studies program does: it links science and technology issues to those issues more traditionally associated with women's studies. The WST minor prepares Tech students (women and men majoring in engineering, science, social sciences, and humanities) to live and work in an increasingly diverse world. The minor helps students develop their understanding of the human side of science and engineering involving not only gender issues, but inequalities of race and class as well.

WST courses reflect on the theoretical and practical dimensions of diversity. Students are encouraged to explore the values associated with scientific culture and to learn to synthesize knowledge across the disciplines, while viewing science and engineering as social and cultural forces that shape relations among women and men.

Each minor must take the two (2) of the following courses from two different Schools: HTS 3020: Gender and Technology, HTS 3021: Women in Science and Engineering, LCC 3304: Science, Technology, and Gender, PUBP 4212: Women and Public Policy, PUBP 4803: Gender, Science, and Technology, PUBP 4214: Gender, Science, Technology, and Public Policy.

Each minor also chooses four (4) courses from the following list OR from the list above. The four elective courses must be offered by at least two different Ivan Allen College schools:

### HISTORY, TECHNOLOGY, AND SOCIETY

HTS 2082 Technology and Science in the Industrial Age

HTS 2084 Technology and Society

HTS 3007 Sociology of Work, Industry, and Occupations

HTS 3016 Women and Gender in the United States

HTS 3017 Sociology of Gender

HTS 3082 Sociology of Science

HTS 3084 Culture and Technology

HTS 3086 Sociology of Medicine and Health

### LITERATURE, COMMUNICATION, AND CULTURE

LCC 2100 Introduction to Science, Technology, and Culture

LCC 2200 Introduction to Gender Studies

LCC 3212 Women, Literature, and Culture

LCC 3219 Literature and Medicine

LCC 3225 Gender in the Disciplines [replaced LCC 3224 Gender Studies]

LCC 3302 Science, Technology, and Ideology

LCC 3306 Science, Technology, and Race

LCC 3308 Environmentalism and Ecocriticism

LCC 3316 Science, Technology, and Postmodernism

LCC 3318 Biomedicine and Culture

### PUBLIC POLICY

PUBP 2012 Foundations of Public Policy

PUBP 4410 Science, Technology, and Public Policy

PUBP 4416 Critical Issues in Science and Technology

PUBP 4200 Social Policy Issues

PUBP 4214 Gender, Science, Technology, and Public Policy

### INTERNATIONAL AFFAIRS:

INTA 4803/8803 Gender in International Relations

### MODERN LANGUAGES:

SPAN 3241 The Individual and the Family in Hispanic Literature

SPAN 3242 Society in Hispanic Literature

## ECONOMICS:

ECON 2100 Economic Analysis and Policy Problems

ECON 2101 The Global Economy

ECON 2106 Principles of Microeconomics

**NOTE:**
Students can receive credit for either ECON 2100 or ECON 2101, or for ECON 2105/2106. Students cannot receive credit for ECON 2100 and ECON 2101, or for ECON 2100 and ECON 2105/2106, or for ECON 2101 and ECON 2105/2106.

With permission of the WST coordinators, students may substitute one independent study course or course from another Georgia Tech unit. This may be chosen from special topics courses, seminars, and other courses that focus upon gender and social inequality or social issues of science and technology. Students may register and plan their courses of study for the WST minor by meeting with WST coordinators, Carol Colatrella (LCC) or Mary Frank Fox (PUBP). Students petition for the minor at the time they petition for their major degree. Minors are conferred upon graduation and appear on students' transcripts.

## B.S./M.S. PUBLIC POLICY - FIVE-YEAR

The School of Public Policy offers a five-year B.S./M.S. program for students enrolled in the undergraduate program who demonstrate an interest in and ability for additional education beyond the B.S. degree.

Students in the B.S./M.S. program will remain undergraduates until they meet requirements for the undergraduate degree, at which point they will receive their B.S. degree and be changed to graduate status. Students will be eligible to apply for the program after completion of thirty semester credit hours at Georgia Tech (i.e., at the end of their first year), and if they show appropriate progress in their degree program thereafter. Any student in good standing in the B.S. PP program is eligible to apply to the five-year program. Admissions decisions will be based on GPA and judgments of the faculty who have served as advisors or instructors. Continuation in the program will require the student to maintain a GPA of 3.0 or higher in public policy courses. The program will not penalize students who opt out after the bachelor's degree. Students participating in this program will be eligible for the six semester credit-hour Graduate Course Option.

### THE GRADUATE-LEVEL CREDITS REQUIRED IN THE FIVE-YEAR B.S./M.S. PROGRAM ARE USUALLY AS FOLLOWS:

- Core-twenty-two hours
- Electives-twelve hours
- Research paper-three hours

**Total 37 hours**

### SPECIFIC REQUIREMENTS FOR THE FIVE-YEAR PROGRAM INCLUDE:

- PUBP 6001 Introduction to Public Policy
  (1 semester hour, all other courses are 3 semester hours)
- PUBP 6010 Ethics, Epistemology, and Public Policy
- PUBP 6112 Research Design in Policy Science
  [NOTE: This course should be taken as an undergraduate instead of PUBP 3110 and will count for both programs]
- PUBP 6114 Applied Policy Methods and Data Analysis
  [NOTE: PUBP 4113 is a prerequisite]
- PUBP 6116 Microeconomics in Policy Analysis
- PUBP 6118 Public Finance and Policy
- PUBP 6210 Public Policy Analysis

### STUDENTS MUST ALSO TAKE ONE OF THE FOLLOWING THREE COURSES:

- PUBP 6014 Organization Theory
- PUBP 6017 Public Management
- PUBP 6018 Policy Implementation

Students are required to develop, in consultation with their advisor, a six-hour concentration in an area or specialty relevant to public policy and management (e.g. environmental policy, science and technology policy, urban policy, economic development, information and communications policy, policy evaluation, public management).

Contact the B.S. PP program director for further information.

## MASTER OF SCIENCE IN PUBLIC POLICY

The Master of Science in Public Policy is designed for students with strong analytical backgrounds, such as those received in engineering, natural science, or an analytically oriented social science or humanities curriculum. Graduate studies in public policy focus on areas in which either the consequences of scientific and technological activity have significant public policy implications, or technical and scientific information is a significant input to the policy-making process. Current areas of specialization for the School include science and technology policy, environmental policy, information and telecommunication policy, and regional economic development policy.

The M.S. in Public Policy requires forty-six credit hours of study, including either: a) three hours devoted to producing a professional policy research paper or team research project or b) nine hours for a thesis. In general, it is expected that students planning to enter employment upon completing the degree will choose the paper or project option, while students planning to continue their graduate work will choose the thesis option.

The program requires a twenty-five-credit-hour core curriculum consisting of five substantive elements: policy and organizational analysis; ethics, philosophy, and public policy; economics and public finance; methods of analysis, including quantitative analysis and research design; and a capstone course in public policy analysis. In addition, there is a required one-credit-hour introductory graduate seminar in public policy. Based on prior coursework or a test-out exam, students may request up to six credit hours of exemptions from core courses. In individual cases, students may be required to take pre-core preparatory courses to be ready for graduate studies in particular methodological or analytical areas.

**CORE COURSES INCLUDE:**

- PUBP 6001 Introduction to Public Policy
- PUBP 6010 Ethics, Epistemology, and Public Policy
- PUBP 6012 Fundamentals of Policy Processes
- PUBP 6112 Research Design in Policy Science
- PUBP 6114 Applied Policy Methods and Data Analysis
- PUBP 6116 Microeconomics for Policy Analysis
- PUBP 6118 Public Finance and Policy
- PUBP 6201 Public Policy Analysis

**PLUS ONE OF THE FOLLOWING:**

- PUBP 6014 Organization Theory
- PUBP 6017 Public Management
- PUBP 6018 Policy Implementation and Administration

Students must achieve a grade of *B* or higher in all core courses. In addition to elective courses in the School of Public Policy, students may develop their own programs of study by taking courses in other Georgia Tech schools, including those in the Ivan Allen College and the Colleges of Architecture, Management, Sciences, and Engineering. A summer internship, work experience, or co-op assignment between the first and second years offers students insight into a research or professional setting related to their career interests.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN PUBLIC POLICY

The Ph.D. in Public Policy is a research-oriented program that prepares students for advanced professional work or for academic careers. Georgia Tech houses two Ph.D. programs in Public Policy, including one offered jointly with Georgia State University. The programs stress intellectual and methodological rigor, building upon the theory and applications of political and organizational analysis, research design, quantitative analysis, and economics.

All students must have completed the equivalent of the core courses for the Master of Science in Public Policy (see description of the M.S. degree) before they begin the doctoral core curriculum. The doctoral core curriculum consists of six three-credit-hour courses (seven in the joint program). These courses are designed to provide students with a theoretical and methodological foundation for conducting public policy research. Core courses include:

| | |
|---|---|
| PUBP 8200 | Advanced Research Methods I |
| PUBP 8205 | Advanced Research Methods II |
| PUBP 8211 | Microeconomic Theory and Applications |
| PUBP 8500 | Research Seminar in Public Policy |
| PUBP 8510 | Logic of Policy Inquiry |
| PUBP 8520 | Scope and Theory of Public Policy |

Additionally, for the joint program, students must take PUBP 8813, Advanced Topics in Analysis and Evaluation. Details on the requirements of the joint program, including equivalent courses at Georgia State University, are available on the Web site.

This core is supplemented with in-depth study of a substantive area of public policy. The Georgia Tech program focuses on science and technology policy, environmental policy, and urban and regional economic development policy. The joint program includes several additional majors, including health policy, policy and program evaluation, and public finance. Students may pursue concentrations with groups of courses already developed by the faculty or an individualized concentration with the written approval of the student's advisor and the Graduate Committee.

In the Georgia Tech program, the major area of concentration consists of four courses and has a capstone seminar at the Ph.D. level that majors are required to complete. The minor concentration is a three-course area of study that is taken outside the School of Public Policy.

Other requirements for the Ph.D. include completion of the one-year residency requirement; admission to candidacy for the degree through successful completion of qualifying exams and a dissertation proposal; and completion and successful defense of a doctoral dissertation (nine credit hours).

In summary, the credits required for the Ph.D. are usually as follows:

Core eighteen hours (twenty-one for the joint program)

Major twelve hours

Minor nine hours

Qualifiers three hours (written exam)

Colloquium three hours (oral exam: presentation of dissertation proposal)

Dissertation nine hours

**Total 54 hours (57 for the joint program)**

This total assumes that a student already has satisfied the core requirements of the master's degree (at most an additional twenty-five hours).

### FINANCIAL AID

Most Ph.D. students receive financial assistance, chiefly through sponsored research projects and teaching assistantships.

# GRADUATE CERTIFICATE IN PUBLIC POLICY

The School of Public Policy offers a certificate in public policy to PhD students from other Schools around campus. The goal of the certificate program is to provide a basic but well-rounded introduction to public policy thinking to Georgia Tech graduate students. The program is designed to address the needs of scientists, engineers, management scholars and others who seek to be more aware of policy, regulatory, ethical, and societal implications of science, technology and innovation. The program will provide breadth and context for those entering employment in any sector. The courses in the program explore the processes through which policy is made.

Although this certificate is not available to policy students, the courses are open to all graduate students, creating an opportunity for students to gain value from divergent perspectives. Students who complete this certificate are eligible to participate in the School's PRIME international graduate student exchange program.

## ELIGIBILITY

Graduate students from all programs may take the courses offered as part of this certificate. The certificate will be awarded by the School of Public Policy to any non-public policy graduate student who successfully complete the program requirements and earns a graduate degree from one of Georgia Tech's degree granting academic units. The requirements for the Graduate Certificate in Public Policy will typically satisfy the minor requirements for the Georgia Tech PhD degree.

Please contact Diana Hicks at dhicks@gatech.edu with any questions.

## CERTIFICATE REQUIREMENTS

Students are required to earn at least a B in every course that counts toward the certificate. The credit requirements for the Certificate in Public Policy are 12 semester hours.

### Required Course, choose one:

6012 - Fundamentals of Policy Processes
6201 - Public Policy Analysis

### Electives

Three electives are required for the certificate. These electives can be chosen from the list below or from graduate level special topics offered by the public policy faculty with the agreement of the certificate advisor. The electives are organized by broad area of interest to guide students in choosing electives that best suits their interests. Students are not required to choose all electives from the same grouping.

**Analytical methods**

- 6112 - Research Design in Policy Science
- 6114 - Applied Methods and Data Analysis

**Economic development**

- 6602 - Economic Development Analysis and Practice
- 6606 - Urban Development Policy
- 6415 - Technology, Regions, and Policy
- 6600 - Foundations of Local Economic Development Planning and Policy

**Economics for public policy**

- 6116 - Microeconomics for Policy Analysis
- 6118 - Public Finance Policy

**Ethics and values**

- 6010 - Ethics, Epistemology, and Public Policy
- 6326 - Environmental Values and Policy Goals

**Environmental & energy policy**

- 6310 - Environmental Issues

- 6312 - Economics of Environmental Policy
- 6314 - Policy Tools for Environmental Management
- 6326 - Environmental Values and Policy Goals

**Information technology**

- 6111 - Internet and Public Policy
- 6501 - Information Policy and Management

**Public administration**

- 6014 - Organization Theory
- 6017 - Public Management
- 6018 - Policy Implementation and Administration
- 6226 - Business and Government

**Science and technology policy**

- 6401 - Science, Technology and Public Policy
- 6402 - Research Policy and Management
- 6417 - Critical Perspectives on Science and Technology
- 6753 - Comparative Science and Technology Policy
- Special topics (PUBP 8803) in public policy. See Oscar catalog for offerings in upcoming semesters. Selection of other courses requires approval of the instructor and the certificate advisor.

# DEPARTMENT OF AIR FORCE AEROSPACE STUDIES

Established in 1946
Location: 151 6th Street O'Keefe Bldg. 2nd Floor
Telephone: 404.894.4175
Fax: 404.894.6857
Web site: www.afrotc.gatech.edu

## GENERAL INFORMATION

The Air Force Reserve Officer Training Corps, Air Force ROTC, is a three- or four-year educational program designed to give men and women the opportunity to become Air Force officers while completing a degree. It involves an elective curriculum taken along with required college classes. Students participating in the program will attend Air Force ROTC classes on Tuesdays and Thursdays. Students earn a college degree and an officer's commission in the U.S. Air Force at the same time.

Air Force ROTC offers competitive four, three and a half, three, two and a half, and two year college scholarships to qualified college students based on merit. Non-competitive scholarships are also available based on major, including certain foreign languages and engineering specialties. Scholarships vary from $3,000, $9,000, $15,000, all the way up to full tuition and required fees. Scholarship winners also receive a stipend of up to $500 for each academic month, in addition to a $900 allowance for books and other educational items. Non-scholarship students also receive the stipend and book allowance as Professional Officer Course cadets in the program.

The curriculum is divided into two courses: a General Military Course open to all freshmen and sophomores, and a Professional Officer Course for qualified juniors, seniors, and graduate students. Students undecided about pursuing a commission can participate in the General Military Course without incurring a military obligation.

Successful completion of the General Military Course, a minimum 2.0 GPA, and the appropriate physical and medical qualifications are prerequisites for enrollment in the Professional Officer Course. Successful completion of both courses with the award of a bachelor's degree allows students to become commissioned second lieutenants in the United States Air Force.

## FACULTY

**Commanding Officer and Professor (sophomores)**

Col. Sheri Andino

**Commandant of Cadets and Assistant Professor (seniors)**

Maj. Steve Headley

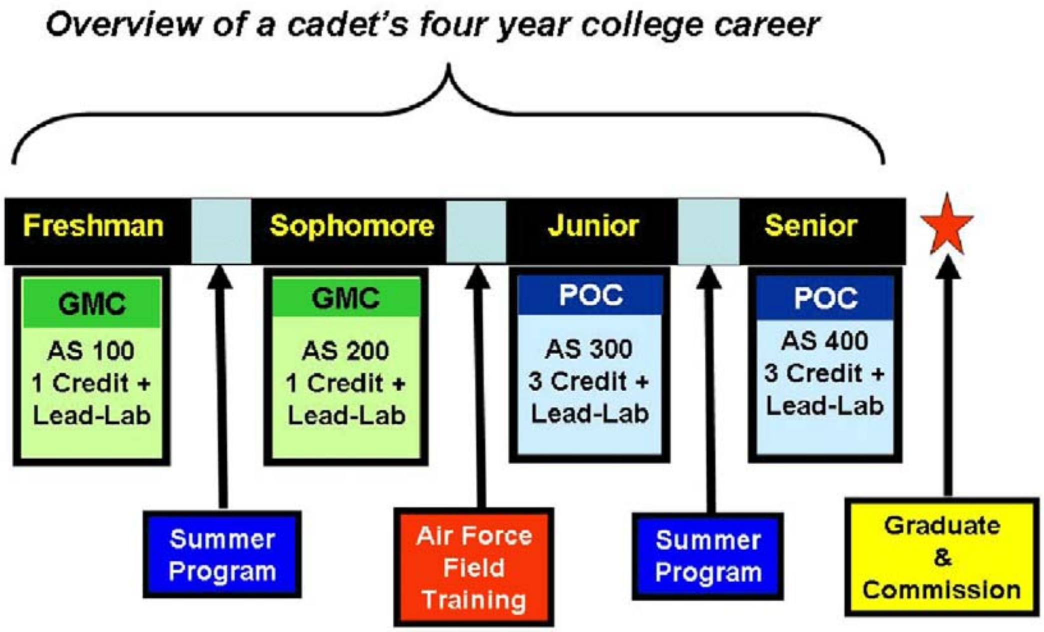
**Unit Admission Officer and Assistant Professor (freshmen)**

Capt. Manolita Figueroa

**Education Officer and Assistant Professor (juniors)**

VACANT

## PROGRAM OVERVIEW




Students entering the program enroll in Air Force ROTC courses in the same manner in which they register for other undergraduate courses. A formal application is not required. Students enrolled in the General Military Course (GMC) incur no military obligation unless they are on an Air Force ROTC scholarship. Those students desiring to become commissioned officers in the Air Force must compete for entry into the Professional Officer course (POC), which is normally the last two years of college. In the summer between the sophomore and junior years, cadets attend a four- or six-week field training session conducted at an Air Force base.

## AIR FORCE ROTC SCHOLARSHIP PROGRAM

Air Force ROTC can help students with the high cost of getting a degree. As an Air Force ROTC cadet, students are entitled to many benefits.

- 1. Up to $15,000 per academic year to cover tuition, lab, and incidental fees; $750 for textbooks; and $250-$400 a month tax-free allowance
- Free Air Force uniforms and textbooks
- Management training and opportunities to apply leadership principles
- At most schools, academic credit for Air Force ROTC classes
- Travel on military aircraft on a space-available basis for students on Air Force ROTC scholarships or in the Professional Officer course

### IN-COLLEGE SCHOLARSHIP PROGRAM (ICSP):

The Air Force ROTC In-College Scholarship Program (ICSP) is a highly competitive scholarship program aimed primarily at college freshmen and sophomores in ANY MAJOR. Detachment commanders nominate and rank/order cadets in their program using the 'whole-person' concept. All ICSP scholarships activate the following fall term.

### HISTORICALLY BLACK COLLEGES AND UNIVERSITIES (HBCU):

Scholarships are available for any Clark Atlanta, Morehouse, or Spelman student. The objective of the HBCU scholarship program is to encourage outstanding HBCU students to enroll in the Air Force ROTC program. To compete for the scholarship, students must: be full-time, be physically and medically qualified, have at least a 2.5 GPA, and meet all other eligibility criteria. Depending on the situation, HBCU scholarships can be activated in the same term.

### FOREIGN LANGUAGE EXPRESS SCHOLARSHIP:

Foreign Language Express scholarships provide preapproved scholarships to individuals in certain areas of study for which the United States Air Force projects a critical need in a few years. Scholarships in these areas are guaranteed if students meet all minimum requirements. Air Force ROTC provides an outstanding opportunity for students to receive a three-, or two-year scholarship. Depending on the situation, Foreign Language scholarships can be activated in the same term. In order to receive an Express Scholarship students must be in one of the areas of study: Arabic, Chinese, Persian-Iranian/Persian-Afghan, Hindi, Indonesian, Japanese, Pashtu, Russian, Turkish, Urdu/Punjabi, Azerbaijani, Bengali, Cambodian, Hausa, Kazakh, Kurdish, Malay, Serbo-Croatian, Swahili, Thai, Uighur, Uzbek, or Vietnamese.

### NURSING SCHOLARSHIPS:

Air Force ROTC offers a variety of scholarships for nursing students that cover most tuition, books, and lab fees. The goal of the Nursing scholarships is to allow nursing students to complete their degree debt-free, while acquiring valuable resource knowledge about the Air Force and become part of the Air Force's medical staff. Air Force nurses may enter in any number of different nursing fields including clinical nurse, operating room nurse, flight nurse, or nurse anesthetist. Depending on the situation, Nursing scholarships can be activated in the same term.

### PRE-HEALTH PROFESSIONS AND ARMED FORCES HEALTH PROFESSIONS PROGRAM:

A Pre-Health Professions Program designation is offered to encourage students to earn commissions through Air Force ROTC and continue their education in medical or osteopathic school. You must apply before the end of the sophomore year. The Armed Forces Health Professions Scholarship Program provides up to four years of medical school and it covers tuition and fees, textbooks. It also pays the student a taxable monthly allowance of $938. Students accepted to the graduate-level health professions school, will be granted the scholarship and transferred into the Air Force Medical Corps. Armed Forces Health Professions scholarship participants incur an additional active-duty service commitment.

## AIR FORCE ROTC CROSS REGISTRATION

Cross Registration is available to students from ARCHE participating schools. As a cross-town cadets students will participate in Air Force ROTC activities at Georgia Tech every Tuesday and Thursday. Scholarship opportunities are available to students from schools with Air Force Education Service Agreements. Stipends and other incentives are available to all students. Students graduating with a degree from their home institution will receive a commission in the United States Air Force. Contact the Detachment 165 Unit Admissions Officer at 404.894.4175 for more information. For more information on the cross registration process and ARCHE participating schools, visit www.atlantahighered.org

## GENERAL MILITARY COURSE (GMC)

Courses are offered during fall and spring semesters with two credit hours awarded for each freshman and sophomore course, and three credit hours for each junior and senior course. Four hours of basic ROTC courses may be applied as elective credits toward degree requirements at the school. Classes normally meet two hours a week. A one-hour leadership laboratory and participation in physical conditioning training are also required.

Students in the GMC do not incur military obligation unless they have received an ROTC scholarship.

### AS 1000 LEVEL CLASS SCHEDULE FOR FRESHMAN YEAR:

A survey course designed to introduce students to United States Air Force and Air Force Reserve Officer Training Corps

**Fall**
AS 1110 Foundations of the Air Force I - 1 hour
AS 1111 Leadership Lab - 1 hour
**Spring**
AS 1120 Foundations of the Air Force II - 1 hour
AS 1121 Leadership Lab - 1 hour

### AS 2000 LEVEL CLASS SCHEDULE FOR SOPHOMORE YEAR:

This course provides the students with a level of understanding for the general element and employment of air and space power.

**Fall**
AS 2210 Evolution of the United States Air and Space Power I - 1 hour
AS 2211 Leadership Lab - 1 hour
**Spring**
AS 2220 Evolution of the United States Air and Space Power I - 1 hour
AS 2221 Leadership Lab - 1 hour

## PROFESSIONAL OFFICER COURSE (POC)

Courses are offered during fall and spring semesters with three credit hours for each junior and senior course. Classes normally meet three hours a week. A one-hour leadership laboratory and participation in physical conditioning training are also required.

### AS 3000 LEVEL CLASS SCHEDULE FOR JUNIOR YEAR:

A study of leadership, management fundamentals, professional knowledge, and communication skills required of an Air Force junior officer

**Fall**

AS 3310 Leadership Studies I - 3 hours
AS 3311 Leadership Lab - 1 hour

**Spring**

AS 3320 Leadership Studies II - 3 hours
AS 3321 Leadership Lab - 1 hour

### AS 4000 LEVEL CLASS SCHEDULE FOR SENIOR YEAR:

Examines the national security process, Air Force structure, and doctrine with emphasis on developing top-level management skills required of an Air Force junior officer.

**Fall**

AS 4410 National Security Affairs - 3 hours
AS 4411 Leadership Lab - 1 hour

**Spring**

AS 4420 Preparation for Active Duty - 3 hours
AS 4421 Leadership Lab - 1 hour

## LEADERSHIP LABORATORY

Leadership Laboratory is a separate course requiring two hours per week throughout the cadet's enrollment in Air Force ROTC. It involves a study of Air Force customs and courtesies, drill and ceremony, professional development opportunities in the Air Force, and the life and work of an Air Force junior officer. Students develop their leadership potential in a practical, supervised laboratory that may include field trips to Air Force installations and presentations by Air Force personnel. Physical Training (PT) is a key part of officer development. Cadets are expected to PT twice per week.

## FIELD TRAINING

Field Training is, in most cases, a cadet's first exposure to a working Air Force environment. The program is designed to develop military leadership and discipline, and to provide Air Force officer orientation and motivation. At the same time, the Air Force evaluates each cadet's potential as an officer. Field training includes Air Force professional development orientation, marksmanship training, junior officer training, physical fitness, and survival training.

## DEPARTMENT OF MILITARY SCIENCE/ARMY ROTC

Established in 1917
151 6th Street
Location: Building 033
Telephone: 404.894.4760 or 404.894.9938
Web site: www.armyrotc.gatech.edu

### GENERAL INFORMATION

The purpose of the Army ROTC is to prepare students for commissioning as officers in the Active Army, Army Reserve, or Army National Guard. The overall program is designed to aid students in developing the abilities and attitudes that will make them academically successful and to develop well educated junior officers.

The curriculum is divided into two courses: a basic course that is open to all freshmen and sophomores, and an advanced course for qualified juniors, seniors, and graduate students. Students who are undecided about pursuing a commission have the option of participating in the basic course without incurring a military obligation. Successful completion of the basic course (or commensurate training), a minimum 2.0 cumulative grade point average, and the appropriate medical and physical qualifications are prerequisites for enrollment in the advanced course. Successful completion of both courses and the award of a bachelor's degree constitute the normal progression to gaining a commission as a second lieutenant. Courses are available to both men and women.

The overall Army ROTC curriculum prepares students to become effective leaders and managers in a variety of responsible and challenging commissioned officer fields, thus facilitating early middle-management career development and progression.

## FACULTY

### Professor and Head

Lt.Col. Nathaniel Farmer

### Assistant Professors

Maj. Thomas Haynes, Capt. Mike Norris, Capt. Marcus O’Neal, Sgt. Maj. Eddie Jackson, MSG Michael Ward, MSG James Rippey

## THE BASIC COURSE CURRICULUM

The Basic Course consists of a four-semester block of instruction taken during the freshman and sophomore years. Successful completion of all four semesters satisfies the military science requirements for progression to the Advanced Course. These courses provide a foundation in basic military subjects such as customs and traditions, history, leadership, and map reading. They round out a student's academic life, provide a challenge, foster confidence, and facilitate personal growth and development.

Courses are offered during fall and spring semesters with three credit hours awarded for each freshman and sophomore course and four credit hours for each junior and senior course. Four hours of basic ROTC courses may be applied as elective credits toward degree requirements at the school. Courses normally meet two hours a week. A one-hour leadership laboratory and participation in physical conditioning training are also required for contracted cadets.

Students in the Basic Course do not incur military obligation unless they have received an ROTC scholarship. Scholarship cadets are required to participate in a field training exercise twice per school year. They are issued uniforms and may participate in other ROTC-related events and training, such as Airborne School, Air Assault School, and Northern Warfare Training.

### THE BASIC COURSE CONSISTS OF THE FOLLOWING:

**First Year**

| Course | Title | Hours |
|---|---|---|
| MSL 1001 | Leadership and Personal Development | 3 |
| MSL 1002 | Introduction to Tactical Leadership | 3 |

**Second Year**

| Course | Title | Hours |
|---|---|---|
| MSL 2001 | Innovative Team Leadership | 3 |
| MSL 2022 | Foundation of Tactical Leadership | 3 |

## THE ADVANCED COURSE CURRICULUM

The Advanced Course is designed to fully develop a cadet's leadership and management potential, physical stamina, and self-confidence, as well as those Army values required of an Army officer. The objective is to produce the highest caliber junior officers fully capable of discharging a wide spectrum of command and management responsibilities in the modern Army and in the business world.

The Advanced Course consists of four semesters of instruction normally taken during the junior and senior years. Successful completion of the four courses fulfills the military science academic requirements for award of an officer's commission. Each student must also participate in a regular physical conditioning program and successfully pass the Army Physical Fitness Test. All Advanced Course students must participate in field training exercises twice a school year. Twelve credit hours are earned, six of which may be applied as elective credits toward any degree at the Institute. Advanced Course students receive a subsistence allowance up to $500 a month. Service veterans and service academy cadets may qualify for direct entry into the Advanced Course. Certain Advanced Course students are eligible to participate in the Simultaneous Membership Program with the Army Reserve or Army National Guard. Students in this program affiliate with an Army unit as officer trainees.

Students enrolled in the Advanced Course are also required to complete a five-week Advanced Camp at Fort Lewis, Washington, to become eligible for commissioning. Attendance at Advanced Camp normally occurs during the summer between the junior and senior years. Students may also participate in additional voluntary training, such as Airborne School or Cadet Troop Leader Training. In addition to completing the military science academic requirements of both the Basic and Advanced Courses, the student must complete at least one undergraduate course from each of five designated fields of study:

- Written Communications: Select any course offered by the Institute in English composition or creative writing.
- Human Behavior: Select any course offered by the Institute in psychology, sociology, anthropology, or ethics.
- Military History/National Security Studies: Select INTA 3520, INTA 3510, or another similar course approved by the Professor of Military Science.
- Computer Literacy: Select any course offered by the College of Computing except CS 1000 (Information and Society).
- Mathematics Reasoning: Select any course offered by the School of Mathematics.

Students who successfully complete the Army ROTC curriculum and earn a bachelor's degree can be commissioned as second lieutenants. Subsequent military service may be on active duty or with the Army Reserve or Army National Guard. The following courses constitute the Advanced Course:

### Third Year

| Course | Title | Hours |
|---|---|---|
| MSL 3001 | Adaptive Tactical Leadership | 4 |
| MSL 3002 | Leadership in Changing Environments | 4 |

### FOURTH YEAR

| Course | Title | Hours |
|---|---|---|
| MSL 4001 | Developing Adaptive Leaders | 4 |
| MSL 4002 | Leadership in a Complex World | 4 |
| MSL 4901 | Special Problems (restricted) | 4 |

## LEADERSHIP TRAINING COURSE (LTC)

Those academically qualified students who are unable to fulfill the requirements of the Basic Course during their freshman and sophomore years may qualify for admission to the Advanced Course by successfully completing the Leadership Training Course (LTC). This option is primarily designed to meet the needs of transfer students, those completing the sophomore year, and others, including graduate students, who have four semesters remaining at the Institute. This option provides a two-year program in lieu of the standard four-year curriculum.

The LTC option consists of a four-week training period conducted at Fort Knox, Kentucky, during the summer months. During each summer, various cycles will be available to meet student needs. Students choosing this option are required to submit a formal application and pass a physical examination.

Students selected to attend the LTC training program will receive approximately $800 in addition to travel expenses to and from the LTC. Uniforms, housing, medical care, and meals are furnished by the government during the training. Interested students should contact the Military Science Department.

## SCHOLARSHIP PROGRAMS

Each year, the Army offers a variety of full scholarship programs to those young men and women who have demonstrated outstanding academic scholarship and leadership potential. Four-, three-, and two-year scholarships are available to qualified students. Scholarships are competitive and awarded based on the student's merit. The Professor of Military Science receives an allocation of scholarships each year. Scholarships provide full tuition/fees or room/board to both resident and out-of-state students, $1,200 allowance for textbooks and supplies, and a $300 to $500-a-month tax-free stipend. Scholarship students serve either on active duty, in the Army reserves, or Army National Guard.

### OPTIONS

Students who wish to obtain a commission as an officer but do not want to serve on active duty may request a Guaranteed Reserve Forces Duty (GRFD) scholarship. Reserve Forces Duty scholarships are available, but are limited in number. Affiliation with an Army Reserve or Army National Guard unit is required to participate in either the scholarship or nonscholarship program. In this program, students are guaranteed in writing that they will not be placed on active duty and can fulfill their entire commitment in the Army Reserve or Army National Guard.

## STUDENT ADVISORY SERVICES

Faculty members are available throughout the academic year and during each summer orientation session in the Department of Military Science for academic counseling, schedule planning, and career guidance. Students and their parents are encouraged to seek advice on the overall Army ROTC program, scholarship opportunities, and officer career development. Appointments may be made in person, by calling 404.894.4760/9938, or by e-mail via the ROTC home page, www.armyrotc.gatech.edu. Students should also check the homepage for the latest updates on course requirements and other important information.

# DEPARTMENT OF NAVAL SCIENCE

Established in 1926
O’keef Building, Second Floor
Telephone: 404.894.4771 or 404.894.4772
Fax: 404.894.6029
Web site: http://nrotc.gatech.edu

## GENERAL INFORMATION

The NROTC program offers students the opportunity to qualify for service as commissioned officers in the United States Navy or Marine Corps. The program's objectives are to provide students with an understanding of the basic concepts and principles of naval science, associated professional knowledge, and the requirements for national security. NROTC students receive an educational background that allows them to later undertake advanced education in the naval service.

The NROTC program is an officer accession program for the unrestricted line communities (Surface Warfare, Submarines, Aviation, Marine Corps). Upon graduation, the student is commissioned as an officer in the Naval or Marine Corps. Naval officers are ordered to active duty in submarines, surface combatants, or the aviation community. Marines undergo training leading to a variety of specialties. NROTC students are enrolled in one of the following three categories: three-year or four-year scholarship students, college programmers, or two-year scholarship students.

## FACULTY

### Commanding Officer and Professor
CAPT Wayne Radloff

### Assistant Professor
Lt. Col. Dwayne Whiteside

### Marine Instructor
Major Ronald Peterson

### Assistant Marine Instructor
Gy. Sgt. Hobbs

### Senior Instructor
LT Brian Wheaton

### Sophomore/Junior Instructor
LT Damien Lipke

### Freshman Instructor
LT Stephen Thompson

## SCHOLARSHIP STUDENTS

Four-year and three-year scholarship students are selected through nationwide competition. Selection criteria include SAT or ACT scores, high school academic performance, and extracurricular activities. The selection process is administered by the chief of Naval Education and Training; however, the NROTC unit will provide guidance and information to applicants. An online application is available at https://www.nrotc.navy.mil.

The NROTC scholarship pays for tuition (and applicable fees) and textbooks. The Navy also provides uniforms and a $250-$400 per month subsistence allowance. The Naval Science Department conducts an orientation program (INFORM) for all new NROTC scholarship students during the week prior to the start of the fall semester. Scholarship students must complete the naval science curriculum and also participate in summer assignments from four to six weeks during the summers between academic years.

## COLLEGE PROGRAM STUDENTS

Non-scholarship students may seek a naval commission through the NROTC College Program. Interested students may apply at the Naval Armory on campus. The process includes a review of previous academic performance and interviews with staff personnel. Students accepted into the College Program must complete the naval science curriculum and take a summer assignment between the junior and senior years.

The Navy provides uniforms and naval science texts. Students who enter advanced standing in the junior year receive a subsistence allowance of $350-$400 per month. College program students are eligible to compete for scholarships ranging from one to three years. Selection criteria are based on academic performance at Georgia Tech and military performance as a College Program student. For information, contact the Naval Science Department at 404.894.4771.

## TWO-YEAR SCHOLARSHIP PROGRAM

Sophomores may apply and compete nationally for two-year NROTC scholarships. Those selected attend six weeks of training in Newport, Rhode Island, during the summer between the sophomore and junior years. Upon successful completion, the student joins the NROTC program on an equal footing with other students in the junior year naval science classes. Interested students should contact the Naval Science Department.

## CURRICULUM

### REQUIRED NAVAL SCIENCE CLASSES:

NS 1321 - Introduction to Naval Science

NS 1323 - Naval Maritime History

NS 2321 - Naval Leadership and Management

NS 2323 - Navigation *Navy only*

NS 3323 - Evolution of Warfare *Marine only*

NS 3324 - Marine Weapons and Tactics *Marine only*

NS 3325 - Naval Weapon Systems *Navy only*

NS 3326 - Naval Engineering Systems *Navy only*

NS 4320 - Naval Operations and Seamanship *Navy only*

NS 4322 - Naval Leadership and Ethics

NS 4323 - Amphibious Warfare *Marine only*

All students must attend weekly Drill Periods in addition to above courses.

In addition to the required naval science courses, all Navy Option Scholarship students must take calculus (MATH 1501-2 or MATH 1511-2), physics (PHYS 2111-2 or 2231-3 series), one term of INTA (contact NROTC unit for required class), and one term of a cultures studies class (contact NROTC unit for required class).

Marine Option students must only take the previously listed international affairs and cultural studies courses or their equivalent as approved by the professor of naval science.

Any additional requirements are based on whether or not the student is in a technical or nontechnical major, a Navy Option or Marine Option student, and a scholarship or nonscholarship recipient. Each student must obtain from the NROTC Department a complete description of program requirements since the above statement is only a general outline. Students may apply a maximum of four hours in basic ROTC courses and six hours in advanced ROTC courses toward meeting the free elective requirements for any degree.

# IVAN ALLEN COLLEGE OF LIBERAL ARTS

## SCHOOL OF ECONOMICS

Bachelor of Science in Economics

Additional Options:

International Plan

Bachelor of Science in Economics and International Affairs

Additional Options:

International Plan

Bachelor of Science in Global Economics and Modern Languages

Additional Options:

International Plan

Master of Science with a Major in Economics

## SCHOOL OF HISTORY, TECHNOLOGY, & SOCIETY

Bachelor of Science in History, Technology, and Society

Additional Options:

International Plan

Research Option

Master of Science in History and Sociology of Technology and Science

Doctor of Philosophy with a Major in History and Sociology of Technology and Science

## SCHOOL OF INTERNATIONAL AFFAIRS

Bachelor of Science in International Affairs

Additional Options:

International Plan

Bachelor of Science in International Affairs and Modern Language

Additional Options:

International Plan

Bachelor of Science in Economics and International Affairs

Additional Options:

International Plan

Master of Science in International Affairs

Doctor of Philosophy with a Major in International Affairs, Science, and Technology

## SCHOOL OF LITERATURE, COMMUNICATION, & CULTURE

Bachelor of Science in Computational Media (Interdisciplinary with COC & Ivan Allen College)

Additional Options:

International Plan

Research Option

Bachelor of Science in Science, Technology, and Culture

Additional Options:

Biomedicine & Culture Option

Gender Studies Option

Media Option

Research Option

B.S./M.S.L.C.C. - Five-year

B.S./M.S.L.C.C. - Five-year

Master of Science in Human-Computer Interaction

Master of Science in Digital Media

Doctor of Philosophy with a Major in Digital Media

## SCHOOL OF MODERN LANGUAGES

Bachelor of Science in International Affairs and Modern Language

Additional Options:

International Plan

Bachelor of Science in Global Economics and Modern Languages

Additional Options:

International Plan

## PUBLIC POLICY

Bachelor of Science in Public Policy

B.S./M.S.PUB.P. - Five-year

B.S./M.S.PUB.P. - Five-year

Master of Science in Public Policy

Doctor of Philosophy with a Major in Public Policy

## RESERVE OFFICERS' TRAINING CORPS (ROTC)

Air Force Reserve Officers' Training Corps (ROTC)

Army Reserve Officers' Training Corps (ROTC)

Navy Reserve Officers' Training Corps (ROTC)

## COLLEGE OF SCIENCES

College established in 1990
First Science Program in 1888
Location: 225 North Avenue
Atlanta, GA 30332-0365
Telephone: 404.894.3300
Fax: 404.894.7466
Web site: www.cos.gatech.edu
Undergraduate: www.cos.gatech.edu/ugrad.htm
Graduate: www.cos.gatech.edu/grad.htm

### GENERAL INFORMATION

The College of Sciences comprises seven schools - Applied Physiology, Biology, Chemistry and Biochemistry, Earth and Atmospheric Sciences, Mathematics, Physics, and Psychology. All schools except Applied Physiology offer B.S., M.S., and Ph.D. degree programs. Applied Physiology offers the M.S. degree in prosthetics and orthotics and the Ph.D. degree in applied physiology. The Center for Education Integrating Science, Mathematics, and Computing (CEISMC), which works with K-12 schools and teachers in the state of Georgia to improve science and mathematics education, is also a unit of the College of Sciences.

The College of Sciences provides the courses in mathematics and the natural sciences that are necessary for all Tech undergraduates to acquire skills and basic principles for their majors. A detailed description of each degree program in the College of Sciences is located under the appropriate school heading, as are descriptions of the courses offered. The College of Sciences' courses required or recommended by degree programs in the other five colleges at Georgia Tech are listed under the curricula for those degrees.

## COLLEGE OF SCIENCES ACCREDITATION STATEMENT

The American Chemical Society has certified the curriculum leading to the bachelor's degree in chemistry; the Human Factors and Ergonomics Society has accredited the curriculum leading to the Ph.D. in Engineering Psychology; the Commission on Accreditation of Allied Health Education Programs (CAAHEP) upon the recommendation of the National Commission on Orthotic and Prosthetic Education (NCOPE) has accredited the curriculum leading to the Master of Science in Prosthetics and Orthotics (MSPO).

## FACULTY

### Dean

Gary B. Schuster

### Associate Deans

E. Kent Barefield, Evans M. Harrell II

### Director of Development

Philip Bonfiglio

### Director of Finance

David L. Moore

### Director of Facilities

Gerald E. O'Brien

# COLLEGE OF SCIENCES

## SCHOOL OF APPLIED PHYSIOLOGY

Master of Science in Prosthetics and Orthotics

Doctor of Philosophy with a major in Applied Physiology

## SCHOOL OF BIOLOGY

Bachelor of Science in Biology

Additional Options:

- Business Option
- International Plan
- Research Option

Master of Science in Biology

Master of Science in Bioinformatics

Master of Science in Computational Science and Engineering

Doctor of Philosophy with a Major in Biology

Doctor of Philosophy with a Major in Bioinformatics

Doctor of Philosophy with a Major in Computational Science and Engineering

## SCHOOL OF CHEMISTRY & BIOCHEMISTRY

Bachelor of Science in Biochemistry

Additional Options:

- International Plan
- Research Option

Bachelor of Science in Chemistry

Additional Options:

- Biochemistry Option
- Business Option
- International Plan
- Materials Option
- Polymer Option
- Research Option

Master of Science in Chemistry

Master of Science in Computational Science and Engineering

Master of Science in Paper Science and Engineering

Doctor of Philosophy with a Major in Bioinformatics

Doctor of Philosophy with a Major in Chemistry

Doctor of Philosophy with a Major in Computational Science and Engineering

Doctor of Philosophy with a Major in Paper Science and Engineering

## SCHOOL OF EARTH & ATMOSPHERIC SCIENCES

Bachelor of Science in Earth and Atmospheric Science

Additional Options:

- International Plan
- Research Option

B.S./M.S.E.A.S. - Five-year

B.S./M.S.E.A.S. - Five-year

Master of Science in Earth and Atmospheric Science

Master of Science with a Major in Earth and Atmospheric Science

Doctor of Philosophy with a Major in Earth and Atmospheric Sciences

## SCHOOL OF MATHEMATICS

Bachelor of Science in Applied Mathematics

Additional Options:

- Business Option
- Business - Research Option

Research Option

Bachelor of Science in Discrete Mathematics

Additional Options:

Business Option

Business - Research Option

Research Option

Master of Science in Computational Science and Engineering

Master of Science in Mathematics

Master of Science in Quantitative and Computational Finance

Master of Science in Statistics

Doctor of Philosophy with a Major in Algorithms, Combinatorics, Optimization

Doctor of Philosophy with a Major in Bioinformatics

Doctor of Philosophy with a Major in Computational Science and Engineering

Doctor of Philosophy with a Major in Mathematics

## SCHOOL OF PHYSICS

Bachelor of Science in Applied Physics

Additional Options:

Buisness Option

Bachelor of Science in Physics

Additional Options:

Buisness Option

Research Option

Master of Science in Physics

Doctor of Philosophy with a Major in Physics

## SCHOOL OF PSYCHOLOGY

Bachelor of Science in Psychology

Additional Options:

Business Option

International Plan

Research Option

Master of Science in Human-Computer Interaction

Master of Science in Psychology

Doctor of Philosophy with a Major in Psychology - Engineering Psychology

Doctor of Philosophy with a Major in Psychology - Experimental Psychology

Doctor of Philosophy with a Major in Psychology - Industrial/Organizational Psychology

Doctor of Philosophy with a Major in Psychology - Quantitative Psychology

## MINORS AND CERTIFICATES

The College of Sciences currently offers minors in biology, earth and atmospheric sciences, and mathematics, along with a number of certificate programs that provide similar opportunities for students to develop their expertise or acquire skills or information in specific areas in addition to their major area. Students who satisfactorily complete a certificate program will receive a certificate of recognition from the department that offers the program. Certificate programs available in the College of Sciences are as follows: (Certificate programs offered by the other colleges at Georgia Tech are also available to students in the College of Sciences.)

### CERTIFICATE PROGRAMS IN THE COLLEGE OF SCIENCES

#### Applied Physiology

Applied Physiology

#### Biology

Environmental Biology

Microbiology

Molecular Biology/Genetics

#### Chemistry and Biochemistry

Biochemistry/Organic Chemistry

Chemical Analysis

Physical/Inorganic Chemistry

#### Earth and Atmospheric Sciences

Geochemistry

Geophysics

#### Physics

Applied Optics

Atomic, Molecular, and Chemical Physics

Computer-based Instrumentation

#### Psychology

Biopsychology

Cognitive Psychology

Engineering Psychology

Experimental Psychology v

Industrial/Organizational Psychology

Social/Personality Psychology

# SCHOOL OF APPLIED PHYSIOLOGY - GENERAL INFORMATION

Established in 2002 (formerly Department of Health and Performance Sciences, established 1990; and Physical Education and Recreation, established 1942)
Location: Weber/SST Building
Centennial Research Building
Telephone: 404.894.3986
Fax: 404.894.9982
Web site: www.ap.gatech.edu

## GENERAL INFORMATION

Faculty in the School of Applied Physiology are focused on understanding the science of movement, the physiological basis of movement control, and on instruction related to the importance of maintaining sound physiological systems. Our approach to these tasks involves every biological level utilizing both basic and applied sciences. For example, attempts to understand how molecules transmit signals in skeletal muscle have a foundation in basic molecular biology and ultimately relate to the applied science of movement control. Faculty interests range from systems physiology (Chang, Gregor, Millard-Stafford, Nichols, Prilutsky, Shinohara, Sparling, Sprigle) to the molecular/cellular levels (Balog, Burkholder, McCarty). At the undergraduate level, the School instructs all Georgia Tech students in their health and wellness requirement and offers a Certificate in Applied Physiology enriching students' desire for pre-medical and allied health science (e.g., physical therapy) education. At the graduate level, the School administers a focused Master's Program in Prosthetics and Orthotics (MSPO). The School offers cutting-edge instruction coupled with sound clinical training and a foundation in movement science. The certified MSPO program graduated its first class in 2004. A graduate program offering a Ph.D. in Applied Physiology, approved by the Board of Regents, entered its first class in 2005. The School is unique to the Georgia Tech community but founded in interdisciplinary teaching and research fundamental to the mission of the Institute.

## SCHOOL OF APPLIED PHYSIOLOGY - ACCREDITATION

The Master of Science Degree Program in Prosthetics and Orthotics is accredited by the Commission on Accreditation of Allied Health Education Programs (www.caahep.org) upon the recommendation of the National Commission of Orthotic and Prosthetic Education (NCOPE).

Commission on Accreditation of Allied Health Education Programs
35 East Wicker Drive, Suite 1970
Chicago, IL 60601-2208
312-553-9355

## FACULTY

### Chair and Professor

T. Richard Nichols

### Associate Chair and Professor

Mindy Millard-Stafford

### Professors

Robert J. Gregor, Phil Sparling

### Associate Professor

Thomas Burkholder, Boris Prilutsky, Minoru Shinohara, Stephen Sprigle

### Adjunct Associate Professors

Gordon Warren, Steve Wolf

### Assistant Professors

Edward Balog, Young Hui Chang

### Adjunct Assistant Professors

Andrew J. Butler, John William Michael, Lena Ting

### Research Associate II

Linda Rosskopf

### Academic Professional

Teresa Snow

### Director MSPO

Chris Hovorka

### Clnical Director, Prosthetics

Rob Kistenberg

## CERTIFICATE PROGRAM IN APPLIED PHYSIOLOGY

The School of Applied Physiology offers a certificate program in applied physiology. It is designed for students from any major who wish to broaden or supplement their educational experiences and career opportunities in areas related to the health sciences, human biology, bioengineering, or biomedical engineering. The certificate curriculum is based in anatomy, physiology, and human movement sciences, but it allows students the flexibility to elect courses in specific areas of interest. Specific information regarding the certificate may be obtained by contacting the School office, located in 113 Weber/SST Building.

## THE HEALTH SCIENCES REQUIREMENT

All Georgia Tech students must satisfactorily complete the health and wellness requirement. The requirement consists of one two-hour course, HPS 1040, Health Concepts and Strategies. The School may grant credit to transfer students for comparable courses completed at other institutions. Students who have completed their health and wellness requirement are encouraged to elect additional elective courses in the School's certificate program (www.ap.gatech.edu/certificate.shtml) related to health and exercise science.

Other Applied Physiology (APPH) courses may be used as free electives or technical electives, if approved by the major school. Individual schools may allow up to three hours of courses to be counted toward degree requirements. Students should check the curricula of their individual schools to determine the number of hours they may apply toward the degree.

### REQUESTING AN OVERLOAD FOR HPS 1040

Overload requests for HPS 1040 should be submitted via the online registration system. Please go to https://oscar.gatech.edu
for information how to request an override for a class. Overload requests will be reviewed the week before classes begin each semester with seniors and juniors having priority.

## MASTER OF SCIENCE IN PROSTHETICS AND ORTHOTICS

The School of Applied Physiology offers a graduate program of study leading to a Master of Science Degree in Prosthetics and Orthotics (MSPO). Similar to a medical education model, the Georgia Tech MSPO program is founded upon organized problem solving and investigative processes within an interdisciplinary clinical environment. The curriculum includes traditional lecture and laboratory courses in basic sciences, medicine, engineering, and prosthetics and orthotics. These courses are supplemented by unique off campus clinical rotations in which students participate in local hospitals, medical clinics, and prosthetics and orthotics patient care facilities under the guidance of a credentialed preceptor. These applied learning experiences occur in parallel to hands-on patient physical examination, treatment planning, and orthosis/prosthesis device design and fabrication. Students perform these tasks both off-site in affiliated medical and orthotic/prosthetic facilities as well as on-campus in Georgia Tech's clinical and fabrication facilities, including on campus research laboratories.

The MSPO education program curriculum consists of 48 credit hours over four semesters and covers three themes:

1. Applied physiology and engineering
2. Clinical medicine and prosthetics/orthotics
3. Applied science and research

Seventy percent of the class hours involve clinical applications, twenty percent involves didactic classes, and five percent of the curriculum focuses on research, i.e., research seminars and a non-thesis research project. Students entering the program should have an academic background that includes prerequisite classes in human anatomy (dissection), human physiology, psychology, chemistry, calculus and calculus-based physics.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN APPLIED PHYSIOLOGY

The School of Applied Physiology offers a multidisciplinary and integrative Ph.D. program focused on the study of human movement and mobility, with research concentrations in biomechanics, neuromechanics, motor control and behavior, muscle cellular and systems physiology, and exercise physiology. Applied physiology refers to the study of normal and abnormal regulation and integration of mechanisms across all levels of biological organization (molecules to cells to organs to organ systems). The course of graduate study focuses on original, independent research culminating in the doctoral dissertation. All students are required to complete a faculty-approved set of required courses (fifteen hours), courses in an approved minor concentration (nine hours), six hours in a specialized focus area and twelve hours of dissertation research for a total of forty-two hours.

## SCHOOL OF BIOLOGY - GENERAL INFORMATION

Established in 1960
Location: Cherry Emerson Building
Telephone: 404.894.3700
Fax: 404.894.0519
Web site: www.biology.gatech.edu/

Programs of study offered by the School of Biology allow students to gain competence in several different areas of modern biological sciences. The curricula in all degree programs in the School encourage breadth by incorporating course selections from other schools and departments. The Institute, with its strengths in science, computing, mathematics, and engineering, provides unique opportunities for careers in the biological sciences and related areas.

The Bachelor of Science degree program consists of a combination of requirements and electives that ensure a balanced background in the fundamental areas of biology, while providing an opportunity to emphasize an area of interest in the junior and senior years. The School also offers graduate programs leading to the M.S. and Ph.D. degrees. The degree programs include coursework, faculty and student seminars, and independent research. Faculty members are actively engaged in research fields such as bioinformatics, biophysics, chemical ecology, evolutionary biology, microbiology, and molecular cell biology/genetics.

## FACULTY

### Chair and Professor

John D. McDonald

### Georgia Research Alliance Eminent Scholar in Structural Biology and Professor

Stephen Harvey

### Georgia Research Alliance Eminent Scholar in Computational Systems Biology and Professor

Jeffery Skolnik

### Harry and Linda Teasley Chair in Environmental Biology and Professor

Mark Hay

### Smithgall Chair in Molecular Cell Biology and Professor

Alfred Merrill Jr.

### Regents' Professor

Mark Borodovsky

### Professors

Thomas J. DiChristina, Joseph Montoya, Jerry Pullman, Terry W. Snell, Roger Wartell, Jeannette Yen

### Associate Professors

John Cairney, Yury Chernoff, Jung Choi, Paul Edmonds, Nael McCarty, Patricia Sobecky, Stephen Spiro, Marc Weissburg

### Assistant Professors

Michael Goodisman, Lin Jiang, John Kirby, Julia Kubanek, Krill Lobachev, Marion Sewer, Todd Streelman, Soojin Yi

### Adjunct Faculty

Leonid Bunimovich, Marc Frischer, Michael Keehan, Eugene Koonin, Frank Loeffler, Valerie Paul, Mindy Millard-Stafford, Peter Verity

## BACHELOR OF SCIENCE IN BIOLOGY

The undergraduate curriculum for the Bachelor of Science in Biology degree is well-suited to prepare students for employment in research and other technical positions; for graduate studies in the biological sciences; or for admission to medical, dental, veterinary, or other professional schools. The minimum number of total hours required for a bachelor's degree is 122. All students participate in research through undergraduate research courses. The School also offers a minor in biology.

# BACHELOR OF SCIENCE IN BIOLOGY
## 2008 - 2009 DEGREE REQUIREMENTS
### SCHOOL OF BIOLOGY
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| BIOL 1510 BIOLOGICAL PRINCIPLES or<br>BIOL 1511 HONORS BIOLOGICAL PRINCIPLES | 4 |
| CHEM 1310 GENERAL CHEMISTRY | 4 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| BIOL 1520 INTRODUCTION TO ORGANISMAL BIOLOGY or<br>BIOL 1521 HONORS INTRODUCTION TO ORGANISMAL BIOLOGY * | 4 |
| CHEM 1311 INORGANIC CHEMISTRY I | 3 |
| CHEM 1312 INORGANIC CHEMISTRY LAB I | 1 |
| **TOTAL SEMESTER HOURS =** | **15** |

| SECOND YEAR-FALL | HRS |
|---|---|
| BIOL 2344 GENETICS or BIOL 2354 HONORS GENETICS or<br>BIOL 2335 GENERAL ECOLOGY or BIOL 2337 HONROS ECOLOGY | 3 |
| QUANTITATIVE REQUIREMENT ** | 3 |
| CHEM 2311 ORGANIC CHEMISTRY I | 3 |
| COMPUTING REQUIREMENT | 3 |
| HUMANITIES ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| BIOL 2335 GENERAL ECOLOGY or BIOL 2337 HONROS ECOLOGY<br>BIOL 2344 GENETICS or BIOL 2354 HONORS GENETICS or | 3 |
| BIOL 2336 GENERAL ECOLOGY LAB or<br>BIOL 2338 HONROS ECOLOGY LAB *** | 1 |
| BIOL 3600 INTRODUCTION TO EVOLUTION | 3 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| FREE ELECTIVE | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| BIOL 3340 CELL BIOLOGY | 3 |
| BIOL 3341 CELL BIOLOGY LAB *** | 1 |
| CHEM 2312 ORGANIC CHEMISTRY II | 3 |
| CHEM 2380 SYNTHESIS LAB I | 2 |
| PHYS 2212 INTRODUCTORY PHYSICS II | 4 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| BIOLOGY ELECTIVES | 9 |
| FREE ELECTIVE | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| SENIOR RESEARCH EXPERIENCE **** | 3 |
| BIOLOGY ELECTIVES | 6 |
| FREE ELECTIVE | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |

| | |
|---|---|
| BIOL 4450 SENIOR SEMINAR | 1 |
| **TOTAL SEMESTER HOURS =** | **16** |

| **FOURTH YEAR-SPRING** | **HRS** |
|---|---|
| BIOLOGY ELECTIVES | 6 |
| FREE ELECTIVE | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

**TOTAL PROGRAM HOURS = 120 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

*4 credit hours of Biology elective may be subsituted for BIOL 1520 if a score of 5 was achieved on the AP Biology test

**
QUANTITATIVE REQUIREMENT: choose one of the following: BIOL 2400 Mathematical Models in Biology, BIOL 4401 Experimental Design & Biostatistics, BIOL 4150 Genomics & Applied Bioinformatics, BIOL 4422 Theoretical Ecology, BIOL 4755 Mathematical Biology, MATH 3770 Statistics & Applications, MATH 3215 Probability & Statistics

*** BIOL 2345/2355 (Genetics Lab) may substitute for either of these courses

****
SENIOR RESEARCH EXPERIENCE choose one of the following: BIOL 4910 Honors Research Thesis, BIOL 4590 Research Project Lab, BIOL 4690 Independent Research Project, or twelve credit hours of BIOL 4698 (Research Assistantship, with approval of School of Biology undergraduate coordinator). Students in BIOL 4590 must enroll in BIOL 4450 Senior Seminar concurrently. Students in BIOL 4910, BIOL 4690, or BIOL 4698 must enroll in BIOL 4450 Senior Seminar concurrently or the semester immediately following taking these courses.

# ELECTIVES

## COMPUTING REQUIREMENT

Students must complete either CS 1315, CS 1301, or a computer programming course approved as satisfying the general education requirements in computer literacy.

## WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

## HUMANITIES/SOCIAL SCIENCES ELECTIVES

ENGL 1101 and 1102 apply toward satisfaction of the twelve-hour humanities requirement. An additional six hours of Institute-approved humanities courses are required to fulfill the twelve-hour humanities requirement. To satisfy the state requirements regarding coursework in the history and constitutions of the United States and Georgia, students must complete one of the following courses: HIST 2111, HIST 2112, POL 1101, PUBP 3000, or INTA 1200. One of these courses, combined with an additional nine hours of Institute-approved social science courses, satisfies the twelve-hour social sciences requirement.

## BIOLOGY ELECTIVES:

Twenty-one additional credit hours selected from BIOL 3XXX level and higher courses are required. A maximum of six credit hours from other Schools (see approved list) and up to 6 hours of BIOL 4699 can be applied towards the twenty one hours.

## FREE ELECTIVES:

The remaining eleven hours beyond courses required for humanities, social sciences, and physical education are free electives and may be taken on a pass/fail basis to the extent allowed under the catalog "Rules and Regulations" section.

## BACHELOR OF SCIENCE IN BIOLOGY - BUSINESS OPTION

The curriculum and suggested course schedule for the B.S. in Biology – Business Option are similar to the B.S. in Biology, with the following exceptions: Students take PSYC 2220 (Industrial – Organizational Psychology) and ECON 2106 (Principles of Economics) in partial fulfillment of social science electives in the second and third years. In the third and/or fourth years, students must take MGT 3000 (Accounting) and MGT 3300 (Marketing). One additional management elective course is taken from a list that includes MGT 3062, 3150, 3076, 4191, and 4670. Biology majors in this option still complete the Senior Research Experience, plus fifteen hours of biology electives, and eight hours of free electives.

## BACHELOR OF SCIENCE IN BIOLOGY - INTERNATIONAL PLAN

Georgia Tech has recently introduced an International Plan through the Office of International Education (www.oie.gatech.edu/). Successful completion of this plan earns students an international designation on their Georgia Tech degree. The primary purpose of the plan is to offer a challenging and coherent academic program for students to develop global competence within the context of a Biology degree. The requirements include: language proficiency equivalent to two years of college coursework (twelve hrs), one course in international relations (three hrs), global economy (three hrs), focused study of a region (three hrs), an integrative course synthesizing the international experience (three hrs), and two semesters (minimum of twenty-six weeks) in residence abroad. Georgia Tech biology courses are taught in Australia/New Zealand ( www.oie.gatech.edu/sa/programs/) and Spain (www.oie.gatech.edu/sa/programs/) as part of the Study Abroad program. In addition, many biology courses are available through Georgia Tech partner universities abroad (www.oie.gatech.edu/sa/programs/). Some of these universities teach biology courses in English, such as Hong Kong University, Tokyo Technological University, University of Victoria (New Zealand), National University of Singapore, University of Strathclyde (Scotland), and Bilkent University (Turkey).

## BACHELOR OF SCIENCE IN BIOLOGY - RESEARCH OPTION

This plan enables students to do nine credit hours of supervised research with a biology faculty member over two-three semesters. With faculty guidance, students write a brief proposal, perform independent, original research, and write a thesis about their work. The thesis is evaluated by two biology faculty members and is presented in Senior Seminar. The first six credit hours of the Research Option are taken as BIOL 2699/4699 (research for credit) or BIOL 2698/4698 (research for pay). Students then take BIOL 4910 (Honors Thesis; three hours) in their final semester and a two-hour writing course, LCC 4700 Undergraduate Thesis Writing. This writing course can be counted as a biology elective. A maximum of six credit hours of BIOL 4699 can be counted as biology electives. BIOL 2699 counts as free elective credits.

Completing this program gives students a "Research Option" designation on their transcripts.

## MINOR AND CERTIFICATE PROGRAMS

A minor in biology is available to all non-biology majors. The minor program provides a concentration in modern biological sciences and is especially valuable for students considering biomedical or environmental fields. The basic requirement is eighteen semester hours in biology, of which twelve hours must be at the 3000 level or higher. Further information is available from the School's undergraduate coordinator.

## GRADUATE PROGRAMS

The School of Biology provides advanced training and research opportunities in various aspects of systems biology, ranging from molecular biology to ecology. Some current research areas include genomic sequence analysis, mechanisms of gene expression and DNA replication, evolutionary mechanisms, sphingolipids and metabolomics, signal transduction in plant and animal cells, environmental microbiology, bioremediation, sensory mechanisms in small animals, biological oceanography, ecosystem toxicology, and theoretical ecology.

## MASTER OF SCIENCE IN BIOINFORMATICS

This is a three-semester-focused professional master's degree program combining thirty-seven semester hours of courses in computer science, advanced molecular biology and biochemistry, statistics, and bioinformatics. A full-time summer internship in a corporate or academic bioinformatics group is an essential part of the curriculum. With input and assistance from corporate partners, the program is geared to training and placing graduates into lucrative jobs in the high-demand specialty field of bioinformatics. More information is available from the graduate coordinator of the M.S. Bioinformatics program.

## MASTER OF SCIENCE IN BIOLOGY

The requirements for the M.S. degree are a research thesis and thirty semester hours of coursework, which includes twelve credit hours in a major field. Twelve of the semester hours must be in formal graduate-level courses. The thesis must be defended in an oral examination. A non-thesis master's degree is available for students unable to carry out a thesis project; information on its requirements is available from the graduate coordinator in the School of Biology.

## MASTER OF SCIENCE IN COMPUTATIONAL SCIENCE AND ENGINEERING

Computational Science and Engineering (CSE) is a discipline concerned with the body of knowledge, skills, and practices associated with the study of computer-based models of natural phenomena and engineered systems. Students will be required to obtain a breadth of knowledge across a set of core areas in the CSE discipline, depth of knowledge in a specific computational specialization (e.g., numerical computing), and knowledge to apply computational techniques in a domain of application. Students will be expected to integrate principles from mathematics, computer science, and engineering to be able to create significant computational artifacts, e.g., software.

The CSE M.S. degree program is an interdisciplinary program offered by the College of Computing, the College of Engineering, and the College of Sciences. Upon application, students select a desired "home unit" among those academic units that formally participate in the program.

Students must complete four of the five courses making up the core curriculum: CSE/Math 6643 (Numerical Linear Algebra), CSE 6140 (Computational Science and Engineering Algorithms), CSE 6730 (Modeling and Simulation: Fundamentals & Implementation), CSE/ISYE 6740 (Computational Data Analysis), and CSE 6220 (High Performance Computing). A home unit minor is required consisting of twelve hours of coursework relevant to the CSE discipline that includes one applications area; this must include at least six hours of courses that do not carry the CS/CSE course designation. Finally, students must either complete 6 additional hours of approved coursework (course option) or an M.S. thesis (thesis option) that is defended to the student's thesis committee who is responsible for overseeing the student's research. Six hours of thesis credit are required in the thesis option. Additional requirements may apply depending on the student's home unit. A plan of study must be approved by the CSE program director and the student's home unit coordinator.

# DOCTOR OF PHILOSOPHY WITH A MAJOR IN BIOINFORMATICS

## PARTICIPATING SCHOOLS

College of Computing
School of Biology
School of Biomedical Engineering
School of Chemistry and Biochemistry
School of Industrial and Sytems Engineering
School of Mathematics

## OBJECTIVE OF THE PROGRAM

The mission of the Georgia Tech Bioinformatics Ph.D. program is to educate and prepare graduate students to reach the forefront of leadership in the field of bioinformatics and computational biology, and to integrate research and education on the use of information technologies in biology and medicine. Thus, the program leading to a Ph.D. in Bioinformatics is an interdisciplinary program spanning a variety of academic departments at Georgia Tech.

Bioinformatics is a multidisciplinary field in which physical sciences, life sciences, computer science, and engineering are merged to solve both fundamental and applied problems in biology and medicine. The outcomes of bioinformatics and computational biology particularly include:

- new and global perspectives into the organization and function of biological systems (fundamental biology);
- new and novel targets for drug discovery and development; and
- genetic/proteomic profiling for pharmaco-genomics or personalized medicine.

Thus, bioinformatics is emerging as a strategic discipline at the frontier of biology, biochemistry, biomedicine, bioengineering, computer science, and mathematics, impacting fundamental science, medicine, biotechnology, and society.

With its broad mission statement, this program at Georgia Tech has the following strengths and focus areas:

1. Development of software tools, algorithms, and databases for gene identification, protein structural prediction, clustering analysis, and data mining
2. Application of bioinformatics to disease diagnosis, classification, prognosis, and treatment
3. Application of bioinformatics to fundamental biology and systems biology

There is an increasing demand for scientists with advanced training in bioinformatics. Professionals in this area should have a thorough knowledge of molecular biology, mathematics, and statistics, as well as computer science and engineering.

For more information visit www.biology.gatech.edu/bioinformatics/bioinformatics_phd.htm.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN BIOLOGY

Each Ph.D. student must acquire a thorough knowledge of a selected area of specialization, a broad knowledge of the field, and competence in the basic sciences. The main emphasis is on the successful completion of an original and independent research project. Credit hour requirements total forty, including twelve research credit hours and nine credit hours in an approved minor. Admission to candidacy requires passing a written comprehensive examination and an oral exam based on a written research proposal. Each Ph.D. student must write a comprehensive dissertation based on the student's scholarly research.

Additional information on the graduate program is available from the graduate coordinator in the School of Biology.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN COMPUTATIONAL SCIENCE AND ENGINEERING

Computational Science and Engineering (CSE) is a discipline concerned with the body of knowledge, skills, and practices associated with the study of computer-based models of natural phenomena and engineered systems. Students will be required to obtain a breadth of knowledge across a set of core areas, depth of knowledge in a specific computational specialization (e.g., numerical computing), and knowledge to apply computational techniques in a domain of application. Students will be expected to integrate principles from mathematics, computing, science, and engineering to be able to create significant computational artifacts, e.g., software, and to complete independent research that advances the state-of-the-art in the CSE discipline.

The CSE M.S. degree program is an interdisciplinary program offered by the College of Computing, the College of Engineering, and the College of Sciences. Upon application students select a desired “home unit” among those academic units that formally participate in the program.

Required coursework includes CSE 6001 (Introduction to Computational Science and Engineering), CSE core courses (twelve hours), a computation specialization (nine hours), and an application specialization (nine hours). To complete the core course requirement, students must complete four of the five courses making up the core curriculum: CSE/Math 6643 (Numerical Linear Algebra), CSE 6140 (Computational Science and Engineering Algorithms), CSE 6730 (Modeling and Simulation: Fundamentals & Implementation), CSE/ISYE 6740 (Computational Data Analysis), and CSE 6220 (High Performance Computing). The computational specialization includes at least nine hours of courses that increase the student’s depth of understanding of computational methods in a specific area, as approved by the student’s academic advisor. These courses must go beyond “using computers” to deepen understanding of computational methods, preferably in the context of some application domain. The application specialization includes at least nine hours of courses that increase depth of understanding in an application field; these need not be computation-focused courses. At least nine hours of Ph.D. courses must be courses that do not carry the CS/CSE course designation. These hours may be taken in the home unit. Hours taken as part of the computation and/or application specialization can be used to fulfill this requirement. Additional requirements may apply depending on the student’s home unit.

A qualifying examination must be attempted by the end of the second year of enrollment in the CSE doctoral program (normally taken after the student completes CSE core coursework). A qualifying examination committee shall be appointed by the CSE program coordinator for each student and is responsible for making an overall recommendation concerning the outcome of the qualifying examination.

Students are required to complete a doctoral thesis reporting the results of independent research that advances the state-of-the-art in the computational science and engineering discipline. The dissertation must be successfully defended to the student's dissertation research committee.

# SCHOOL OF CHEMISTRY AND BIOCHEMISTRY

Established in 1906
Location: Molecular Science & Engineering Building
Telephone: 404.894.4002
Fax: 404.894.7452
Web site: www.chemistry.gatech.edu

## GENERAL INFORMATION

The School offers courses in chemistry required for various engineering and science curricula, as well as for students interested in medical school, for the Bachelor of Science in Biochemistry and Bachelor of Science in Chemistry degrees, and for graduate work leading to the degrees Master of Science in Chemistry, Computational Science and Engineering, Paper Science and Engineering, and Doctor of Philosophy in Chemistry, Computational Science and Engineering, Bioinformatics, and Paper Science and Engineering.

## FACULTY

### Chair and Professor
Thomas Orlando

### Associate Chair for Academic Programs and Professor
David M. Collard

### Associate Chair for Operations & Facilities and Professor
Angus Wilkinson

### Director of Teaching Effectiveness and Professor
Lawrence Bottomley

### Provost, Vasser Woolley Chair, and Professor
Gary B. Schuster

### Dean of the College of Sciences and Professor
Paul L. Houston

### Associate Dean of the College of Sciences and Professor
E. Kent Barefield

### Julius Brown Chair and Professor
Mostafa A. El-Sayed

### Eminent Scholar and Professor
Jiri (Art) Janata

### Regents' Professors
Charles L. Liotta, Sheldon W. May, James C. Powers

### Professors
Bridgette Barry, Jean-Luc Brédas, Uwe Bunz, Robert M. Dickson, L. Andrew Lyon, Seth Marder, Joseph Perry, Arthur Ragauskas, William S. Rees Jr., C. David Sherrill, Laren M. Tolbert, Robert L. Whetten, Loren D. Williams, Paul H. Wine, Z. John Zhang

### Associate Professors
Donald Doyle, Christoph J. Fahrni, Rigoberto Hernandez, Nicholas V. Hud, Julia Kubanek,.

### Assistant Professors
Ken Brown, Facundo Fernandez, Stefan France, Wendy Kelly, Nils Kroger, Raquel L. Lieberman, A. (Yomi) K. Oyelere, Christine Payne, Jake D. Soper

### Adjunct Faculty
Haskell W. Beckham, Andreas Bommarius, Charles A. Eckert, Steve Harvey, Gregory Huey, Christopher W. Jones, Alfred Merrill, Marie-Paule Pileni, Mohan Srinivasarao, Yadong Wang, Z.L.Wang, C.P. Wong

### Professor of Practice
Ronald R. Chance

### Senior Academic Professionals
William J. Baron, Leigh D. Bottomley, Robert A. Braga, J. Cameron Tyson

### Academic Professionals
Charles Cox, Chad Morris, Mary Peek

## BACHELOR OF SCIENCE IN BIOCHEMISTRY

The Bachelor of Science in Biochemistry degree program consists of a combination of requirements and electives that ensure a strong foundation in the chemical and biological sciences while providing the flexibility to tailor the curriculum to satisfy specific interests or career goals. This program may be of interest to students who plan careers in research, teaching, or in a life/health science profession (medicine, pharmacy, dentistry). The judicious use of free electives also enables the student to achieve considerable knowledge of other disciplines at Georgia Tech, such as chemical and biomolecular engineering, bioinformatics (computing), biomedical engineering, and biology. The biochemistry curriculum enables majors who are interested in medical, dental, or law school to meet admission requirements of these schools.

# BACHELOR OF SCIENCE IN BIOCHEMISTRY
## 2008 - 2009 DEGREE REQUIREMENTS
### SCHOOL OF CHEMISTRY AND BIOCHEMISTRY
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| CHEM 1310 GENERAL CHEMISTRY | 4 |
| CS 1301 or CS 1315 or CS 1371 | 3 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| BIOL 1510 BIOLOGICAL PRINCIPLES or 1520 INTRODUCTION TO ORGANISMAL BIOLOGY | 4 |
| CHEM 1311 INORGANIC CHEMISTRY I | 3 |
| CHEM 1313 QUANTITATIVE ANALYSIS | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-FALL | HRS |
|---|---|
| MATH 2401 CALCULUS III | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CHEM 2311 ORGANIC CHEMISTRY I | 3 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| HUMANITIES ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| CHEM 2312 ORGANIC CHEMISTRY II | 3 |
| CHEM 2380 SYNTHESIS LAB I | 2 |
| PHYS 2212 INTRODUCTORY PHYSICS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| BIOLOGY ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-FALL | HRS |
|---|---|
| CHEM 3411 PHYSICAL CHEMISTRY I | 3 |
| CHEM 4511 BIOCHEMISTRY I | 3 |
| CHEM 3371 ORGANIC CHEMISTRY LABORATORY | 2 |
| HUMANITIES ELECTIVE | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **14** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| CHEM 4512 BIOCHEMISTRY II | 3 |
| CHEM 4581 BIOCHEMISTRY LAB I | 3 |
| FREE ELECTIVE | 3 |
| BIOLOGY ELECTIVE | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CHEM 4582 BIOCHEMISTRY LABORATORY II | 3 |
| CHEM 4521 BIOPHYSICAL CHEMISTRY | 3 |
| BIOLOGY ELECTIVE | 3 |
| FREE ELECTIVES | 6 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-SPRING | HRS |
|---|---|
| CHEM 4601 CHEMISTRY SEMINAR | 2 |
| CHEM 3211 ANALYTICAL CHEMISTRY | 5 |
| FREE ELECTIVES | 6 |
| **TOTAL SEMESTER HOURS =** | **13** |

**TOTAL PROGRAM HOURS = 120 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

# SCHOOL OF CHEMISTRY AND BIOCHEMISTRY - ELECTIVES

## WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

## HUMANITIES/SOCIAL SCIENCES ELECTIVES

ENGL 1101 and 1102 apply toward satisfaction of the twelve-hour humanities requirement. An additional six hours of Institute-approved humanities courses are required to fulfill the twelve-hour humanities requirement. To satisfy the state requirements regarding coursework in the history and constitutions of the United States and Georgia, students must complete one of the following courses: HIST 2111, HIST 2112, POL 1101, PUBP 3000, or INTA 1200. One of these courses, combined with an additional nine hours of Institute-approved social science courses, satisfies the twelve-hour social sciences requirement.

## BIOLOGY ELECTIVES

Two of the three biology electives must be BIOL 2344, 3340, OR 4668. The remaining biology elective must be one of the following: BIOL 3380, 4290, 4340, 4400, 4418, 4420, or 4803 (cancer biology and biotechnology).

## BACHELOR OF SCIENCE IN BIOCHEMISTRY - INTERNATIONAL PLAN

The B.S. in Chemistry (International Plan) and B.S. in biochemistry (International Plan) are offered to undergraduate students seeking to understand their majors in a global perspective. Students in this program must demonstrate proficiency in a foreign language; complete coursework in a country/regional elective, international relations, and global economics; and participate study or research abroad experience (usually in the junior year). While abroad, students are required to complete in a supervised research experience with a faculty member in chemistry and biochemistry at the host institution. Upon successful completion of degree requirements for the International Plan, a "International Plan" designator is indicated on the diploma. If interested in participating in the International Plan as part of the B.S. in Chemistry or B.S. in Biochemistry, students should visit: www.internationalplan.gatech.edu/students/application.html.

## BACHELOR OF SCIENCE IN BIOCHEMISTRY RESEARCH OPTION

The BS in Chemistry (Research Option) and BS in Biochemistry (Research Option) is offered for students who wish to participate in a research problem under the supervision of one of the forty-six members of faculty and adjunct faculty in the School. Participants in the Research Option learn how to attack a research problem from experiment design and execution to interpretation of results. There is an expectation that undergraduates who contribute to completed studies will be co-authors on submissions to high-quality scholarly journals. Research projects are available in the traditional areas of chemistry (analytical, biological, inorganic, organic, physical, and polymer chemistry) as well as highly interdisciplinary research areas, such as nanochemistry, polymer and materials chemistry, environmental chemistry and sensors, medicinal chemistry, molecular biophysics, and computational chemistry.

To participate in the Research Option in the School of Chemistry and Biochemistry, students should obtain a research project with a faculty member in the department and apply online via http://undergradresearch.gatech.edu/research_option/index.php. Successful completion of the Research Options requires participation by the student in nine credit hours of supervised research (CHEM 4698/4699) with a chemistry and biochemistry faculty over three or more semesters, approval of a brief proposal on their project to a committee of two or more faculty, completion of LCC 4700 (a thesis writing course), and submission of an approved thesis. Successful completion of the Research Option is noted on the student's transcript. Students completing this degree may pursue graduate studies in the chemical or biological sciences or research careers in industrial or governmental laboratories. This degree is certified by the American Chemical Society (ACS).

## BACHELOR OF SCIENCE IN CHEMISTRY

The School of Chemistry and Biochemistry has a vibrant program of study leading to a Bachelor of Science in Chemistry with certification by the American Chemical Society (ACS). The flexibility of the curriculum allows students to study fundamental areas of chemistry while tailoring their degree with technical and free electives to produce a well-rounded experience in preparation for a variety of career opportunities. Students may pursue tailored tracks towards the BS in Chemistry, including those allowing specialization in: biochemistry, business, polymers, and materials options. There are also tremendous opportunities to gain valuable research experience in state-of-the-art laboratories. In addition to coursework requirements, students in the program often participate in a variety of experiential programs, including: undergraduate research, Cooperative work, study abroad, summer internship, and undergraduate teaching assistance.

Faculty in the school are committed to undergraduate education and several have won awards for excellence in teaching. With a faculty to student ratio of approximately 1:6, the School prides itself on the close contact that it maintains with its undergraduate students. The high quality of the curriculum and faculty is part of the reason chemistry graduates receive job offers at the highest salary levels for B.S. chemists. Graduates of the BS in Chemistry pursue careers such diverse field as forensics, nanoscience, biotechnology, pharmaceuticals in industry or governmental organizations; or they may continue their education in the chemical or biological sciences, or in medicine, pharmacy, dentistry, and law. Chemistry, especially with the biochemistry option (or the stand-alone B.S. in Biochemistry degree) is a superb preparation for medical school. All Chemistry degrees are certified by the ACS.

# BACHELOR OF SCIENCE IN CHEMISTRY
## 2008 - 2009 DEGREE REQUIREMENTS
### SCHOOL OF CHEMISTRY AND BIOCHEMISTRY
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| CHEM 1310 GENERAL CHEMISTRY | 4 |
| CS 1301 INTRODUCTION TO COMPUTING | 3 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| BIOL 1510 BIOLOGICAL PRINCIPLES | 4 |
| CHEM 1311 INORGANIC CHEMISTRY I | 3 |
| CHEM 1313 QUANTITATIVE ANALYSIS | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-FALL | HRS |
|---|---|
| CHEM 2311 ORGANIC CHEMISTRY I | 3 |
| MATH 2401 CALCULUS III | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| HUMANITIES ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| CHEM 2312 ORGANIC CHEMISTRY II | 3 |
| CHEM 2380 SYNTHESIS LAB I | 2 |
| PHYS 2212 INTRODUCTORY PHYSICS II | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-FALL | HRS |
|---|---|
| CHEM 3411 PHYSICAL CHEMISTRY I | 3 |
| CHEM 3111 INORGANIC CHEMISTRY II | 3 |
| CHEM 3380 SYNTHESIS LAB II | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| CHEM 3412 PHYSICAL CHEMISTRY II | 3 |
| CHEM 3481 PHYSICAL CHEMISTRY LAB I | 2 |
| CHEM 3211 ANALYTICAL CHEMISTRY | 5 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **13** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| CHEM 4681 ADVANCED CHEMISTRY LAB | 5 |
| CHEM 3511 or 4511 or 4512 (Biochemistry) | 3 |
| CHEM ELECTIVE | 3 |
| TECHNICAL ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **14** |

| FOURTH YEAR-SPRING | HRS |
|---|---|

| | |
|---|---|
| CHEM ELECTIVE | 3 |
| TECHNICAL ELECTIVE | 3 |
| FREE ELECTIVES | 9 |
| **TOTAL SEMESTER HOURS =** | **15** |

**TOTAL PROGRAM HOURS = 120 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

## WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

## HUMANITIES/SOCIAL SCIENCES ELECTIVES

ENGL 1101 and 1102 apply toward satisfaction of the twelve-hour humanities requirement. An additional six hours of Institute-approved humanities courses are required to fulfill the twelve-hour humanities requirement. To satisfy the state requirements regarding coursework in the history and constitutions of the United States and Georgia, students must complete one of the following courses: HIST 2111, HIST 2112, POL 1101, PUBP 3000, or INTA 1200. One of these courses, combined with an additional nine hours of Institute-approved social science courses, satisfies the twelve-hour social sciences requirement.

## CHEMISTRY ELECTIVES

Chemistry electives include CHEM 3482 and all CHEM 4000 level courses except CHEM 4681, specifically required biochemistry courses, and CHEM 4699. With approval, graduate chemistry courses may also be used as chemistry electives.

## TECHNICAL ELECTIVES

The technical elective requirement may be fulfilled by courses in science, engineering, and computing at the 3000 level or higher. A maximum of three hours toward the technical elective requirement may be chosen from CHEM 4699.

## BACHELOR OF SCIENCE IN CHEMISTRY - BIOCHEMISTRY OPTION

Students are often interested in learning about the interface between chemistry and biology. The BS in Chemistry (biochemistry option) offers an interdisciplinary program of study whereby students gain a molecular understanding of the biological processes that take place in the world around us. Students pursuing the BS in Chemistry (biochemistry option) complete a series of courses in chemistry, biochemistry, and biology (with possible electives in biomedical engineering), as well as other technical and free electives that compliment their training. Graduates typically pursue careers in medicine, continue their study at the graduate level in the biological or chemical sciences, or take positions in industry or governmental organizations. This degree is certified by the American Chemical Society (ACS).

## BACHELOR OF SCIENCE IN CHEMISTRY - BUSINESS OPTION

The BS in Chemistry (business option) is offered for students who wish to compliment their technical training in the chemical sciences with coursework on business. The program includes coursework in fundamental areas of chemistry along with business and economics coursework from the School of Management. Prepared with a background in chemistry and business, students completing this program pursue careers in technical sales, marketing, and entrepreneurship in industry or governmental organizations. Students completing this degree also may pursue graduate studies in the chemical sciences or business programs. This degree is certified by the American Chemical Society (ACS). Suggested curriculum

## BACHELOR OF SCIENCE IN CHEMISTRY - INTERNATIONAL PLAN

The B.S. in Chemistry (International Plan) and B.S. in biochemistry (International Plan) are offered to undergraduate students seeking to understand their majors in a global perspective. Students in this program must demonstrate proficiency in a foreign language; complete coursework in a country/regional elective, international relations, and global economics; and participate study or research abroad experience (usually in the junior year). While abroad, students are required to complete in a supervised research experience with a faculty member in chemistry and biochemistry at the host institution. Upon successful completion of degree requirements for the International Plan, a "International Plan" designator is indicated on the diploma. If interested in participating in the International Plan as part of the B.S. in Chemistry or B.S. in Biochemistry, students should visit: www.internationalplan.gatech.edu/students/application.html.

## BACHELOR OF SCIENCE IN CHEMISTRY - MATERIALS OPTION

Advances in new materials have rapidly been introduced over the past 20 years in the US. Recent scientific discoveries range in everything from rewritable CDs to materials designed for stealth technology on airplanes. The School of Chemistry and Biochemistry offers interdisciplinary training for students who desire to understand synthesis, characterization, and application of new organic and inorganic materials. The BS in Chemistry (materials option) consists of a coursework in fundamental areas of chemistry combined with coursework from the School of Materials Science and Engineering. Graduates of the BS in Chemistry (materials option) are equipped to pursue successful careers in materials research, continue their education with graduate studies in chemistry or allied disciplines, or take positions in industry or governmental organizations. This degree is certified by the American Chemical Society (ACS). Suggested curriculum

## BACHELOR OF SCIENCE IN CHEMISTRY - POLYMER OPTION

Polymers (or plastics) are important materials used in every day life in the US. Historical discoveries in polymer science include the synthesis, characterization, and application of vulcanized rubber, nylon, polyethylene (plastic bottles), Kevlar (bullet-proof vests), polyester, etc. The search for new polymers (e.g. synthetic skin, electrically conductive plastics, light-emitting displays, etc) to advance science within society is still continuing. The School of Chemistry and Biochemistry at Georgia Tech offers excellent interdisciplinary training for the next generation of polymer chemists. The BS in Chemistry (polymer option) consists of a fundamental chemistry courses combined with polymer science and engineering coursework offered jointly by the Schools of Chemistry and Biochemistry, Chemical and Biomolecular Engineering, and Polymer, Textile and Fiber Engineering. . Graduates of the BS in Chemistry (polymer option) are equipped to pursue successful careers in research, continue their education with graduate studies in chemistry or allied disciplines, or take positions in industry or governmental organizations. This degree is certified by the American Chemical Society (ACS). Suggested curriculum

## BACHELOR OF SCIENCE IN CHEMISTRY- RESEARCH OPTION

The BS in Chemistry (Research Option) and BS in Biochemistry (Research Option) is offered for students who wish to participate in a research problem under the supervision of one of the forty-six members of faculty and adjunct faculty in the School. Participants in the Research Option learn how to attack a research problem from experiment design and execution to interpretation of results. There is an expectation that undergraduates who contribute to completed studies will be co-authors on submissions to high-quality scholarly journals. Research projects are available in the traditional areas of chemistry (analytical, biological, inorganic, organic, physical, and polymer chemistry) as well as highly interdisciplinary research areas, such as nanochemistry, polymer and materials chemistry, environmental chemistry and sensors, medicinal chemistry, molecular biophysics, and computational chemistry.

To participate in the Research Option in the School of Chemistry and Biochemistry, students should obtain a research project with a faculty member in the department and apply online via http://undergradresearch.gatech.edu/research_option/index.php. Successful completion of the Research Options requires participation by the student in nine credit hours of supervised research (CHEM 4698/4699) with a chemistry and biochemistry faculty over three or more semesters, approval of a brief proposal on their project to a committee of two or more faculty, completion of LCC 4700 (a thesis writing course), and submission of an approved thesis. Successful completion of the Research Option is noted on the student's transcript. Students completing this degree may pursue graduate studies in the chemical or biological sciences or research careers in industrial or governmental laboratories. This degree is certified by the American Chemical Society (ACS).

## CHEMISTRY CERTIFICATE PROGRAM (FOR NON-MAJORS)

The School of Chemistry and Biochemistry offers, for non-chemistry majors, programs of study leading to certificates in three areas: biochemistry/organic chemistry, chemical analysis, and physical/inorganic chemistry. These certificate programs should be of interest to students considering careers in medicine or chemical-related industries, as well as those who wish to strengthen their background in areas of chemistry that are not required by their major.

Each certificate program requires a minimum of twelve hours in a coherent program with at least nine hours at the 3000 level or higher. These courses must be chosen from the list of courses in the given emphasis area and must be completed with a *C* or better. Courses required by the student's major may not be used in the certificate program. Courses which may be taken to satisfy the certificate requirements are as follows:

- Biochemistry/Organic Chemistry Certificate:
    - Chem 2312, 2313, 2380, 3511, 4311, 4341, 4511, 4512, 4581
- Chemical Analysis Certificate:
    - CHEM 2380, 3211, 3411, 3412, 4341, 4401
- Physical/Inorganic Chemistry Certificate:
    - CHEM 2380, 3111, 3380, 3411, 3412, 3481, 4452

Additional information regarding undergraduate programs is available by e-mailing us below, or writing to:

Director of Undergraduate Studies
School of Chemistry and Biochemistry
Georgia Institute of Technology
Atlanta, Georgia 30332-0400

## FINANCIAL AID

Financial support is available for graduate study in the School of Chemistry and Biochemistry. The usual form of financial aid for first-year students is the teaching assistantship. Most students beyond the first year are appointed as research assistants. Both teaching and research assistants receive full tuition waivers. Additional information on the graduate program is available by writing:

graduate coordinator
School of Chemistry and Biochemistry
Georgia Institute of Technology
Atlanta, Georgia 30332-0400

or by visiting www.chemistry.gatech.edu.

## MASTER OF SCIENCE IN CHEMISTRY

Two different programs of study leading to a master's degree are offered by the School of Chemistry and Biochemistry. The formal requirements for the M.S. degree (thesis option) are twenty-four credit hours of approved coursework beyond the bachelor's degree, along with an approved master's thesis. The formal requirement for the M.S. degree (non-thesis option) is thirty credit hours of approved coursework beyond the bachelor's degree. The M.S. degree (non-thesis option) is a terminal degree in this department. Current research includes multidisciplinary initiatives in biomolecular structure, molecular biophysics, computational and theoretical chemistry, materials chemistry, nanochemistry, bio-organic chemistry, photochemistry and photobiology, polymer chemistry, sensors, and environmental chemistry.

## MASTER OF SCIENCE IN COMPUTATIONAL SCIENCE AND ENGINEERING

Computational Science and Engineering (CSE) is a discipline concerned with the body of knowledge, skills, and practices associated with the study of computer-based models of natural phenomena and engineered systems. Students will be required to obtain a breadth of knowledge across a set of core areas in the CSE discipline, depth of knowledge in a specific computational specialization (e.g., numerical computing), and knowledge to apply computational techniques in a domain of application. Students will be expected to integrate principles from mathematics, computer science, and engineering to be able to create significant computational artifacts, e.g., software.

The CSE M.S. degree program is an interdisciplinary program offered by the College of Computing, the College of Engineering, and the College of Sciences. Upon application, students select a desired "home unit" among those academic units that formally participate in the program.

Students must complete four of the five courses making up the core curriculum: CSE/Math 6643 (Numerical Linear Algebra), CSE 6140 (Computational Science and Engineering Algorithms), CSE 6730 (Modeling and Simulation: Fundamentals & Implementation), CSE/ISYE 6740 (Computational Data Analysis), and CSE 6220 (High Performance Computing). A home unit minor is required consisting of twelve hours of coursework relevant to the CSE discipline that includes one applications area; this must include at least six hours of courses that do not carry the CS/CSE course designation. Finally, students must either complete 6 additional hours of approved coursework (course option) or an M.S. thesis (thesis option) that is defended to the student's thesis committee who is responsible for overseeing the student's research. Six hours of thesis credit are required in the thesis option. Additional requirements may apply depending on the student's home unit. A plan of study must be approved by the CSE program director and the student's home unit coordinator.

## MASTER OF SCIENCE IN PAPER, SCIENCE, AND ENGINEERING

The Institute of Paper Science and Technology supports the master's and Ph.D. degree programs offered by the Georgia Institute of Technology. The Paper Science and Engineering (PSE) graduate degree provides students with a multidisciplinary graduate education in the science and engineering involved in the production of paper, tissue, and other products from natural fiber, and related industries. The processing and consolidation of natural fiber into a paper web involve complex chemical and mechanical processes. The advantages of a multidisciplinary approach in research and education supporting this field have long been recognized. The Georgia Tech PSE program integrates the former Institute of Paper Science and Technology's multidisciplinary graduate program with other science and engineering programs available at Georgia Tech.

The M.S. and Ph.D. degrees in PSE are unique multidisciplinary degrees covering basic engineering and science disciplines involved in the production and consolidation of wood fiber products. Students are enrolled in the participating Georgia Tech school (referred to as the "home school") and, upon completion of degree requirements, the home school recommends the award of its M.S. or Ph.D. degree with an emphasis in Paper Science and Engineering. Degrees are being offered by the Schools of Chemical and Biomolecular Engineering, Chemistry and Biochemistry, Mechanical Engineering, and Materials Science and Engineering.

The paper industry continues to evolve through considerable consolidation and reorganization, and the need for innovation in the science and engineering of pulp and paper technology from plant biology to chemical treatment and processes involved in paper production is greater than ever. The PSE program provides research results and equips students with a unique set of skills to lead in this effort.

For more information, please visit www.ipst.gatech.edu/degree_progs/index.html.

# DOCTOR OF PHILOSOPHY WITH A MAJOR IN BIOINFORMATICS

## PARTICIPATING SCHOOLS

College of Computing
School of Biology
School of Biomedical Engineering
School of Chemistry and Biochemistry
School of Industrial and Sytems Engineering
School of Mathematics

## OBJECTIVE OF THE PROGRAM

The mission of the Georgia Tech Bioinformatics Ph.D. program is to educate and prepare graduate students to reach the forefront of leadership in the field of bioinformatics and computational biology, and to integrate research and education on the use of information technologies in biology and medicine. Thus, the program leading to a Ph.D. in Bioinformatics is an interdisciplinary program spanning a variety of academic departments at Georgia Tech.

Bioinformatics is a multidisciplinary field in which physical sciences, life sciences, computer science, and engineering are merged to solve both fundamental and applied problems in biology and medicine. The outcomes of bioinformatics and computational biology particularly include:

- new and global perspectives into the organization and function of biological systems (fundamental biology);
- new and novel targets for drug discovery and development; and
- genetic/proteomic profiling for pharmaco-genomics or personalized medicine.

Thus, bioinformatics is emerging as a strategic discipline at the frontier of biology, biochemistry, biomedicine, bioengineering, computer science, and mathematics, impacting fundamental science, medicine, biotechnology, and society.

With its broad mission statement, this program at Georgia Tech has the following strengths and focus areas:

1. Development of software tools, algorithms, and databases for gene identification, protein structural prediction, clustering analysis, and data mining
2. Application of bioinformatics to disease diagnosis, classification, prognosis, and treatment
3. Application of bioinformatics to fundamental biology and systems biology

There is an increasing demand for scientists with advanced training in bioinformatics. Professionals in this area should have a thorough knowledge of molecular biology, mathematics, and statistics, as well as computer science and engineering.

For more information visit www.biology.gatech.edu/bioinformatics/bioinformatics_phd.htm.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN CHEMISTRY

The goal of the doctoral program is to provide proficient knowledge in a specialized area of chemistry, with particular emphasis being placed on original, independent, and scholarly research. Students working toward a Ph.D. must complete fifteen credit hours of courses and a series of seminar courses. Students should complete all course requirements in the first year of graduate study and present a seminar in the second year. The Ph.D. candidacy examination consists of a series of examinations in the major area based on a reading assignment from the recent literature and an original research proposal to be completed by the end of the second year. Independent research for the Ph.D. is demonstrated by completion of published work.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN COMPUTATIONAL SCIENCE AND ENGINEERING

Computational Science and Engineering (CSE) is a discipline concerned with the body of knowledge, skills, and practices associated with the study of computer-based models of natural phenomena and engineered systems. Students will be required to obtain a breadth of knowledge across a set of core areas, depth of knowledge in a specific computational specialization (e.g., numerical computing), and knowledge to apply computational techniques in a domain of application. Students will be expected to integrate principles from mathematics, computing, science, and engineering to be able to create significant computational artifacts, e.g., software, and to complete independent research that advances the state-of-the-art in the CSE discipline.

The CSE M.S. degree program is an interdisciplinary program offered by the College of Computing, the College of Engineering, and the College of Sciences. Upon application students select a desired “home unit” among those academic units that formally participate in the program.

Required coursework includes CSE 6001 (Introduction to Computational Science and Engineering), CSE core courses (twelve hours), a computation specialization (nine hours), and an application specialization (nine hours). To complete the core course requirement, students must complete four of the five courses making up the core curriculum: CSE/Math 6643 (Numerical Linear Algebra), CSE 6140 (Computational Science and Engineering Algorithms), CSE 6730 (Modeling and Simulation: Fundamentals & Implementation), CSE/ISYE 6740 (Computational Data Analysis), and CSE 6220 (High Performance Computing). The computational specialization includes at least nine hours of courses that increase the student’s depth of understanding of computational methods in a specific area, as approved by the student’s academic advisor. These courses must go beyond “using computers” to deepen understanding of computational methods, preferably in the context of some application domain. The application specialization includes at least nine hours of courses that increase depth of understanding in an application field; these need not be computation-focused courses. At least nine hours of Ph.D. courses must be courses that do not carry the CS/CSE course designation. These hours may be taken in the home unit. Hours taken as part of the computation and/or application specialization can be used to fulfill this requirement. Additional requirements may apply depending on the student’s home unit.

A qualifying examination must be attempted by the end of the second year of enrollment in the CSE doctoral program (normally taken after the student completes CSE core coursework). A qualifying examination committee shall be appointed by the CSE program coordinator for each student and is responsible for making an overall recommendation concerning the outcome of the qualifying examination.

Students are required to complete a doctoral thesis reporting the results of independent research that advances the state-of-the-art in the computational science and engineering discipline. The dissertation must be successfully defended to the student's dissertation research committee.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN PAPER SCIENCE AND ENGINEERING

The Institute of Paper Science and Technology supports the Master's and Ph.D. degree programs offered by the Georgia Institute of Technology. The Paper Science and Engineering (PSE) graduate degree provides students with a multidisciplinary graduate education in the science and engineering involved in the production of paper, tissue, and other products from natural fiber and related industries. The processing and consolidation of natural fiber into a paper web involve complex chemical and mechanical processes. The advantages of a multidisciplinary approach in research and education supporting this field have long been recognized. The Georgia Tech PSE program integrates the former Institute of Paper Science and Technology's multidisciplinary graduate program with other science and engineering programs available at Georgia Tech.

The M.S. and Ph.D. degrees in PSE are unique multidisciplinary degrees covering basic engineering and science disciplines involved in the production and consolidation of wood fiber products. Students are enrolled in the participating Georgia Tech school (referred to as the "home school") and, upon completion of degree requirements, the home school recommends the award of its M.S. or Ph.D. degree with an emphasis in Paper Science and Engineering. Degrees are being offered by the Schools of Chemical and Biomolecular Engineering, Chemistry and Biochemistry, Mechanical Engineering, and Materials Science and Engineering.

The paper industry continues to evolve through considerable consolidation and reorganization, and the need for innovation in the science and engineering of pulp and paper technology from plant biology to chemical treatment and processes involved in paper production is greater than ever. The PSE's graduate degree programs provide research results and equips students with a unique set of skills to lead in this effort.

For more information, please visit www.ipst.gatech.edu/degree_progs/index.html.

## CERTIFICATE PROGRAM IN REMOTE SENSING

Students completing the master's or doctoral degree requirements of the School may earn a Remote Sensing Certificate. Additional details can be found in this catalog at http://www.catalog.gatech.edu/colleges/cos/eas/grad/certificates.php.

# SCHOOL OF EARTH AND ATMOSPHERIC SCIENCES

Established in 1970
Location: 311 Ferst Drive
Telephone: 404.894.3893
Web site: www.eas.gatech.edu

## GENERAL INFORMATION

The School of Earth and Atmospheric Sciences (EAS) is an interdisciplinary program that studies the Earth's physical and chemical environment. EAS takes an integrated Earth system science approach in which all components of the Earth system are studied and analyzed as parts of the larger coupled system. The curriculum is designed to provide its graduates with the intellectual insights needed to understand the evolution of the Earth's environment and its possible future changes. This integrated approach provides the context for professional training in environmental science and meteorology, as well as specialization for research careers in weather and climate dynamics, atmospheric chemistry and air quality, oceanography, aqueous geochemistry and biogeochemistry, paleoclimatology, atmospheric physics and remote sensing, geophysics, and geohydrology.

## FACULTY

### Chair and Professor

Judith A. Curry

### Graduate Coordinator and Professor

Robert X. Black

### Undergraduate Coordinator

Dana E. Hartley

### Georgia Research Alliance Eminent Scholar and Professor

Robert E. Dickinson

### Professors

L.Greg Huey, E. Michael Perdue, Philippe Van Cappellen, Irina N. Sokolik, Peter J. Webster, Rodney J. Weber, Paul H. Wine

### Emeritus Professors

William Chameides, George Chimonas, Derek Cunnold, Douglas D. Davis, C. S. Kiang, L. Timothy Long, Robert P. Lowell, Charles Pollard, Robert Roper, Marion Wampler

### Associate Professors

Michael H. Bergin, Robert Black, Rong Fu, Ellery D. Ingall, Athanasios Nenes, Jean Lynch-Stieglitz, Mark Stieglitz, Martial Taillefert, Yuhang Wang

### Assistant Professors

Annalisa Bracco, Kim Cobb, Yi Deng, Emanuele Di Lorenzo, Josef Dufek, Kurt Frankel, Andrew Newman, Carol Paty, Zhigang Peng, Andrew Stack

### Senior Research Scientists

Carlos A. Cardelino, Hai-Ru Chang, Michael E. Chang, Robert E. Stickel, David Tan, Viatcheslav V. Tatarskii, Hsiang-Jui (Ray) Wang, Wenyue Xu, Mei Zheng

### Research Scientists II

Paula Agudelo, Kremena Darmenova, Carlos Hoyos, Sangil Lee, Wenhong Li, Jiping Liu, Qing Liu, Muhammad Shaikh, Rafaella Sotiropoulou, James C. St. John, David J. Tanner, Tao Zeng

### Adjunct Faculty

Dominic Assimaki, Thomas DiChristina, Leonid Germanovich, Joseph Montoya, Armistead Russell, Valerie Thomas

## BACHELOR OF SCIENCE IN EARTH AND ATMOSPHERIC SCIENCES - GENERAL INFORMATION

The program leading to the Bachelor of Science in Earth and Atmospheric Sciences degree is based on forty-five hours of core courses within the School and forty-one hours of required courses in mathematics/computing and science. The EAS degree is comparable to traditional degrees in meteorology and environmental sciences, but the program has several unique attributes. EAS courses provide "hands-on" experiences in collection and interpretation of environmental data and in predictive modeling. The integrated approach of the program gives a broad environmental background, while still allowing students to specialize in meteorology, earth science, education, or a business option. The program prepares students for graduate study or immediate employment in fields such as meteorology, air quality, environmental chemistry, exploration geophysics, geological engineering, geological hazards, impact assessment, and environmental policy. Electives (twenty-seven hours), both within the School and in other units of Georgia Tech, allow students considerable flexibility in tailoring their degree programs according to individual career goals. The School provides incentives and encouragement for undergraduate students to participate in ongoing research with the faculty.

In addition to campus-wide academic requirements for graduation, a *C* or better is required in the following courses for the bachelor's degree in Earth and Atmospheric Sciences: MATH 1501, MATH 1502, PHYS 2211, CHEM 1310, BIOL 1510 or 1520, and CS 1371.

# BACHELOR OF SCIENCE IN EARTH AND ATMOSPHERIC SCIENCES
## 2008 - 2009 DEGREE REQUIREMENTS
### SCHOOL OF EARTH AND ATMOSPHERIC SCIENCES
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I *** | 4 |
| CHEM 1310 GENERAL CHEMISTRY *** | 4 |
| EAS 1600 INTRODUCTION TO ENVIRONMENTAL SCIENCE | 4 |
| GT 1000 FRESHMAN SEMINAR | 1 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II *** | 4 |
| CHEM 1311 INORGANIC CHEMISTRY I | 3 |
| CHEM 1312 INORGANIC CHEMISTRY LAB I | 1 |
| CS 1371 COMPUTING FOR ENGINEERS *** | 3 |
| **TOTAL SEMESTER HOURS =** | **14** |

| SECOND YEAR-FALL | HRS |
|---|---|
| MATH 2401 CALCULUS III | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I *** | 4 |
| EAS 2600 EARTH PROCESSES | 4 |
| TECHNICAL ELECTIVE ** | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| MATH 2403 DIFFERENTIAL EQUATIONS | 4 |
| PHYS 2212 INTRODUCTORY PHYSICS II | 4 |
| WELLNESS | 2 |
| EAS 2655 QUANTITATIVE TECHNIQUES | 3 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| EAS 3603 THERMODYNAMICS OF EARTH SYSTEMS | 3 |
| EAS CORE ELECTIVE * | 3 |
| TECHNICAL ELECTIVE ** | 3 |
| BIOL 1510 BIOLOGICAL PRINCIPLES or 1520 INTRODUCTION TO ORGANISMAL BIOLOGY *** | 4 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| EAS CORE ELECTIVES * | 4 |
| TECHNICAL ELECTIVE ** | 3 |
| HUMANITIES ELECTIVE | 3 |
| FREE ELECTIVES | 3 |
| S0CIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| EAS 4610 EARTH SYSTEM MODELING | 3 |
| EAS 4651 PRACTICAL INTERNSHIP or EAS 4699 UNDERGRADUATE RESEARCH | 3 |
| TECHNICAL ELECTIVE ** | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| FREE ELECTIVES | 4 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FOURTH YEAR-SPRING | HRS |
|---|---|
| EAS 4420 ENVIRONMENTAL FIELD METHODS | 4 |
| TECHNICAL ELECTIVE ** | 3 |
| HUMANITIES ELECTIVE | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **13** |

**TOTAL PROGRAM HOURS = 120 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

*** Choose two of the following four with at least one including a lab 3620 or 4740/46 41**

1. EAS 3620 Geochemistry
2. EAS 4630 Physics of the Earth
3. EAS 4655 Atmospheric Dynamics
4. EAS 4740 Atmospheric Chemistry and EAS 4641 Atmos. Chem Lab

******

**All upper division courses in EAS can count as technical electives, as well as other new courses introduced by EAS faculty, Special Problems (up to 3 credit hours) , or upper division courses in Math, Physics, Biology, Chemistry, and CEE, if approved by the undergraduate coordinator.**

***** In addition to campus-wide academic requirements for graduation, a *C* or better is required in the following courses for the bachelor's degree in Earth and Atmospheric Sciences: MATH 1501, MATH 1502, PHYS 2211, CHEM 1310, BIOL 1510 or 1520, and CS 1371.**

# ELECTIVES

## WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

## ELECTIVES

EAS students are required to complete fifteen hours of technical electives in science, engineering, and mathematics. All upper division courses in EAS can count as technical electives, as well as other new courses introduced by EAS faculty, Special Problems (up to three credit hours), or upper-division courses in math, physics, biology, chemistry, and civil and environmental engineering, if approved by the undergraduate coordinator.

Those students who choose the business option may substitute two management courses for EAS technical electives. All EAS students are required to complete an additional eleven hours of free electives in areas of their choice. Students should consult the School's undergraduate coordinator for advice on their electives.

## HUMANITIES/SOCIAL SCIENCES ELECTIVES

ENGL 1101 and 1102 apply toward satisfaction of the twelve-hour humanities requirement. An additional six hours of Institute-approved humanities courses are required to fulfill the twelve-hour humanities requirement. To satisfy the state requirements regarding coursework in the history and constitutions of the United States and Georgia, students must complete one of the following courses: HIST 2111, HIST 2112, POL 1101, PUBP 3000, or INTA 1200. One of these courses, combined with an additional nine hours of Institute-approved social science courses, satisfies the twelve-hour social sciences requirement.

## BACHELOR OF SCIENCE IN EARTH AND ATMOSPHERIC SCIENCES - INTERNATIONAL PLAN

The EAS with International Plan (EAS-IP) is designed to give a student a solid, global competence within the context of an Earth and Atmospheric Science degree.

The major course requirements are the same for both EAS and EAS-IP. Where they differ is that for the EAS-IP degree, a student:

1. Spends twenty-six weeks abroad engaged in any combination of study abroad, research, or internship.
2. Takes their Social Science/Humanities electives in targeted areas:
   a. International relations
   b. Global economics
   c. A course about a particular country or region
3. Complete the equivalent to two years of college-level language study. * See Georgia IP requirements for the different options: www.internationalplan.gatech.edu/students/requirements.html
4. Complete a capstone course that combines their global experience with their EAS degree.

## BACHELOR OF SCIENCE IN EARTH AND ATMOSPHERIC SCIENCES - RESEARCH OPTION

The B.S. in Earth and Atmospheric Sciences with Research Option allows a student to emphasize his or her interest in research. To complete the Research Option in the School of Earth and Atmospheric Sciences, students must:

1. Complete at least nine units of undergraduate research;
    a. Over at least two, preferably three terms
    b. Research may be for either pay or credit. To get credit towards completion of the Research Option for research for pay, students must be registered for the appropriate audit-only, research for pay class (EAS 2698 or 4698).
2. Take the class LCC 4700 Writing an Undergraduate Thesis prior to or during the thesis-writing semester; and
3. Write an undergraduate thesis/report of research on their findings.

Completion of the Research Option is noted on the student's transcript. For more information, visit: www.urop.gatech.edu.

To read more about the Earth and Atmospheric Sciences major, please see the B.S. in Earth and Atmospheric Sciences description here.

## B.S./M.S. EARTH AND ATMOSPHERIC SCIENCES - FIVE-YEAR

EAS offers a five-year B.S./M.S. Program. EAS majors may apply to the B.S./M.S. program after completing at least thirty semester credit hours at Georgia Tech with a GPA of at least 3.5.

Students admitted to the program must maintain a cumulative GPA of at least 3.0.

As part of the program, students may use up to six credit hours of graduate-level coursework in the major discipline for both degrees.

To apply, complete the B.S./M.S. application form, a biographical statement, and two letters of recommendation.

For more information, visit our Web site.

## MINOR IN EARTH AND ATMOSPHERIC SCIENCES

A minor in Earth and Atmospheric Sciences may be obtained by completing specified EAS courses. It is designed for students interested in environmental/atmospheric chemistry, solid Earth geophysics/planetology, Earth systems science, hydrogeology, physical/chemical oceanography, atmospheric dynamics, environmental geophysics, or soils science.

## CERTIFICATE PROGRAMS

The School of Earth and Atmospheric Sciences offers programs of study for non-School majors leading to certificates in two areas of emphasis: geochemistry and solid earth geophysics. Each course must be completed with a *C* or better.

Additional information regarding undergraduate programs, the minor, and the certificate programs is available by contacting:

undergraduate coordinator,
School of Earth and Atmospheric Sciences,
Georgia Institute of Technology,
Atlanta, Georgia 30332-0340.

## B.S./M.S. EARTH AND ATMOSPHERIC SCIENCES - FIVE-YEAR

EAS offers a five-year B.S./M.S. Program. EAS majors may apply to the B.S./M.S. program after completing at least thirty semester credit hours at Georgia Tech with a GPA of at least 3.5.

Students admitted to the program must maintain a cumulative GPA of at least 3.0.

As part of the program, students may use up to six credit hours of graduate-level coursework in the major discipline for both degrees.

To apply, complete the B.S./M.S. application form, a biographical statement, and two letters of recommendation.

For more information, visit our Web site.

## MASTER OF SCIENCE IN EARTH AND ATMOSPHERIC SCIENCES

Students can choose a program of study leading to either the designated master's degree (with thesis) or the undesignated master's degree (without thesis). General requirements for both degrees are found in this catalog under "Information for Graduate Students." In either program of study, students can specialize in weather and climate dynamics, atmospheric chemistry and air quality, oceanography, aqueous geochemistry and biogeochemistry, paleoclimatology, atmospheric physics and remote sensing, geophysics, and geohydrology. With approval of the School's faculty, multidisciplinary programs of study are also permitted. Students entering the master's degree program need an academic background that includes a minimum of one year of university-level courses in calculus, chemistry, and physics. Students who lack this academic background are required to complete appropriate remedial courses, for which they will not receive graduate credit.

Students can satisfy the requirements for the designated master's degree by completing a faculty-approved set of courses and a master's thesis in earth and atmospheric sciences. With approval of the School chair, students can satisfy the requirements for the undesignated master's degree by completing a faculty-approved set of courses and a three-hour Special Problems course. This course must take the form of a research project supervised by the student's advisor and culminating in a written final report.

## MASTER OF SCIENCE WITH A MAJOR IN EARTH AND ATMOSPHERIC SCIENCE

Students can choose a program of study leading to either the designated master's degree (with thesis) or the undesignated master's degree (without thesis). General requirements for both degrees are found in this catalog under "Information for Graduate Students." In either program of study, students can specialize in weather and climate dynamics, atmospheric chemistry and air quality, oceanography, aqueous geochemistry and biogeochemistry, paleoclimatology, atmospheric physics and remote sensing, geophysics, and geohydrology. With approval of the School's faculty, multidisciplinary programs of study are also permitted. Students entering the master's degree program need an academic background that includes a minimum of one year of university-level courses in calculus, chemistry, and physics. Students who lack this academic background are required to complete appropriate remedial courses, for which they will not receive graduate credit.

Students can satisfy the requirements for the designated master's degree by completing a faculty-approved set of courses and a master's thesis in earth and atmospheric sciences. With approval of the School chair, students can satisfy the requirements for the undesignated master's degree by completing a faculty-approved set of courses and a three-hour Special Problems course. This course must take the form of a research project supervised by the student's advisor and culminating in a written final report.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN EARTH AND ATMOSPHERIC SCIENCES

In the doctoral program at the School of Earth and Atmospheric Sciences, students are engaged primarily in original, independent research that culminates in the doctoral dissertation. In this School, students can specialize in weather and climate dynamics, atmospheric chemistry and air quality, oceanography, aqueous geochemistry and biogeochemistry, paleoclimatology, atmospheric physics and remote sensing, geophysics, and geohydrology. With approval of the School's faculty, multidisciplinary programs of study are also permitted. In each area of specialization, doctoral students are required to complete a faculty-approved set of core courses and a comprehensive examination. Students are also required to complete nine semester hours of coursework in an academic minor.

## CERTIFICATE PROGRAM IN GEOHYDROLOGY

Students completing the master's or doctoral degree requirements of the School may be awarded a Multidisciplinary Geohydrology Certificate if their program of study satisfies the requirements of the Multidisciplinary Geohydrology program. Additional details can be found in this catalog under Multidisciplinary Certificate Programs in Engineering.

## CERTIFICATE PROGRAM IN REMOTE SENSING

Remote sensing refers to a means of investigating the properties of a target using measurements made at some distance from the target. Applications range from astronomy and environmental applications to medical radiography and automotive collision avoidance radars, as well as security-enhancing sensors. In the last three decades, sensing of the Earth and its atmosphere has increased very substantially because of climate change and global pollution concerns and because of the need for measurements to support the increasingly sophisticated weather and earthquake forecasting and oil and gas surveying capabilities.

Students completing the master's or doctoral degree requirements of the Schools listed below may be awarded a Remote Sensing Certificate. The primary administration of the certificate is through Dr. Irina Sokolik of the School of Earth and Atmospheric Sciences. Departmental contacts are listed below:

Aerospace Engineering: Dr. Robert Braun
Electrical and Computer Engineering: Dr. Manos Tentzeris
Earth and Atmospheric Sciences: Dr. Irina Sokolik
Civil and Environmental Engineering: Dr. Michael Bergin
Chemistry and Biochemistry: Dr. Thomas Orlando
City Planning: Dr. Steven French

The courses that would be used to satisfy the requirements of this certificate have been divided into two areas: First, a group of core courses that cover both fundamentals and applications of remote sensing; second, elective courses that cover a range of courses that cover fundamental physics, data analysis methods, and application areas. A total of twelve credit hours are required to obtain the certificate, including at least two core courses. Nine of the hours must be at the 6000 level or above.

### Area 1: Core Courses

**CP 6531: Introduction to Remote Sensing** - Introduces students to the collection and use of satellite imagery and other remote sensing data

**EAS 4430: Remote Sensing and Data Analysis** - Introduction to passive environmental remote sensing of the atmosphere and the Earth. Laboratory examples of data and image analysis for remote sensing applications

**EAS 4460: Satellite and Radar Meteorology** - Interpretation of satellite and radar data for meteorological forecasting based on understanding radiative transfer and the resulting strengths and limitations of the imagery

**EAS 6145: Remote Sensing of the Atmosphere and Oceans** - Provides foundation for understanding the physical principles of remote sensing and its applications to the study of atmospheric gases, clouds, and ocean surfaces

**ECE 4390: Introduction to Radar and Electromagnetic Sensing** - Introduces students to radar systems, including pulsed CW, CWFM, and MTI radars, and other techniques for electromagnetic sensing, such as radiometry and EM tagging, are discussed

### Area 2: Electives

**AE 6354: Advanced Orbital Mechanics** - Advanced concepts in orbital mechanics including orbital perturbations, rendezvous, N-body effects, non-spherical gravitational harmonics, and low-thrust maneuvers

**AE 8803: Special Topics**
- Course may be taught as Astrodynamics I historical background and equations of motion, two-body orbital mechanics, orbit determination and prediction, orbital maneuvers, Earth remote sensing and reconnaissance orbits, lunar and interplanetary trajectories and orbital rendezvous

**CEE 6222: Hydrometeorology** - Estimation of hydrologic variables from on-site and remote sensors, operational hydrologic models, parameter estimation, and operational forecasting

**CEE 6462: Signals and Inverse Problems in Civil Engineering** - Addresses civil engineering signals and systems, discrete time and frequency domain operations, nonlinear and nonstationary systems, inverse problems, matrix-based and other solutions, tomography, and civil engineering examples

**CEE 6483: Geotechnical Image and Spatial Analysis** - Presentation of techniques for spatial and image processing and analysis of subsurface data at micro and macro scales

**CP 6521: Advanced Geographic Information Systems** - Provides students with advanced spatial analysis techniques including network analysis, three-dimensional surface modeling, and GIS applications

**EAS 4510: Exploration Geophysics** - Introduces methods of exploration geophysics, including refraction and reflection seismology, resistivity, gravity, magnetics, and ground penetrating radar, including laboratory work and introduction to operation of field equipment

**EAS 4520: Seismic Methods in Exploration Geophysics** - A study of seismic reflection exploration methods and theory, with examples taken from oil industry exploration and production and near-surface environmental imaging

**EAS 6134: Inverse Methods and Time Series Analysis in EAS** - Theory of remotely-sensed data acquisition, time series analysis, and discrete inverse theory, with applications in the Earth and atmospheric sciences

**EAS 8803: Special Topics**
- May be taught as Atmospheric Radiative Transfer. This course provides a foundation for understanding the theoretical and computer modeling principles of radiative transfer in planetary atmospheres

**EAS 8803: Special Topics**
- May be taught as Optical Techniques in Atmospheric Sensing. Discusses light propagation and scattering, and instrumentation used to make remote measurements in the atmosphere, including a description of infrared atmospheric spectra

**ECE 6272: Fundamentals of Radar Signal Processing** - Signal modeling, including radar cross section, multipath, and clutter, properties of the ambiguity function and coded waveforms, and algorithms for Doppler processing, detection, and radar imaging

**ECE 6780: Medical Image Processing** - A study of methods for enhancing, analyzing, interpreting, and visualizing information from two- and three-dimensional data obtained from a variety of medical imaging modalities

**ECE 7370: Antennas and Wave Propagation in Matter** - Basic methods for characterizing the electromagnetic properties of common materials (geophysical, biological, etc.) and techniques for analyzing antennas and wave propagation in these materials

### Courses in development:

**AE/EAS 4XXX: Designing a UAV for Remote Sensing Applications** - This course is currently being planned and EAS recently received a NASA grant to provide education in this subject area.

**EAS 6XXX: Earth Science/Geological Applications of Remote Sensing** - A new faculty memberin EAS geodetic remote sensing will be creating this course. It probably will include Global Positioning System (GPS) applications

Other new courses on remote sensing may qualify as electives for this certificate with approval by the Remote Sensing Certificate, Dr. Irina Sokolik.

# SCHOOL OF MATHEMATICS - GENERAL INFORMATION

Established in 1952
Location: Skiles Building
Telephone: 404.894.2700
Fax: 404.894.4409
Web site: www.math.gatech.edu

## GENERAL INFORMATION

Mathematics forms an integral part of the curricula of most students at Georgia Tech. Consequently, the School of Mathematics offers a wide range of courses serving students in the various engineering, science, and management disciplines. In addition, the School offers programs of study leading to the bachelor's, master's, and doctoral degrees in mathematics. Such programs of study serve as preparation for mathematics careers, professional schools, and graduate studies.

In addition to basic courses in mathematics, the School offers a variety of specialized courses at the undergraduate and graduate levels, emphasizing areas related to the research activities of the faculty. These include mathematical analysis, applied mathematics, differential equations and partial differential equations, geometry, scientific computing, probability, statistics, combinatorics, mathematical physics, topology, and algebra.

The School of Mathematics has excellent computer facilities that are used in conjunction with an increasing number of courses and programs of study. A Cooperative Plan for students who wish to combine practical experience with academic work is available for mathematics majors.

## FACULTY

### Chair and Professor

William T. Trotter

### Associate Chair and Professor

Alfred D. Andrew

### Associate Chair, Coordinator of Graduate Programs, and Professor

Luca Dieci

### Coordinator of Undergraduate Programs and Professor

Michael Loss

### Director of Advising and Assessment

Enid Steinbart

### Assistant Coordinator of Undergraduate Programs

Rena Brakebill

### Assistant Academic Program Coordinator

Russell Todres

### Director of Information Technology

Lew E. Lefton

### Regents' Professors

William F. Ames (emeritus), Leonid Bunimovich, Jack K. Hale (emeritus)

### Professors

Saguata Basu, Johan G.F. Belinfante, Jean Bellissard, Eric A. Carlen, Shui-Nee Chow, John Etnyre, Wilfrid Gangbo, Stavros Garoufalidis, Jeffrey S. Geronimo, William L. Green, Evans M. Harrell II, Christopher Heil, Christian Houdré, Robert P. Kertz, Vladimir Koltchinskii, Michael T. Lacey, Thang Le, Wing Suet Li, Doron Lubinsky, Konstantin Mischaikow, Thomas D. Morley, Andrzej Swiech, Prasad Tetali, Robin Thomas, Yang Wang, Howard Weiss, Yingfei Yi, Xingxing Yu

### Emeritus Professors

George L. Cain Jr., Nathaniel Chafee, Richard A. Duke, Jamie J. Goode, James V. Herod, Theodore P. Hill, Dar-Vieg Ho, Roger D. Johnson, John P. Line, Gunter H. Meyer, James M. Osborn, Ronald W. Shonkwiler, M. Carl Spruill, Frank W. Stallard, Michael P. Stallybrass, Yung L. Tong

### Associate Professors

Matthew Baker, Igor Belegradek, Federico Bonetto, Xu-Yan Chen, Mihai Ciucu, Ernest Croot, Mohammad Ghomi, Guillermo Goldsztein, Yingjie Liu, John McCuan, Ronghua Pan, Liang Peng, Chongchun Zeng, Hao Min Zhou

### Assistant Professors

Silas Alben, Yuri Bakhtin, Serge Guillas, Christine Heitsch, Plamen Iliev, Heinrich Matzinger, Ionel Popescu, Maria Westdickenberg, Michael Westdickenberg

### Adjunct Professors

William J. Cook, Arkadi Nemirovski, Dana Randall, Allen Tannenbaum

### Instructors

Steven Demko, John Elton, Michael Evans, Klara Grodzinsky, Cathleen Jacobson

## UNDERGRADUATE PROGRAMS

The School of Mathematics offers programs leading to two undergraduate degrees: the Bachelor of Science in Applied Mathematics and the Bachelor of Science in Discrete Mathematics. Both programs emphasize the study of core mathematics as well as its applications. They provide excellent preparation for employment, as well as graduate study in mathematics and related fields.

## BACHELOR OF SCIENCE IN APPLIED MATHEMATICS

Reflecting the scientific environment at Georgia Tech, the bachelor's program in applied mathematics trains students in the traditional core mathematics curriculum, as well as in its applications. The undergraduate program is sufficiently flexible to accommodate the wide variety of interests of undergraduate majors, and yet, by its scientific breadth, it prepares the student for the extensive employment opportunities that exist for applied mathematicians. Students are encouraged to develop an expertise in another field related to mathematics. This can be accomplished by developing a program of study involving technical electives and an appropriate concentration within mathematics. Some of the more popular fields include physics, computer science, electrical engineering, industrial engineering, operations research, and economics. The School of Mathematics has a large, well-networked computer lab that is utilized in courses throughout the undergraduate curriculum.

In addition to the institutional requirement of maintaning at least a 2.0 grade point average for the entire academic program, the School of Mathematics requires a *C* or better in each of MATH 4107, 4317, 4318, and 4320. Students may count no more than two hours of coursework in physical education toward graduation. Only free electives and MATH 4999 in the degree program may be taken on a pass/fail basis, and no more than nine hours are allowed under this option.

## BACHELOR OF SCIENCE IN APPLIED MATHEMATICS
### 2008 - 2009 DEGREE REQUIREMENTS
### SCHOOL OF MATHEMATICS
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| WELLNESS | 2 |
| CS 1301 INTRODUCTION TO COMPUTING | 3 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| LAB SCIENCE (Biol, Chem, Eas) | 4 |
| CS 1331 INTRO OBJECT ORIENTED PROGRAMMING | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-FALL | HRS |
|---|---|
| MATH 2401 CALCULUS III | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| HUMANITIES ELECTIVE | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **14** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| MATH 2406 ABSTRACT VECTOR SPACES | 3 |
| MATH 2403 DIFFERENTIAL EQUATIONS | 4 |
| PHYS 2212 INTRODUCTORY PHYSICS II | 4 |
| HUMANITIES ELECTIVE | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-FALL | HRS |
|---|---|
| MATH 3215 PROBABILITY & STATISTICS | 3 |
| ENGINEERING or SCIENCE ELECTIVE (3000 Level) | 3 |
| MATH ELECTIVES (3000 Level or Higher) | 6 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| MATH 3012 APPLIED COMBINATORICS | 3 |
| MATH ELECTIVES (3000 Level or Higher) | 9 |
| ENGINEERING or SCIENCE ELECTIVE (3000 Level) | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| MATH 4107 ABSTRACT ALGEBRA I | 3 |
| MATH 4640 NUMERICAL ANALYSIS I | 3 |
| MATH 4317 ANALYSIS I | 3 |
| PHYS ELECTIVE (3000 Level) | 3 |
| FREE ELECTIVE | 2 |
| **TOTAL SEMESTER HOURS =** | **14** |

| FOURTH YEAR-SPRING | HRS |
|---|---|
| MATH 4318 ANALYSIS II | 3 |
| MATH 4320 COMPLEX ANALYSIS | 3 |

| | |
|---|---|
| FREE ELECTIVES | 9 |
| **TOTAL SEMESTER HOURS =** | **15** |

**TOTAL PROGRAM HOURS = 120 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

# ELECTIVES

## WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

## SUBSTITUTIONS

Honors physics and mathematics courses may be substituted for the corresponding regular courses.

## MATH ELECTIVES

Mathematics courses at the 3000 level or higher, with the exception of MATH 3770 and certain Special Topics Classes.

## ENGINEERING OR SCIENCE ELECTIVES

The School of Mathematics requires that students complete two courses (total six hours) of engineering or science electives at the 3000 level or higher. These courses must be taken from the same approved school. The following schools are approved: College of Sciences-Biology, Chemistry and Biochemistry, Earth and Atmospheric Sciences, Physics, and Psychology; College of Engineering-all engineering schools; College of Computing; and Ivan Allen College-Economics.

## HUMANITIES AND SOCIAL SCIENCES ELECTIVES

Six credit hours of humanities are required in addition to ENGL 1101 and ENGL 1102. The School of Mathematics recommends that students take a one-year sequence of courses in a modern language. All students must satisfy a state requirement regarding coursework in the history and constitutions of the United States and Georgia by taking one course from HIST 2111, HIST 2112, INTA 1200, POL 1101, or PUBP 3000. An additional nine credit hours of social sciences are required.

## BACHELOR OF SCIENCE IN APPLIED MATHEMATICS - BUSINESS OPTION

The School of Mathematics offers a Business Option variant of the undergraduate degree program in Applied Mathematics. This option is designed for students who wish to acquire and document the skills and knowledge needed for success as a scientific entrepreneur. Students electing this option complete the degree requirements for the Applied Mathematics program, except that:

- two of their social science electives must be PSYC 2220 Industrial/Organizational Psychology (3) and ECON 2106 Principles of Microeconomics (3);
- two courses - MGT 3000 Financial and Managerial Accounting (3) and MGT 3300 Marketing Management I (3) - replace the six hours of engineering or science electives in the Applied Mathematics program; and
- MGT 3150 Principles of Management (3) replaces three hours of free electives.
- Completion of the Business Option is noted by the designation “Business Option” on the student’s transcript.

For further information, consult a School of Mathematics advisor.

## BACHELOR OF SCIENCE IN APPLIED MATHEMATICS - BUSINESS AND RESEARCH OPTIONS

A student may elect to complete both the Business Option and the Research Option.

Applied Mathematics - Business Option
and
Applied Mathematics - Research Option

Completion of the Business and Research Options is noted by the designations “Business Option” and “Research Option” on the student's transcript.

## BACHELOR OF SCIENCE IN APPLIED MATHEMATICS - RESEARCH OPTION

For the B.S. in Applied Mathematics - Research Option, a student conducts supervised research with a faculty advisor over two-three semesters and completes nine hours of either MATH 2698/4698 (research for pay) or MATH 2699/4699 (research for credit). In addition, during his or her final research semester, the student takes LCC 4700 Undergraduate Thesis Writing (two hours), prepares a research report (research paper, project report/thesis), and makes an oral presentation of the project. Six hours of MATH 4699 may be used as Mathematics Electives for the B.S. in Applied Mathematics.

Completion of this Research Option is noted by the designation "Research Option" on the student's transcript.

For more information, please visit: http://undergradresearch.gatech.edu/research_option.

## BACHELOR OF SCIENCE IN DISCRETE MATHEMATICS

Certain areas of mathematics have become increasingly important over the past twenty years due to the introduction of computing into nearly every aspect of science, technology, and business. These are the branches of mathematics that are devoted to the study of discrete as opposed to continuous structures. The methods of discrete mathematics are used whenever objects are to be counted, when the relationships between finite sets are examined, and when processes involving a finite number of steps are studied. These methods become essential when, for example, computer algorithms are analyzed, transportation networks or communications systems are designed, or when optimal schedules are sought.

Many problems associated with the transmission and storage of information, the design of complicated circuits, or the identification of organic chemicals require the tools of discrete mathematics. Several fields of application, most notably operations research and computer science, not only use the techniques of discrete mathematics, but have also contributed significantly to the development of the subject. For this reason, the curriculum for the bachelor's degree program in discrete mathematics combines basic work in mathematics and science and advanced studies in discrete mathematics with substantial training in these areas of application.

After completion of the program's core requirements in the first two years, students take fifteen hours of mathematics, nine to ten hours of computer science, and six hours of industrial and systems engineering. The program requires nine hours of approved technical electives. The list of approved technical electives includes mathematics, computing, electrical engineering, and operations research. Four hours for the senior research project and twelve hours of free electives complete the program.

In addition to the Institute requirement of a grade point average of at least 2.0, the School of Mathematics requires a *C*
or better in each of MATH 4022, 4107, and 4317. Students may count no more than two hours of coursework in physical education toward graduation. Only free electives and MATH 4999 in the degree program may be taken on a pass/fail basis, and no more than nine hours are allowed under this option.

# BACHELOR OF SCIENCE IN DISCRETE MATHEMATICS
## 2008 - 2009 DEGREE REQUIREMENTS
### SCHOOL OF MATHEMATICS
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| WELLNESS | 2 |
| CS 1301 INTRODUCTION TO COMPUTING | 3 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| LAB SCIENCE (Biol, Chem, Eas) | 4 |
| CS 1331 INTRO OBJECT ORIENTED PROGRAMMING | 3 |
| CS 1050 UNDERSTANDING & CONSTRUCTING PROOFS | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-FALL | HRS |
|---|---|
| MATH 2401 CALCULUS III | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| HUMANITIES ELECTIVE | 3 |
| SOCIAL SCIENCE ELECTIVES | 6 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| MATH 2406 ABSTRACT VECTOR SPACES | 3 |
| MATH 2602 LINEAR & DISCRETE MATHEMATICS | 4 |
| PHYS 2212 INTRODUCTORY PHYSICS II | 4 |
| HUMANITIES ELECTIVE | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| THIRD YEAR-FALL | HRS |
|---|---|
| MATH 3215 PROBABILITY & STATISTICS | 3 |
| CS 3510 DESIGN & ANALYSIS OF ALGORITHMS | 3 |
| CS 2335 (3) & FREE ELECTIVES (7) OR CS 2110 (4) & FREE ELECTIVES (6) | 10 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| MATH 3012 APPLIED COMBINATORICS | 3 |
| ISYE 3133 ENGINEERING OPTIMIZATION | 3 |
| CS 4510 AUTOMATA & COMPLEXITY THEORY | 3 |
| TECHNICAL ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **12** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| MATH 4080 SENIOR PROJECT I | 2 |
| MATH 4107 ABSTRACT ALGEBRA I | 3 |
| MATH 4022 INTRODUCTION TO GRAPH THEORY | 3 |
| MATH 4317 ANALYSIS I | 3 |
| TECHNICAL ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **14** |

| FOURTH YEAR-SPRING | HRS |
|---|---|
| MATH 4090 SENIOR PROJECT II | 2 |
| ISYE 3232 STOCHASTIC MANUFACTURING & SERVICE SYSTEMS | 3 |

| | |
|---|---|
| TECHNICAL ELECTIVE | 3 |
| FREE ELECTIVES | 6 |
| **TOTAL SEMESTER HOURS =** | **14** |

**TOTAL PROGRAM HOURS = 120 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

# ELECTIVES

## WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

## SUBSTITUTIONS

MATH 4580 may be substituted for ISYE 3133. Honors physics and mathematics courses may be substituted for the corresponding regular courses.

## TECHNICAL ELECTIVES

Students must complete nine hours of technical electives from the following list: MATH 2403, 4012, 4032, 4150, 4221, 4222, 4255, 4261, 4262, 4280, 4318, 4320, 4431, 4432, 4640, 4641, 4777; CS 2200, 3220, 3240, 3251, 3451; ISYE 3103, 3104, 3044, 4833; ECE 2025, 2030, 2031, 3055, 3075, 3085, 4270.

## HUMANITIES AND SOCIAL SCIENCES ELECTIVES

Six credit hours of humanities are required in addition to ENGL 1101 and ENGL 1102. The School of Mathematics recommends that students take a one-year sequence of courses in a modern language. All students must satisfy a state requirement regarding coursework in the history and constitutions of the United States and Georgia by taking one course from HIST 2111, HIST 2112, INTA 1200, POL 1101, or PUBP 3000. An additional nine credit hours of social sciences are required.

## BACHELOR OF SCIENCE IN DISCRETE MATHEMATICS - BUSINESS OPTION

The School of Mathematics offers a Business Option variant of the undergraduate degree program in Discrete Mathematics. This option is designed for students who wish to acquire and document the skills and knowledge needed for success as a scientific entrepreneur. Students electing this option complete the degree requirements for the Discrete Mathematics program, except that:

- 1. two of their social science electives must be PSYC 2220 Industrial/Organizational Psychology (3) and ECON 2106 Principles of Microeconomics (3);
- 2. two courses - MGT 3000 Financial and Managerial Accounting (3) and MGT 3300 Marketing Management I (3) replace six of the nine hours of technical electives in the Discrete Mathematics program; and
- 3. MGT 3150 Principles of Management (3) replaces three hours of free electives.

For further information, consult a School of Mathematics advisor.

## BACHELOR OF SCIENCE IN DISCRETE MATHEMATICS - BUSINESS AND RESEARCH OPTIONS

A student may elect to complete both the Business Option and the Research Option.
B.S. Discrete Mathematics-Business Option
and
B.S. Discrete Mathematics-Research Option

Completion of the Business and Research Options is noted by “Business Option” and “Research Option” designations on the student's transcript.

## BACHELOR OF SCIENCE IN DISCRETE MATHEMATICS - RESEARCH OPTION

For the B.S. in Discrete Mathematics - Research Option, a student conducts supervised research with a faculty advisor over 2-3 semesters and completes nine hours of either MATH 2698/4698 (research for pay) or MATH 2699/4699 (research for credit). In addition, during his or her final research semester, the student takes LCC 4700 Undergraduate Thesis Writing (2 hours), prepares a research report (research paper, project report/thesis), and makes an oral presentation of the project. Four hours of MATH 4699 may be used in place of MATH 4080 and 4090 (Senior Project I and II) for the B.S. in Discrete Mathematics.

Completion of this Research Option is noted by the designation "Research Option" on the student's transcript.

For more information, please visit: http://undergradresearch.gatech.edu/research_option.

## MINOR IN MATHEMATICS

A student may earn a minor in mathematics by fulfilling, in addition to the general Institute requirements, the requirements in one of the two tracks specified below.

### TRACK I

MATH 4317, MATH 4107, MATH 4305, and nine additional hours of 3000 level or higher mathematics courses.

### TRACK II

At least nine hours in one of the following fields:

1. Analysis: MATH 4317, 4318, 4320, 4581, 4640, 4641
2. Algebra and Number Theory: MATH 4012, MATH 4107, 4108, 4150, 4305
3. Probability and Statistics: MATH 3215, 3770, 4221, 4222, 4255, 4261, 4262, 4280
4. Dynamics and Differential Equations: MATH 4347, 4348, 4541, 4542, 4581
5. Discrete Mathematics: MATH 3012, 4012, 4022, 4032, 4580
6. Geometry and Topology: MATH 4431, 4432, 4441

Nine additional hours of 3000 level or higher mathematics courses are also required.

For further information, consult the departmental advisor.

### FURTHER RULES

1. No more than four semester hours of Special Topics courses may be used.
2. No Special Problems or Internship coursework may be used.
3. All coursework in the program must be completed with an overall grade point average of at least 2.0.
4. Courses must be completed on a letter grade mode.
5. No more than two minors may be awarded with a degree. Each minor must contain eighteen semester hours not used in the other minor.
6. Courses required by name and number in a student's major degree program may not be used in satisfying the minor requirement.

For further information, consult the departmental advisor.

## MASTER OF SCIENCE IN COMPUTATIONAL SCIENCE AND ENGINEERING

Computational Science and Engineering (CSE) is a discipline concerned with the body of knowledge, skills, and practices associated with the study of computer-based models of natural phenomena and engineered systems. Students will be required to obtain a breadth of knowledge across a set of core areas in the CSE discipline, depth of knowledge in a specific computational specialization (e.g., numerical computing), and knowledge to apply computational techniques in a domain of application. Students will be expected to integrate principles from mathematics, computer science, and engineering to be able to create significant computational artifacts, e.g., software.

The CSE M.S. degree program is an interdisciplinary program offered by the College of Computing, the College of Engineering, and the College of Sciences. Upon application, students select a desired “home unit” among those academic units that formally participate in the program.

Students must complete four of the five courses making up the core curriculum: CSE/Math 6643 (Numerical Linear Algebra), CSE 6140 (Computational Science and Engineering Algorithms), CSE 6730 (Modeling and Simulation: Fundamentals & Implementation), CSE/ISYE 6740 (Computational Data Analysis), and CSE 6220 (High Performance Computing). A home unit minor is required consisting of twelve hours of coursework relevant to the CSE discipline that includes one applications area; this must include at least six hours of courses that do not carry the CS/CSE course designation. Finally, students must either complete 6 additional hours of approved coursework (course option) or an M.S. thesis (thesis option) that is defended to the student’s thesis committee who is responsible for overseeing the student’s research. Six hours of thesis credit are required in the thesis option. Additional requirements may apply depending on the student’s home unit. A plan of study must be approved by the CSE program director and the student’s home unit coordinator.

## MASTER OF SCIENCE IN MATHEMATICS

The School of Mathematics provides opportunities for study in a wide range of mathematical disciplines. First-year graduate sequences include algebra, analysis, differential equations, geometry, numerical analysis, probability, quantitative finance, statistics, and topology in addition to courses in methods of applied mathematics.

A program of study leading to a master's degree in mathematics consists of 30 credit hours and must include at least twelve hours at the 6000 level or above in mathematics, with courses in at least three different fields of Mathematics, as follows.

1. At least two classes from a concentration in Analysis.
   A. Analysis: MATH 6321, 6337, 6338, 6580, 7334, 7337, 7338. One of these two classes must be MATH 6337 or 6338
2. At least one class in two of the following areas.
   A. Discrete Mathematics and Algebra: MATH 6014, 6121, 6122, 7016, 7018

   B. Geometry and Topology: MATH 6441, 6442, 6455, 6456, 6457, 6458

   C. Differential Equations: MATH 6307, 6308, 6341, 6342

   D. Probability and Mathematical Statistics: MATH 6241, 6242, 7244, 7245, 6262, 6263, 6266, 6267

   E. Numerical Analysis: MATH 6640, 6643, 6644, 6645, 6646

Classes taken to satisfy criteria (1) and (2) must be passed with a grade of *B* or better.

The remaining eighteen hours required may be taken under either a thesis or a non-thesis option. Under the thesis option, the program must include a thesis (up to nine thesis hours) and additional hours of coursework at the 4000 level or higher. Under the non-thesis option, the program must include a total of eighteen hours of coursework at the 6000 level or higher in Mathematics, with a grade of *B* or better, and the remaining twelve hours are free electives. Under either of these options, MATH 6701 and 6702, as well as all courses required by number for the Bachelor of Science in Applied Mathematics or Discrete Mathematics (MATH 3012, 3215, 4107, 4317, 4318, 4320, and 4640), do not carry degree credit for graduate mathematics majors, and may not be used to fulfill these degree requirements.

Students must maintain an overall grade point average of at least 2.7 and receive a grade of *C* or better in each mathematics course in the program of study.

# MASTER OF SCIENCE IN QUANTITATIVE AND COMPUTATIONAL FINANCE

The Master of Science degree program in Quantitative and Computational Finance (M.S.Q.C.F.) is a multidisciplinary program under the provost of the Georgia Institute of Technology, with home units in the College of Management, the School of Mathematics, and the School of Industrial and Systems Engineering.

The main objective of the M.S.Q.C.F. degree program is to provide students with the practical skills and theoretical understanding they need to be leaders in the formulation, implementation, and evaluation of the models used by the financial sector to structure transactions, manage risk, and construct investment strategies.

The M.S.Q.C.F. program is well structured both to cover the fundamentals needed to understand and model a wide variety of problems in finance and to allow specialization to build expertise in specific approaches, techniques, and problem areas. For the fundamentals, the M.S.Q.C.F. program emphasizes both foundational concepts within finance and also the principles and techniques needed for the formulation, implementation, and testing of financial models. The program is not just centered on one type of problem; students develop expertise for a range of career paths that use quantitative and computational reasoning. For their area of specialization, students are encouraged to develop expertise that draws on the strengths present in the many related quantitative, computational, and mathematical areas present at Georgia Tech.

The prerequisites of the M.S.Q.C.F. program include:

- interest in the problems of finance, and a high level of mathematical ability that has been demonstrated within past performance on appropriate coursework and standardized testing;
- mathematical background - a working knowledge of calculus (differential and integral calculus of one variable, multivariate calculus, fundamentals of linear algebra and linear systems of equations, and differential equations) and undergraduate calculus-based probability and statistics;
- basic programming background - basic knowledge of a programming language, such as MatLab programming, Visual Basic, C, or Fortran; and
- Institute and academic unit requirements for admission to graduate study.

## M.S. IN QUANTITATIVE AND COMPUTATIONAL FINANCE CURRICULUM REQUIREMENTS

### REQUIRED CORE COURSES (EIGHTEEN SEMESTER HOURS)

MGT 6078 Finance and Investments
MGT 6081 Derivative Securities
MATH 6635 Numerical Methods in Finance
ISYE/MATH 6759 Stochastic Processes in Finance I
ISYE/MATH 6767 Design and Implementation of Systems to Support Computational Finance
ISYE/MATH/MGT 6769 Fixed Income Securities

### THREE SEMESTER HOURS FROM THE FOLLOWING:

ISYE 6673 Financial Optimization Models
MATH 6235 Stochastic Processes in Finance II
MGT 6090 Management of Financial Institutions

### SIX SEMESTER HOURS FROM THE FOLLOWING:

ISYE/MATH 6783 Statistical Techniques of Financial Data Analysis
ISYE/MATH/MGT 6785 The Practice of Quantitative and Computational Finance
MGT 7061 Empirical Finance

### NINE SEMESTER HOURS OF FREE ELECTIVES AT THE 6000 LEVEL OR HIGHER

### TOTAL SEMESTER HOURS: THIRTY-SIX

For the nine semester hours of free electives at the 6000 level or higher, students choose at least three additional electives from the electives categories or from other courses. Students are encouraged to choose electives to develop expertise within a specific area such as statistical data analysis, economic analysis, finance, risk management/optimization, or model implementation. It is strongly recommended that students who do not have previous coursework in economics take ECON 6100 Economic Analysis for Managers (or its equivalent).

## MASTER OF SCIENCE IN STATISTICS

The School of Mathematics offers the degree of Master of Science in Statistics (M.S.S.) in cooperation with the School of Industrial and Systems Engineering. It is available for applicants having the B.S. in mathematics; students with engineering backgrounds should enter the same program through the School of Industrial and Systems Engineering. Prerequisites include work in probability, statistics, linear algebra, calculus, and optimization. The program requires thirty semester hours of coursework. There is no thesis option.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN ALGORITHMS, COMBINATORICS, OPTIMIZATION

One of the most rapidly growing areas of research in applied mathematics, computer science, and operations research has been dealing with discrete structures. This has been most evident in the fields of combinatorics, discrete optimization, and the analysis of algorithms. Increasingly, work in each of these subjects has come to depend on knowledge of all of them. Indeed, many of the most significant advances have resulted from the efforts of researchers in more than one, if not all three, of these areas.

In response to these developments, Georgia Tech has introduced a doctoral degree program in Algorithms, Combinatorics, and Optimization (ACO). This multidisciplinary program is sponsored jointly by the School of Mathematics, the School of Industrial and Systems Engineering, and the College of Computing. Faculty for the program are drawn from these three sponsoring units, as well as from the School of Electrical and Computer Engineering and the College of Management.

The ACO program is arranged to bring together the study of discrete structures and the design and analysis of algorithms in areas such as graph theory, integer programming, combinatorial optimization, and polyhedral theory. It is intended for students possessing a strong background in one or more of the fields represented by the three sponsoring units. Each student in the program has a single home department chosen from the School of Mathematics, the School of Industrial and Systems Engineering, and the College of Computing. Courses for the program are drawn from all three of these units, and include study in such areas as combinatorial methods, algebraic structures, probability, the analysis of algorithms, computational complexity, linear programming, discrete optimization, and convex analysis.

# DOCTOR OF PHILOSOPHY WITH A MAJOR IN BIOINFORMATICS

## PARTICIPATING SCHOOLS

College of Computing
School of Biology
School of Biomedical Engineering
School of Chemistry and Biochemistry
School of Industrial and Sytems Engineering
School of Mathematics

## OBJECTIVE OF THE PROGRAM

The mission of the Georgia Tech Bioinformatics Ph.D. program is to educate and prepare graduate students to reach the forefront of leadership in the field of bioinformatics and computational biology, and to integrate research and education on the use of information technologies in biology and medicine. Thus, the program leading to a Ph.D. in Bioinformatics is an interdisciplinary program spanning a variety of academic departments at Georgia Tech.

Bioinformatics is a multidisciplinary field in which physical sciences, life sciences, computer science, and engineering are merged to solve both fundamental and applied problems in biology and medicine. The outcomes of bioinformatics and computational biology particularly include:

- new and global perspectives into the organization and function of biological systems (fundamental biology);
- new and novel targets for drug discovery and development; and
- genetic/proteomic profiling for pharmaco-genomics or personalized medicine.

Thus, bioinformatics is emerging as a strategic discipline at the frontier of biology, biochemistry, biomedicine, bioengineering, computer science, and mathematics, impacting fundamental science, medicine, biotechnology, and society.

With its broad mission statement, this program at Georgia Tech has the following strengths and focus areas:

1. Development of software tools, algorithms, and databases for gene identification, protein structural prediction, clustering analysis, and data mining
2. Application of bioinformatics to disease diagnosis, classification, prognosis, and treatment
3. Application of bioinformatics to fundamental biology and systems biology

There is an increasing demand for scientists with advanced training in bioinformatics. Professionals in this area should have a thorough knowledge of molecular biology, mathematics, and statistics, as well as computer science and engineering.

For more information visit www.biology.gatech.edu/bioinformatics/bioinformatics_phd.htm.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN COMPUTATIONAL SCIENCE AND ENGINEERING

Computational Science and Engineering (CSE) is a discipline concerned with the body of knowledge, skills, and practices associated with the study of computer-based models of natural phenomena and engineered systems. Students will be required to obtain a breadth of knowledge across a set of core areas, depth of knowledge in a specific computational specialization (e.g., numerical computing), and knowledge to apply computational techniques in a domain of application. Students will be expected to integrate principles from mathematics, computing, science, and engineering to be able to create significant computational artifacts, e.g., software, and to complete independent research that advances the state-of-the-art in the CSE discipline.

The CSE M.S. degree program is an interdisciplinary program offered by the College of Computing, the College of Engineering, and the College of Sciences. Upon application students select a desired “home unit” among those academic units that formally participate in the program.

Required coursework includes CSE 6001 (Introduction to Computational Science and Engineering), CSE core courses (twelve hours), a computation specialization (nine hours), and an application specialization (nine hours). To complete the core course requirement, students must complete four of the five courses making up the core curriculum: CSE/Math 6643 (Numerical Linear Algebra), CSE 6140 (Computational Science and Engineering Algorithms), CSE 6730 (Modeling and Simulation: Fundamentals & Implementation), CSE/ISYE 6740 (Computational Data Analysis), and CSE 6220 (High Performance Computing). The computational specialization includes at least nine hours of courses that increase the student’s depth of understanding of computational methods in a specific area, as approved by the student’s academic advisor. These courses must go beyond “using computers” to deepen understanding of computational methods, preferably in the context of some application domain. The application specialization includes at least nine hours of courses that increase depth of understanding in an application field; these need not be computation-focused courses. At least nine hours of Ph.D. courses must be courses that do not carry the CS/CSE course designation. These hours may be taken in the home unit. Hours taken as part of the computation and/or application specialization can be used to fulfill this requirement. Additional requirements may apply depending on the student’s home unit.

A qualifying examination must be attempted by the end of the second year of enrollment in the CSE doctoral program (normally taken after the student completes CSE core coursework). A qualifying examination committee shall be appointed by the CSE program coordinator for each student and is responsible for making an overall recommendation concerning the outcome of the qualifying examination.

Students are required to complete a doctoral thesis reporting the results of independent research that advances the state-of-the-art in the computational science and engineering discipline. The dissertation must be successfully defended to the student's dissertation research committee.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN MATHEMATICS

The doctoral program in Mathematics requires fifty-one hours of coursework, with grades of *C* or better, beyond the undergraduate degree. At least thirty-six hours, chosen to the satisfaction of the student's research advisor and the School's Graduate Committee, must be taken at the 6000 level in mathematics, and a further nine hours must be taken outside the School of Mathematics at the 4000 level or higher in the student's minor field of study. The program must also include six additional hours at the 6000 level. Work on a master's thesis (thesis hours) may not be counted toward any of the fifty-one hours specified above, but coursework for the master's degree may be counted. At least six hours of the minor should be completed within three years of the student's admission to the doctoral program.

Prior to admission to candidacy for the doctoral degree, each student must pass the comprehensive examination, which consists of a written examination in real analysis and algebra and an oral examination in the student's proposed area of specialization. Doctoral students must also satisfy the Institute's requirements with respect to the dissertation and final oral examination.

# SCHOOL OF PHYSICS - GENERAL INFORMATION

Established in 1939
Location: Howey Building
Telephone: 404.894.5201
Fax: 404.894.9958
Web site: www.physics.gatech.edu

## GENERAL INFORMATION

Physics is primarily a basic science, and fundamental research into the principles of physics continues to occupy the attention of many physicists. The study of physics also has become increasingly important as a basis for fundamental research in interdisciplinary areas such as biophysics, chemical physics, and materials science, and as an applied science in government and industrial labs. Furthermore, as society becomes more technically oriented, an education in physics can provide an advantageous preprofessional foundation.

The School of Physics offers basic service courses to freshmen and sophomores, some advanced service courses for students in other units of the Institute, and advanced studies leading to the bachelor's, master's, and Ph.D. degrees in physics. The School seeks to provide elective freedom in its degree programs in order to enable students with a wide variety of goals to construct programs of study suitable for them.

In addition to offering courses in the fundamentals of physics, the School provides numerous specialized courses at all levels, particularly in those areas related to the research interests of the faculty. These areas of research currently include: atomic, molecular, and chemical physics; biophysics; computational materials science; nonlinear mechanics and chaos; nuclear and particle physics; optics and laser physics; condensed matter physics; quantum computing; relativity; statistical mechanics; physics instruction; and interdisciplinary areas of biophysics and materials science. Opportunities exist in all these areas and in other areas through collaboration with faculty of other schools and colleges for Special Problems courses, master's theses, and doctoral dissertations.

Supplementary program planning is available from the School of Physics. Opportunities for graduate study and research are also available at www.physics.gatech.edu.

## FACULTY

### Chair and Professor
Mei-Yin Chou

### Associate Chair for Graduate Programs and Professor
Andrew Zangwill

### Associate Chair for Undergraduate Programs and Professor
Edward Conrad

### Callaway Chair and Regents' and Institute Professor
Uzi Landman

### Georgia Research Alliance Eminent Scholar Chair and Professor
Rick Trebino

### Glen Robinson Chair and Professor
Predrag Cvitanovic

### Regents' Professors
M. Ray Flannery, Ronald Fox, Turgay Uzer

### Professors
Jean Bellissard, Michael Chapman, Walt deHeer, Ahmet Erbil, James Gole, T. A. Brian Kennedy, Kurt Wiesenfeld, John Wood, Li You

### Adjunct Professor
Robert Whetten

### Professors Emeriti
Tino Ahrens, Helmut Biritz, David Finkelstein, Ian Gatland, Don Harmer, Donald O'Shea, Eugene Patronis, Edward Thomas, Henry Valk, R. A. Young

### Associate Professors
Dragomir Davidovic, Phillip First, Roman Grigoriev, Carlos Sa de Melo, Michael Schatz

### Cullen-Peck Assistant Professor
Alex Kuzmich

### Assistant Professors
Jennifer Curtis, Daniel Goldman, Markus Kindermann, Alexei Marchenkov, Toan Nguyen, Michael Pustilnik, Chandra Raman, Elisa Riedo

### Senior Research Scientists
Robert Barnett, Eduard Bogachek, Charles Cleveland, Jianping Gao, W. David Luedtke, Constantine Yannouleas

### Research Scientist II
Claire Berger, David Kulp, Bokwon Yoon

### Research Scientist I
Galina Grom

### Senior Academic Professionals
Andrew Scherbakov, James Sowell

### Academic Professionals
Martin Jarrio, Eric Murray

## BACHELOR OF SCIENCE IN PHYSICS

The School of Physics offers two undergraduate degrees, the Bachelor of Science in Physics and the Bachelor of Science in Applied Physics. The basis of the former degree is the traditional preparation of a student for graduate study in physics.

The degree program in applied physics may be better suited for entry into industry or government upon graduation, preparation for further professional training (medicine, law, dentistry, or business), or preparation for graduate study in some other discipline. The applied physics program differs from the traditional one in that a few courses intended primarily as preparation for graduate study in physics are replaced by courses oriented toward the applications of physics.

Each of the baccalaureate programs contains the following: a) courses needed to meet general institutional degree requirements; b) a core of technical courses intended to give a strong background in mathematics and the physical principles of mechanics, electricity and magnetism, thermodynamics, and the quantum theory that governs physical phenomena at the microscopic level of molecules, atoms, and nuclei; c) technical electives that enable the student to explore areas of his or her choice in greater depth; d) courses involving undergraduate research, and e) free electives, about fifteen percent of the total hours, which may be employed to schedule additional technical or nontechnical courses.

The considerable flexibility inherent in the physics curricula is advantageous to students who wish to work out individual programs of study. At the same time, this flexibility suggests the need for consultation with advisors so students can make the best use of elective hours and avoid scheduling difficulties that may arise in later semesters. Students may utilize their elective freedom in the physics curricula to specialize in particular areas of physics, to prepare for careers in interdisciplinary areas of science, to compose a preprofessional program, or to gain a background in other technical or nontechnical disciplines. To assist students in planning programs of study with emphasis directed toward a particular objective, the School has formulated suggestions for the use of elective hours. Supplementary materials, available from the School office, include suggestions relevant to the following areas of study: preparation for graduate study in physics; acoustics; applied optics; atomic, molecular, and chemical physics; biophysics; computational physics; nonlinear dynamics and chaos; solid state physics; and preparation for teaching secondary education. Attention is also directed to the possibility of using elective hours for undergraduate research (PHYS 2699 or 4699) conducted under the supervision of a faculty member.

Since some students who earn a degree in physics have transferred from other disciplines, the School has planned its degree programs to enable most students to transfer into physics with little or no loss of credit.

A total of 120 credit hours (exclusive of wellness) and a grade point average of at least 2.0 in physics courses numbered 3000 and higher are requisites for the bachelor's degree in physics.

# BACHELOR OF SCIENCE IN PHYSICS
## 2008 - 2009 DEGREE REQUIREMENTS
## SCHOOL OF PHYSICS
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| CHEM 1310 GENERAL CHEMISTRY | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| **TOTAL SEMESTER HOURS =** | **14** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1301 INTRODUCTION TO COMPUTING | 3 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| MATH 2401 CALCULUS III | 4 |
| PHYS 2212 INTRODUCTORY PHYSICS II | 4 |
| SOCIAL SCIENCE ELECTIVES | 6 |
| HUMANITIES ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| MATH 2403 DIFFERENTIAL EQUATIONS | 4 |
| PHYS 2213 INTRODUCTION TO MODERN PHYSICS | 3 |
| PHYS 3201 CLASSICAL MECHANICS I | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| PHYS 3143 QUANTUM MECHANICS I | 3 |
| PHYS 3122 ELECTROSTATICS & MAGNETOSTATICS | 3 |
| PHYSICS or TECHNICAL ELECTIVES | 6 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| PHYS 3141 THERMODYNAMICS | 3 |
| PHYS 3123 ELECTRODYNAMICS | 3 |
| PHYSICS or TECHNICAL ELECTIVE | 3 |
| FREE ELECTIVES | 6 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| PHYS 4321 ADVANCED LAB I | 3 |
| PHYS 4142 STATISTICAL MECHANICS | 3 |
| PHYSICS or TECHNICAL ELECTIVE | 3 |
| PHYS 4601 SENIOR SEMINAR I | 1 |
| FREE ELECTIVES | 5 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-SPRING | HRS |
|---|---|
| PHYS 4143 QUANTUM MECHANICS II | 3 |
| PHYS 4602 SENIOR SEMINAR II | 1 |

| | |
|---|---|
| PHYSICS or TECHNICAL ELECTIVES | 5 |
| FREE ELECTIVES | 5 |
| **TOTAL SEMESTER HOURS =** | **14** |

**TOTAL PROGRAM HOURS = 120 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

## WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

## PHYSICS AND TECHNICAL ELECTIVES

These include physics courses and selected courses in other disciplines. At most, six hours may be below the 3000 level. These must include at least one lab-based physics course (other than PHYS 4321) at the 3000 level or above.

## HUMANITIES/SOCIAL SCIENCES ELECTIVES

ENGL 1101 and 1102 apply toward satisfaction of the twelve-hour humanities requirement. An additional six hours of Institute-approved humanities courses are required to fulfill the twelve-hour humanities requirement. To satisfy the state requirements regarding coursework in the history and constitutions of the United States and Georgia, students must complete one of the following courses: HIST 2111, HIST 2112, POL 1101, PUBP 3000, or INTA 1200. One of these courses, combined with an additional nine hours of Institute-approved social science courses, satisfies the twelve-hour social sciences requirement.

## PHYSICS

Students who have demonstrated competence in mathematics are encouraged to substitute the honors sequence, PHYS 2231-2, for PHYS 2211-2.

## BUSINESS OPTION

Students pursuing a B.S. in Physics or Applied Physics as a terminal degree may find the Business Option advantageous. This option uses six hours of social science credits for PSYC 2220 and ECON 2106 and nine hours of free electives for MGT 3000, MGT 3300, and MGT 3150. Students using another three hours of free electives, may replace MGT 3150 with a combination of MGT 3062 and either MGT 3076, MGT 4191, or MGT 4670.

## RESEARCH OPTION

The Research Option is intended for students who seek a concentrated research experience, culminating in an undergraduate thesis, integrated into their undergraduate studies in Physics. The purpose of this program is to prepare students who plan to go on to graduate research after their BS degree. This option includes three or four semesters of focused research in the student's junior and senior years. Students who complete this option receive a designation on their transcript. For an undergraduate to fulfill the Research Option in the School of Physics, the student must fulfill the following requirements:

1. Complete 9 credit hours of Undergraduate research PHYS 4698 or PHYS 4699. At least 3 credits must be PHYS 4699.
2. Complete LCC 4700 "Writing an Undergraduate Thesis".
3. Write and submit an undergraduate research thesis to the School of Physics based on the student's research that is approved by the student's research advisor.

Course requirements are detailed in brochures available from the School of Physics. For specific questions, students should contact the Associate Chair for Undergraduate Studies in the School of Physics.

## BACHELOR OF SCIENCE IN APPLIED PHYSICS

The School of Physics offers two undergraduate degrees, the Bachelor of Science in Physics and the Bachelor of Science in Applied Physics. The basis of the former degree is the traditional preparation of a student for graduate study in physics.

The degree program in applied physics may be better suited for entry into industry or government upon graduation, preparation for further professional training (medicine, law, dentistry, or business), or preparation for graduate study in some other discipline. The applied physics program differs from the traditional one in that a few courses intended primarily as preparation for graduate study in physics are replaced by courses oriented toward the applications of physics.

Each of the baccalaureate programs contains the following: a) courses needed to meet general institutional degree requirements; b) a core of technical courses intended to give a strong background in mathematics and the physical principles of mechanics, electricity and magnetism, thermodynamics, and the quantum theory that governs physical phenomena at the microscopic level of molecules, atoms, and nuclei; c) technical electives that enable the student to explore areas of his or her choice in greater depth; d) courses involving undergraduate research, and e) free electives, about fifteen percent of the total hours, which may be employed to schedule additional technical or nontechnical courses.

The considerable flexibility inherent in the physics curricula is advantageous to students who wish to work out individual programs of study. At the same time, this flexibility suggests the need for consultation with advisors so students can make the best use of elective hours and avoid scheduling difficulties that may arise in later semesters. Students may utilize their elective freedom in the physics curricula to specialize in particular areas of physics, to prepare for careers in interdisciplinary areas of science, to compose a preprofessional program, or to gain a background in other technical or nontechnical disciplines. To assist students in planning programs of study with emphasis directed toward a particular objective, the School has formulated suggestions for the use of elective hours. Supplementary materials, available from the School office, include suggestions relevant to the following areas of study: preparation for graduate study in physics; acoustics; applied optics; atomic, molecular, and chemical physics; biophysics; computational physics; nonlinear dynamics and chaos; solid state physics; and preparation for teaching secondary education. Attention is also directed to the possibility of using elective hours for undergraduate research (PHYS 2699 or 4699) conducted under the supervision of a faculty member.

Since some students who earn a degree in physics have transferred from other disciplines, the School has planned its degree programs to enable most students to transfer into physics with little or no loss of credit.

A total of 120 credit hours (exclusive of wellness) and a grade point average of at least 2.0 in physics courses numbered 3000 and higher are requisites for the bachelor's degree in physics.

# BACHELOR OF SCIENCE IN APPLIED PHYSICS
## 2008 - 2009 DEGREE REQUIREMENTS
## SCHOOL OF PHYSICS
Suggested Schedule

| FIRST YEAR-FALL | HRS |
|---|---|
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| MATH 1501 CALCULUS I | 4 |
| CHEM 1310 GENERAL CHEMISTRY | 4 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| **TOTAL SEMESTER HOURS =** | **14** |

| FIRST YEAR-SPRING | HRS |
|---|---|
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| MATH 1502 CALCULUS II | 4 |
| PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| CS 1301 INTRODUCTION TO COMPUTING | 3 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
|---|---|
| MATH 2401 CALCULUS III | 4 |
| PHYS 2212 INTRODUCTORY PHYSICS II | 4 |
| SOCIAL SCIENCE ELECTIVES | 6 |
| HUMANITIES ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
|---|---|
| MATH 2403 DIFFERENTIAL EQUATIONS | 4 |
| PHYS 2213 INTRODUCTION TO MODERN PHYSICS | 3 |
| PHYS 3201 CLASSICAL MECHANICS I | 3 |
| SOCIAL SCIENCE ELECTIVE | 3 |
| HUMANITIES ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| THIRD YEAR-FALL | HRS |
|---|---|
| PHYS 3143 QUANTUM MECH I | 3 |
| PHYS 3122 ELECTROSTATICS & MAGNETOSTATICS | 3 |
| PHYSICS or TECHNICAL ELECTIVE | 3 |
| FREE ELECTIVES | 5 |
| **TOTAL SEMESTER HOURS =** | **14** |

| THIRD YEAR-SPRING | HRS |
|---|---|
| PHYS 3141 THERMODYNAMICS | 3 |
| PHYS 3123 ELECTRODYNAMICS | 3 |
| PHYSICS or TECHNICAL ELECTIVE | 3 |
| PHYS 3266 COMPUTATIONAL PHYSICS | 4 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **16** |

| FOURTH YEAR-FALL | HRS |
|---|---|
| PHYS 4321 ADVANCED LAB I | 3 |
| PHYS 3211 ELECTRONICS I | 5 |
| PHYS 4601 SENIOR SEMINAR I | 1 |
| PHYSICS or TECHNICAL ELECTIVE | 3 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-SPRING | HRS |
|---|---|
| PHYS 4206 ELECTRONICS II | 5 |

| | |
|---|---|
| PHYSICS or TECHNICAL ELECTIVES | 5 |
| PHYS 4602 SENIOR SEMINAR II | 1 |
| FREE ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **14** |

**TOTAL PROGRAM HOURS = 120 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

## WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

## PHYSICS AND TECHNICAL ELECTIVES

These include physics courses and selected courses in other disciplines. At most, six hours may be below the 3000 level. These must include at least one lab-based physics course (other than PHYS 4321) at the 3000 level or above.

## HUMANITIES/SOCIAL SCIENCES ELECTIVES

ENGL 1101 and 1102 apply toward satisfaction of the twelve-hour humanities requirement. An additional six hours of Institute-approved humanities courses are required to fulfill the twelve-hour humanities requirement. To satisfy the state requirements regarding coursework in the history and constitutions of the United States and Georgia, students must complete one of the following courses: HIST 2111, HIST 2112, POL 1101, PUBP 3000, or INTA 1200. One of these courses, combined with an additional nine hours of Institute-approved social science courses, satisfies the twelve-hour social sciences requirement.

## PHYSICS

Students who have demonstrated competence in mathematics are encouraged to substitute the honors sequence, PHYS 2231-2, for PHYS 2211-2.

## BUSINESS OPTION

Students pursuing a B.S. in Physics or Applied Physics as a terminal degree may find the Business Option advantageous. This option uses six hours of social science credits for PSYC 2220 and ECON 2106 and nine hours of free electives for MGT 3000, MGT 3300, and MGT 3150. Students using another three hours of free electives, may replace MGT 3150 with a combination of MGT 3062 and either MGT 3076, MGT 4191, or MGT 4670.

## MASTER OF SCIENCE IN PHYSICS

The Master of Science in Physics degree requires thirty hours of physics course credit. These hours must include six hours of 8000 level Special Problems or Master's Practicum research (with a physics faculty member) and the following six graduate physics courses:

- PHYS 6101 Classical Mechanics I (3)
- PHYS 6103 Electromagnetism I (3)
- PHYS 6104 Electromagnetism II (3)
- PHYS 6105 Quantum Mechanics I (3)
- PHYS 6106 Quantum Mechanics II (3)
- PHYS 6107 Statistical Mechanics (3)

The remaining six credit hours may be earned from either: a) physics lecture courses at the 4000 level or higher; or b) graduate courses at the 6000 level or higher from a school other than physics.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN PHYSICS

The Ph.D. degree in physics requires:

1. admission to candidacy;
2. a program of study in core and advanced physics courses;
3. a minor course of study; and
4. successful defense of the Ph.D. thesis.

Students are admitted to candidacy when they have

1. passed the Comprehensive Exam:
2. selected a Thesis Reading Committee; and
3. submitted a thesis proposal to the graduate coordinator.

To ensure adequate preparation for the Comprehensive Exam, the School strongly recommends that the first year of graduate study be devoted to coursework as follows:

### First Semester

- PHYS 6101 Classical Mechanics I (3)
- PHYS 6103 Electromagnetism I (3)
- PHYS 6105 Quantum Mechanics I (3)
- PHYS 6124 Mathematical Methods of Physics I (3)

### Second Semester

- PHYS 6107 Statistical Mechanics I (3)
- PHYS 6104 Electromagnetism II (3)
- PHYS 6106 Quantum Mechanics II (3)
- PHYS 8901 Special Problems (3)

The School requires every doctoral student to take two lecture-type graduate physics courses not including those previously listed. In some cases, these may be used to satisfy the Institute requirement that every doctoral student earn nine credit hours in a minor course of study in a scientific subfield different from the subfield of his or her Ph.D. thesis research. Alternatively, these credit hours are earned in a school other than physics. Finally, each student must prepare a written dissertation that summarizes the Ph.D. research and present a public, oral defense of the dissertation to a Thesis Exam Committee.

# SCHOOL OF PSYCHOLOGY

Established in 1959
Location: J.S. Coon Building
Telephone: 404.894.2680 or 404.894.2683
Fax: 404.894.8905
Web site: www.psychology.gatech.edu

## GENERAL INFORMATION

The School of Psychology offers programs of study leading to the Bachelor of Science in Psychology and the Master of Science and Doctor of Philosophy in Psychology. It also offers training in the basic and applied aspects of the science of behavior for the student majoring in architecture, engineering, management, and natural sciences. The undergraduate curriculum provides a broad-based natural science approach to the study of psychology. Courses in mathematics, biology, and chemistry, for instance, complement the psychology courses. The curriculum also stresses methodological issues so that students learn the fundamentals for carrying out solid research.

## FACULTY

### Chair and Professor

Randall Engle

### Associate Chair and Associate Professor

Gregory M. Corso

### Professor Emeritus

Edward H. Loveland, M. Jackson Marr, Stanley A. Mulaik, M. Carr Payne Jr.

### Regents' Professor

Anderson D. Smith

### Professors

Phillip L. Ackerman, Fredda Blanchard-Fields, Richard Catrambone, Susan Embretson, Jack M. Feldman, Arthur D. Fisk, Christopher K. Hertzog, Larry James, Ruth Kanfer, Terry L. Maple, Wendy Rogers

### Associate Professors

Paul Corballis, Elizabeth T. Davis, Zenzi Griffin, Daniel Spieler,
Paul Verhaeghen, Bruce Walker

### Assistant Professors

Audrey Duarte, Eric Schumacher

### Instructors

Dianne Leader

### Adjunct Professors

Dorritt Billman, Mollie Bloomsmith, Kristin Boyle, Theodore J. Doll, Debra L. Forthman, Leonard W. Poon, Tara Stoinski

## BACHELOR OF SCIENCE IN PSYCHOLOGY

The curriculum is technically oriented and stresses quantitative and experimental approaches to the study of behavior. The undergraduate curriculum is based on a strong emphasis in the sciences and mathematics and provides an excellent preparation for graduate school in psychology, medical school, law school, and other professional and academic graduate programs. In addition, many students with the B.S. degree in psychology choose to enter a variety of fields, including computer software design, human resources, marketing, human factors, system design, personnel selection and training, and management.

# BACHELOR OF SCIENCE IN PSYCHOLOGY
## 2008 - 2009 DEGREE REQUIREMENTS
### SCHOOL OF PSYCHOLOGY
Suggested Schedule

| FIRST YEAR-FALL | HRS |
| --- | --- |
| ENGL 1101 ENGLISH COMPOSITION I | 3 |
| BIO 1510 BIOLOGICAL PRINCIPLES | 4 |
| MATH 1501 CALCULUS I | 4 |
| PSYC 1101 GENERAL PSYCHOLOGY | 3 |
| HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200 | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| FIRST YEAR-SPRING | HRS |
| --- | --- |
| ENGL 1102 ENGLISH COMPOSITION II | 3 |
| BIO 1520 INTRODUCTION TO ORGANISMAL BIOLOGY | 4 |
| MATH 1502 CALCULUS II | 4 |
| PSYC 2210 SOCIAL PSYCHOLOGY | 3 |
| WELLNESS | 2 |
| **TOTAL SEMESTER HOURS =** | **16** |

| SECOND YEAR-FALL | HRS |
| --- | --- |
| CHEM 1310 GENERAL CHEMISTRY or PHYS 2211 INTRODUCTORY PHYSICS I | 4 |
| ISYE 2027 PROBABILITY WITH APPLICATIONS | 3 |
| HUMANITIES ELECTIVE | 3 |
| PSYC 2015 RESEARCH METHODS | 4 |
| PSYC 2103 HUMAN DEVELOPMENT | 3 |
| **TOTAL SEMESTER HOURS =** | **17** |

| SECOND YEAR-SPRING | HRS |
| --- | --- |
| (CHEM 1311 AND CHEM 1312 ) or<br>PHYS 2211 or PHYS 2212 | 4 |
| PSYCHOLOGY ELECTIVE | 3 |
| PSYC 2020 PSYCHOLOGICAL STATISTICS | 4 |
| HUMANITIES ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **14** |

| THIRD YEAR-FALL | HRS |
| --- | --- |
| CS 1301 INTRODUCTION TO COMPUTING | 3 |
| PSYC 3011 COGNITIVE PSYCHOLOGY | 4 |
| PSYC 3020 BIOPSYCHOLOGY | 3 |
| FREE ELECTIVES | 5 |
| **TOTAL SEMESTER HOURS =** | **15** |

| THIRD YEAR-SPRING | HRS |
| --- | --- |
| PSYC 3031 EXPERIMENTAL ANALYSIS OF BEHAVIOR | 4 |
| PSYC 3041 HUMAN SENSATION AND PERCEPTION | 4 |
| PSYCHOLOGY ELECTIVE | 3 |
| SOCIAL SCIENCE ELECTIVE | 2 |
| FREE ELECTIVE | 2 |
| **TOTAL SEMESTER HOURS =** | **15** |

*** NON THESIS OPTION ***

| FOURTH YEAR-FALL | HRS |
| --- | --- |
| FREE ELECTIVES | 9 |
| PSYC ELECTIVES | 6 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-SPRING | HRS |
| --- | --- |

| | |
|---|---|
| PSYC 4031 APPLIED EXPERIMENTAL PSYCHOLOGY | 4 |
| FREE ELECTIVES | 9 |
| **TOTAL SEMESTER HOURS =** | **13** |

***THESIS OPTION ***

| FOURTH YEAR-FALL | HRS |
|---|---|
| PSYC 4600 SENIOR THESIS I | 3 |
| FREE ELECTIVES | 9 |
| PSYC ELECTIVE | 3 |
| **TOTAL SEMESTER HOURS =** | **15** |

| FOURTH YEAR-SPRING | HRS |
|---|---|
| PSYC 4601 SENIOR THESIS II | 4 |
| FREE ELECTIVES | 9 |
| **TOTAL SEMESTER HOURS =** | **13** |

**TOTAL PROGRAM HOURS = 120 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

## ELECTIVES

### WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

### HUMANITIES/FINE ARTS

Twelve hours, ENGL 1101 and 1102, apply toward satisfaction of the twelve-hour humanities requirement. An additional six hours of Institute-approved humanities courses are required to fulfill the twelve-hour humanities requirement.

### SOCIAL SCIENCE

Twelve hours, including three hours of Constitution and History; PSYC 1101 and PSYC 2015 count toward the twelve hours.

### SCIENCE / MATHEMATICS

- Chemistry/Physics (eight hours): either one year of chemistry (1310, 1311, 1312) or one year of physics (2211, 2212) or one semester of each
- Biology (eight hours): BIOL 1510, 1520
- Computer Science (three hours): CS 1301 or CS 1371
- Mathematics (eleven hours): one year of calculus (1501, 1502) and ISYE 2027.

### PRELIMINARY COURSES

- PSYC 1101 General Psychology (3-0-3)
- PSYC 2015 Research Methods in Psychology (with lab) (3-3-4)
- PSYC 2020 Psychological Statistics (with lab) (3-3-4)

### REQUIRED COURSES

- PSYC 2103 Human Development (3-0-3)
- PSYC 2210 Social Psychology (3-0-3)
- PSYC 3011 Cognitive Psychology (with lab) (3-3-4)
- PSYC 3020 Biopsychology (3-0-3)
- PSYC 3031 Experimental Analysis of Behavior (with lab) (3-3-4)
- PSYC 3041 Sensation and Perception (3-3-4)

### REQUIRED CAPSTONE COURSE

- PSYC 4031 Applied Experimental Psychology (with lab) (3-3-4) or
- PSYC 4601 Senior Thesis II (1-9-4)

### ELECTIVE COURSES (AT LEAST FOUR MUST BE TAKEN)

- PSYC 2220 Industrial/Organizational Psychology (3-0-3)
- PSYC 2230 Abnormal Psychology (3-0-3)
- PSYC 2240 Personality Theory (3-0-3)
- PSYC 2270 Engineering Psychology (3-0-3)
- PSYC 3060 Comparative Psychology (3-0-3)
- PSYC 3790 Introduction to Cognitive Science (3-0-3) (cross isted with CS and ISYE)
- PSYC 4010 Human Abilities (3-0-3)
- PSYC 4050 History and Systems (3-0-3)
- PSYC 4090 Cognitive Neuroscience (3-0-3)
- PSYC 4100 Behavioral Pharmacology (3-0-3)

- PSYC 4200 Advanced Topics in Cognitive Psychology (3-0-3)
- PSYC 4260 Psychology of Aging (3-0-3)
- PSYC 4270 Psychological Testing (3-0-3)
- PSYC 4310 Field Studies in Animal Behavior I (1-6-3)
- PSYC 4320 Field Studies in Animal Behavior II (1-6-3)
- PSYC 4600 Senior Thesis I
- PSYC 4770 Psychology and Environmental Design (2-3-3)
- PSYC 4801-4 Special Topics (3-0-3) (permission of instructor and junior/senior standing) (Only a total of three hours may be applied toward the psychology elective.)
- PSYC 4900-10 Special Problems (credit hours arranged) (permission of instructor and junior/senior standing)

Only a total of three hours may be applied toward the psychology elective.

### OTHER PSYCHOLOGY CLASSES THAT MAY BE OFFERED BUT WILL NOT SATISFY THE MAJOR REQUIREMENTS (I.E., THEY CAN BE FREE ELECTIVES ONLY)

- PSYC 2300 Psychology of Advertising (3-0-3)
- PSYC 2901-2903 Special Problems (arranged hours) [permission of instructor]
- PSYC 2400 Psychology and Contemporary Issues in Society (3-0-3)
- PSYC 3750 Human-Computer Interface Design & Evaluation (cross listed with CS) (3-0-3)
- PSYC 4790 Seminar in Cognitive Science (with lab) (cross listed with CS and ISYE) (3-0-3)
- PSYC 4791 Integrative Project in Cognitive Science (3-0-3)
- PSYC 4792 Design Project in Cognitive Science (3-0-3)

### PREMEDICAL PREPARATION

Premedical students must take chemistry (CHEM 1310, 1311) and physics (PHYS 2211, 2212). In addition, premedical students must take either CHEM 1312 (Inorganic Laboratory) or 1313 (Introduction to Quantitative Methods) and CHEM 2311 (Organic I), 2312 (Organic II), and 2380 (Synthesis Laboratory I).

### BUSINESS/MANAGEMENT OPTION

For a psychology major to complete the Business/Management Option, he or she must take the following courses:

#### Required

- ECON 2106 Principles of Microeconomics (3)
- MGT 3000 Accounting for Decision Making (3)
- MGT 3300 Marketing Management I (3)
- PSYC 2220 Industrial/Organizational Psychology (3)

#### Electives (One course from list below must be taken)

- MGT 3150 Principles of Management (3)
- MGT 3310 Marketing Research: Qualitative Aspects
- MGT 4191 The Entrepreneurship Forum (3)
- MGT 4331 Consumer Behavior

# BACHELOR OF SCIENCE IN PSYCHOLOGY (BUSINESS OPTION)

The curriculum is technically oriented and stresses quantitative and experimental approaches to the study of behavior. The undergraduate curriculum is based on a strong emphasis in the sciences and mathematics and provides an excellent preparation for graduate school in psychology, medical school, law school, and other professional and academic graduate programs. In addition, many students with the B.S. degree in psychology choose to enter a variety of fields including computer software design, human resources, marketing, human factors, system design, personnel selection and training, and management.

## BUSINESS/MANAGEMENT OPTION

For a psychology major to complete the Business/Management option, he or she must take the following courses:

### Required

- ECON 2106 Principles of Microeconomics (3)
- MGT 3000 Accounting for Decision Making (3)
- MGT 3300 Marketing Management I (3)
- PSYC 2220 Industrial/Organizational Psychology (3)

### Electives (One course from list below must be taken)

- MGT 3150 Principles of Management (3)
- MGT 3310 Marketing Research: Qualitative Aspects
- MGT 4191 The Entrepreneurship Forum (3)
- MGT 4331 Consumer Behavior

## BACHELOR OF SCIENCE IN PSYCHOLOGY - INTERNATIONAL PLAN

Psychology's International Plan follows the Institute model to develop a global competence within the student's major program of study. It thus integrates the student's international studies and experiences with the School's quantitative and experimental approaches to the study of behavior.

In addition to the requirements for the B.S. in Psychology, students must complete the following:

1. take three international courses, including one from each of the following categories: international relations, global economics, and a course on a specific country or region;
2. spend two consecutive terms abroad engaged in fulfilling psychology electives (must be approved by the School of Psychology prior to enrolling in courses), free electives, humanities, and/or social science electives;
3. demonstrate language proficiency equivalent to two years of college-level language study (to be determined by testing); and,
4. incorporate the international experience within the capstone course or the senior thesis.

## BACHELOR OF SCIENCE IN PSYCHOLOGY - RESEARCH OPTION

The curriculum is technically oriented and stresses quantitative and experimental approaches to the study of behavior. The undergraduate curriculum is based on a strong emphasis in the sciences and mathematics and provides an excellent preparation for graduate school in psychology, medical school, law school, and other professional and academic graduate programs. The Research Plan in the School of Psychology provides additional research experience for those students seeking to continue their education in graduate school.

## MINOR IN PSYCHOLOGY

A student may earn a minor in psychology by completing the following requirements.

### FOUNDATION COURSES:

PSYC 2015 - Research Methods (four hours)
PSYC 2020 - Psychological Statistics (requires ISYE 2027 or equivalent as a prerequisite) (four hours)

### ADVANCED COURSES:

Twelve semester hours of psychology courses at or above the 3000 level with the following restrictions:

#### Courses excluded:

Psyc 3031 - Experimental Analysis of Behavior
Psyc 4031 - Applied Experimental Psychology

#### Additional regulations (as stipulated by the Office of the Registrar):

- No more than four semester hours of Special Topics courses may be used in a minor program.
- Special Problem courses may not be used.
- All courses must be completed at Georgia Tech.
- All courses must be taken on a letter grade basis and must be completed with an overall GPA of 2.0.

Total twenty credit hours.

# CERTIFICATES

The School of Psychology offers a number of certificate programs that provide similar opportunities for students to develop their expertise or acquire skills or information in specific areas in addition to their major area.

## CERTIFICATES IN PSYCHOLOGY

- Certificate in Biopsychology
- Certificate in Cognitive Psychology
- Certificate in Engineering Psychology
- Certificate in Experimental Psychology
- Certificate in Industrial/Organizational Psychology
- Certificate in Social/Personality Psychology

## GRADUATE INFORMATION

Doctoral candidates take a core curriculum in general psychology and quantitative methods. Doctoral candidates will complete all requirements for the master's degree, which includes writing a research thesis.

The doctoral program provides the student with an opportunity for advanced study in engineering, experimental (focus areas in cognitive science, cognitive aging, and animal behavior), industrial-organizational, or quantitative psychology. Each of these curricula consists of additional courses and programs of individual study and research beyond the core curriculum, which contribute to a strong background in general experimental psychology and the student's area of specialization. The doctoral program will ordinarily require at least four years for students who enter immediately after obtaining a bachelor's degree.

Admission to graduate study in psychology with full graduate standing in the School of Psychology requires the equivalent of an undergraduate major in psychology or a related field with courses in general and experimental psychology, as well as psychological statistics. All applicants should submit scores from the Graduate Record Examination.

The psychology faculty will consider admissions applications from competent students who have majored in subjects other than psychology.

## MASTER OF SCIENCE IN HUMAN - COMPUTER INTERACTION

The Master of Science in Human-Computer Interaction (M.S.H.C.I.) at Georgia Tech is an interdisciplinary, collaborative effort of the College of Computing, the School of Psychology, and the School of Literature, Communication, and Culture, and is coordinated through the Graphics, Visualization, and Usability (GVU) Center. The program provides students with the practical, interdisciplinary skills and theoretical understanding they will need to become leaders in the design, implementation, and evaluation of the computer interfaces of the future.

Students may apply to enter the program through any one of the three participating units, the choice of which usually reflects that student's intended area of specialization. All M.S.H.C.I. students take a common set of core courses, plus a set of additional courses that relate more to that student's area and particular needs.

Full details of the M.S.H.C.I. program are listed in the College of Computing section and on the GVU Center Web site. Note that all applications for admission to the program are collected by the GVU Center and forwarded to the relevant department for evaluation.

## MASTER OF SCIENCE IN PSYCHOLOGY

The School of Psychology does not accept students seeking a terminal master's degree. The master's degree coursework prepares the student for continuation of graduate work toward a Ph.D. Most students require two to three calendar years to complete the master's degree.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN PSYCHOLOGY - ENGINEERING PSYCHOLOGY

The Engineering Psychology Ph.D. program focuses on understanding the capabilities and limitations of human performance from the perspective of perception, cognition, and movement control and applying this knowledge to the design of systems and environments that accommodate those capabilities and limitations.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN PSYCHOLOGY - EXPERIMENTAL PSYCHOLOGY

The Experimental Psychology Ph.D. program at Georgia Tech is the scientific study of the basic processes of behavior, with a quantitative emphasis. Faculty in the experimental psychology area perform research in a wide range of topics. Specific subareas are animal/behavioral psychology, cognitive aging, and cognitive psychology.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN PSYCHOLOGY - INDUSTRIAL/ORGANIZATIONAL PSYC

The Industrial/Organizational Psychology (I/O) Ph.D. program concentrates on research related to the psychology of work and the workplace. Students develop specialized I/O knowledge, skills, and experiences through an individually tailored program of seminars, elective courses, participation in laboratory- and field-based research projects, and training in local organizations.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN PSYCHOLOGY - QUANTITATIVE PSYCHOLOGY

The Quantitative Psychology Program emphasizes the interface between quantitative methods and psychological issues. Graduates will be trained as quantitative specialists, with a substantial background in psychology. The exact focus of the student's studies depends on the current interests of the faculty and the student. Current faculty interests and course offerings include psychometric methods, item response theory, structural equation modeling, multivariate statistics, factor analysis, and multilevel modeling, as well as many other topics in psychological methods and statistics.

## UNIVERSITY SYSTEM OF GEORGIA CORE REQUIREMENTS

The following is a description of core requirements effective as of Georgia Tech's first semester term Fall 1999. The courses that can be used to satisfy the various area requirements are subject to change, and will be updated as soon as possible. Please check back regularly to obtain the most current information.

Courses completed at the 3000-4000 level may not satisfy the Core Curriculum Area C and Area E requirements for students transferring to other units of the University System of Georgia.

Any courses completed that were listed in prior catalogs as satisfying the humanities/social science requirement and were completed while that catalog was in effect may also be used to satisfy this requirement.

## CORE AREA A - ESSENTIAL SKILLS (TEN SEMESTER HOURS)

Area A is satisfied by completion of 10 semester hours as follows.

**Required for all majors:**

| Course | Class Title | Credit Hours |
|---|---|---|
| ENGL 1101 | English Composition I | 3 semester hours |
| ENGL 1102 | English Composition II | 3 semester hours |

**Required of all students majoring in the College of Architecture, Computing, Engineering, and Sciences:**

| Course | Class Title | Credit Hours |
|---|---|---|
| MATH 1501 | Calculus I | 4 semester hours |

**Required of all other majors. Select one of the following:**

| Course | Class Title | Credit Hours |
|---|---|---|
| MATH 1712 | Survey of Calculus | 4 semester hours |
| MATH 1501 | Calculus I | 4 semester hours |

## CORE AREA B - INSTITUTIONAL OPTIONS (4 SEMESTER HOURS)

Area B is satisfied by students completing the following:

Electives approved by the program plus one hour from Area A.

## CORE AREA C - HUMANITIES (SIX SEMESTER HOURS)

- The humanities requirement (Core Area C) is satisfied by completion of six semester hours from the list below.
- Humanities credit awarded for Modern Languages 1001 classes upon successful completion of the corresponding 1002 classes. Humanities credit is awarded for SPAN 1101 only upon the successful completion of SPAN 1102.
- Undergraduate Research courses numbered 2698, 2699, 4698, and 4699 cannot be used to fulfill requirements for humanities or social science requirements.
- Additional Music Core Area C Information

| | | | | |
|---|---|---|---|---|
| ARBC 1002 | FREN 3012 | JAPN 3061 | LCC 3228 | PST 4803 |
| ARBC 1813 | FREN 3030 | JAPN 3062 | LCC 3234 | PST 4811 |
| ARBC 1814 | FREN 3061 | JAPN 3691 | LCC 3252 | PST 4812 |
| ARBC 2001 | FREN 3062 | JAPN 3692 | LCC 3254 | PST 4813 |
| ARBC 2002 | FREN 3121 | JAPN 3693 | LCC 3256 | PST 4814 |
| ARBC 2813 | FREN 3691 | JAPN 3813 | LCC 3262 | PST 4815 |
| ARBC 3813 | FREN 3692 | JAPN 3XXX | LCC 3302 | RUSS 1002 |
| ARBC 4813 | FREN 3693 | JAPN 4113 | LCC 3304 | RUSS 1813 |
| ARCH 2111 | FREN 3694 | JAPN 4123 | LCC 3306 | RUSS 1814 |
| ARCH 2112 | FREN 3813 | JAPN 4133 | LCC 3308 | RUSS 2001 |
| ARCH 2115 | FREN 3XXX | JAPN 4163 | LCC 3310 | RUSS 2002 |
| ARCH 4109 | FREN 4001 | JAPN 4743 | LCC 3314 | RUSS 2813 |
| ARCH 4110 | FREN 4061 | JAPN 4750 | LCC 3316 | RUSS 2XXX |
| ARCH 4113 | FREN 4062 | JAPN 4813 | LCC 3318 | RUSS 3001 |
| ARCH 4114 | FREN 4101 | JAPN 4XXX | LCC 3352 | RUSS 3002 |
| ARCH 4117 | FREN 4102 | KOR 1002 | LCC 3362 | RUSS 3222 |
| ARCH 4118 | FREN 4241 | KOR 1813 | LCC 3823 | RUSS 3691 |
| ARCH 4119 | FREN 4242 | KOR 1814 | LCC 3833 | RUSS 3692 |
| ARCH 4120 | FREN 4813 | KOR 2001 | LCC 3843 | RUSS 3698 |
| ARCH 4124 | FREN 4XXX | KOR 2002 | LCC 3853 | RUSS 3803 |
| ARCH 4128 | GRMN 1002 | KOR 2813 | LCC 3863 | RUSS 3813 |
| ARCH 4151 | GRMN 1813 | KOR 2XXX | LCC 4204 | RUSS 3823 |
| ARCH 4305 | GRMN 2001 | KOR 3813 | LCC 4811 | RUSS 3XXX |
| CHIN 1002 | GRMN 2002 | KOR 3XXX | LCC 4812 | RUSS 4813 |
| CHIN 1012 | GRMN 2813 | KOR 4813 | LCC 4813 | RUSS 4XXX |
| CHIN 1813 | GRMN 2XXX | KOR 4XXX | LCC 4814 | SPAN 1002 |
| CHIN 1814 | GRMN 3010 | LATN 2XXX | LCC 4815 | SPAN 1102 |
| CHIN 2001 | GRMN 3011 | LCC 2100 | LING 1813 | SPAN 1813 |
| CHIN 2002 | GRMN 3024 | LCC 2102 | LING 1XXX | SPAN 2001 |
| CHIN 2011 | GRMN 3025 | LCC 2104 | LING 2001 | SPAN 2002 |
| CHIN 2012 | GRMN 3034 | LCC 2106 | LING 2002 | SPAN 2813 |
| CHIN 2813 | GRMN 3035 | LCC 2108 | LING 2813 | SPAN 2XXX |
| CHIN 2XXX | GRMN 3036 | LCC 2110 | LING 3010 | SPAN 3050 |
| CHIN 3003 | GRMN 3071 | LCC 2112 | LING 3813 | SPAN 3061 |
| CHIN 3004 | GRMN 3072 | LCC 2114 | LING 4002 | SPAN 3062 |
| CHIN 3006 | GRMN 3695 | LCC 2116 | LING 4065 | SPAN 3101 |
| CHIN 3021 | GRMN 3696 | LCC 2118 | LING 4813 | SPAN 3102 |
| CHIN 3022 | GRMN 3697 | LCC 2200 | ML 2813 | SPAN 3111 |
| CHIN 3691 | GRMN 3813 | LCC 2202 | ML 4813 | SPAN 3112 |
| CHIN 3692 | GRMN 3XXX | LCC 2204 | MUSI 2600 | SPAN 3122 |
| CHIN 3813 | GRMN 4010 | LCC 2206 | MUSI 3450 | SPAN 3170 |
| CHIN 3XXX | GRMN 4012 | LCC 2208 | MUSI 3500 | SPAN 3211 |
| CHIN 4001 | GRMN 4023 | LCC 2210 | MUSI 3600 | SPAN 3235 |
| CHIN 4002 | GRMN 4024 | LCC 2212 | MUSI 3610 | SPAN 3241 |
| CHIN 4813 | GRMN 4025 | LCC 2214 | MUSI 3620 | SPAN 3242 |
| CHIN 4XXX | GRMN 4026 | LCC 2216 | MUSI 4450 | SPAN 3691 |
| COA 2241 | GRMN 4061 | LCC 2218 | MUSI 4801 | SPAN 3692 |
| COA 2242 | GRMN 4062 | LCC 2300 | MUSI 4802 | SPAN 3693 |
| COA 3114 | GRMN 4065 | LCC 2400 | MUSI 4803 | SPAN 3694 |
| COA 3115 | GRMN 4813 | LCC 2500 | MUSI 4813 | SPAN 3813 |
| COA 3116 | GRMN 4XXX | LCC 2600 | MUSI 4823 | SPAN 3XXX |
| CP 4040 | HUM 1XXX | LCC 2813 | MUSI 4833 | SPAN 4061 |
| CS 4752 | HUM 21XX | LCC 2823 | PST 1101 | SPAN 4062 |
| ENGL 1101 | HUM 2XXX | LCC 3202 | PST 2050 | SPAN 4065 |
| ENGL 1102 | HUM 3XXX | LCC 3204 | PST 2068 | SPAN 4070 |
| FREN 1002 | HUM 4XXX | LCC 3206 | PST 3102 | SPAN 4101 |
| FREN 1813 | ID 2202 | LCC 3208 | PST 3103 | SPAN 4160 |
| FREN 2001 | INTA 4743 | LCC 3210 | PST 3105 | SPAN 4165 |
| FREN 2002 | JAPN 1002 | LCC 3212 | PST 3109 | SPAN 4170 |
| FREN 2813 | JAPN 1813 | LCC 3214 | PST 3113 | SPAN 4235 |
| FREN 2XXX | JAPN 1814 | LCC 3216 | PST 3115 | SPAN 4236 |
| FREN 3001 | JAPN 2001 | LCC 3218 | PST 3127 | SPAN 4242 |
| FREN 3002 | JAPN 2002 | LCC 3219 | PST 4110 | SPAN 4254 |
| FREN 3004 | JAPN 2813 | LCC 3220 | PST 4112 | SPAN 4255 |
| FREN 3007 | JAPN 2XXX | LCC 3222 | PST 4174 | SPAN 4813 |
| FREN 3008 | JAPN 3001 | LCC 3225 | PST 4176 | SPAN 4XXX |
| FREN 3011 | JAPN 3002 | LCC 3226 | PST 4752 | |

## CORE AREA D - SCIENCE, MATHEMATICS, AND TECHNOLOGY (TWELVE HOURS)

Area D is satisfied by students completing eight semester hours from the science list, and four semester hours from the Mathematics list:

### SCIENCE

| Course | Class Title | Credit Hours |
|---|---|---|
| CHEM 1310 | General Chemistry | 4 semester hours |
| CHEM 1311 | Inorganic Chemistry I | 3 semester hours |
| CHEM 1312 | Inorganic Chem Lab | 1 semester hours |
| BIOL 1510 | Biological Principles | 4 semester hours |
| BIOL 1511 | Honors Biological Principles | 4 semester hours |
| BIOL 1520 | Intro to Organismal Biology | 4 semester hours |
| BIOL 1521 | Honors Intro to Organismal Biology | 4 semester hours |
| EAS 1600 | Intro to Environmental Field Science | 4 semester hours |
| EAS 1601 | Habitable Planet | 4 semester hours |
| EAS 2600 | Earth Processes | 4 semester hours |
| PHYS 2211 | Intro. Physics I | 4 semester hours |
| PHYS 2212 | Intro. Physics II | 4 semester hours |

### Mathematics

**All students with majors in the Colleges of Architecture, Computing, Engineering, and Science will complete the following:**

| Course | Class Title | Credit Hours |
|---|---|---|
| MATH 1502 | Calculus II | 4 semester hours |

**All other majors will complete the following:**

| Course | Class Title | Credit Hours |
|---|---|---|
| MATH 1711 | Finite Mathematics | 4 semester hours |
| MATH 1502 | Calculus II | 4 semester hours |

## CORE AREA E - SOCIAL SCIENCES (TWELVE SEMESTER HOURS)

The social science requirement (Core Area E) is satisfied by completion of the United States/Georgia history and constitution legislative requirement with three semester hours from HIST 2111, 2112, **POL 1101**, **INTA 1200**, PUBP 3000, and nine semester hours from the following list.

**EFFECTIVE FALL TERM 2004, CREDIT NOT ALLOWED FOR BOTH INTA 1200 AND POL 1101.**

| | | | | |
|---|---|---|---|---|
| ARCH 4126 | HTS 2082 | HTS 3083 | INTA 3031 | PSYC 2103 |
| ARCH 4335 | HTS 2084 | HTS 3084 | INTA 3101 | PSYC 2210 |
| ARCH 4770 | HTS 2085 | HTS 3085 | INTA 3102 | PSYC 2220 |
| CP 4010 | HTS 2101 | HTS 3086 | INTA 3103 | PSYC 2230 |
| CP 4020 | HTS 2803 | HTS 3102 | INTA 3104 | PSYC 2240 |
| CP 4030 | HTS 2813 | HTS 3803 | INTA 3110 | PSYC 2270 |
| ECON 1XXX | HTS 2823 | HTS 3813 | INTA 3111 | PSYC 2300 |
| ECON 2100 | HTS 2XXX | HTS 3823 | INTA 3120 | PSYC 2400 |
| ECON 2101 | HTS 3001 | HTS 3XXX | INTA 3121 | PSYC 3060 |
| ECON 2105 | HTS 3002 | HTS 4001 | INTA 3130 | PSYC 4770 |
| ECON 2106 | HTS 3003 | HTS 4002 | INTA 3131 | PUBP 2012 |
| ECON 2XXX | HTS 3005 | HTS 4003 | INTA 3203 | PUBP 3000 |
| ECON 4160 | HTS 3006 | HTS 4004 | INTA 3220 | PUBP 3010 |
| ECON 4232 | HTS 3007 | HTS 4005 | INTA 3221 | PUBP 3016 |
| ECON 4311 | HTS 3008 | HTS 4011 | INTA 3230 | PUBP 3110 |
| ECON 4340 | HTS 3009 | HTS 4012 | INTA 3231 | PUBP 3201 |
| ECON 4350 | HTS 3011 | HTS 4013 | INTA 3240 | PUBP 3214 |
| ECON 4351 | HTS 3012 | HTS 4014 | INTA 3241 | PUBP 3315 |
| ECON 4355 | HTS 3015 | HTS 4015 | INTA 3301 | PUBP 3600 |
| ECON 4357 | HTS 3016 | HTS 4031 | INTA 3303 | PUBP 3610 |
| ECON 4411 | HTS 3017 | HTS 4032 | INTA 3304 | PUBP 4111 |
| ECON 4421 | HTS 3018 | HTS 4033 | INTA 3321 | PUBP 4120 |
| ECON 4430 | HTS 3019 | HTS 4034 | INTA 3330 | PUBP 4130 |
| ECON 4440 | HTS 3020 | HTS 4035 | INTA 3331 | PUBP 4200 |
| ECON 4450 | HTS 3021 | HTS 4061 | INTA 3803 | PUBP 4211 |
| ECON 4460 | HTS 3023 | HTS 4062 | INTA 3813 | PUBP 4212 |
| ECON 4510 | HTS 3024 | HTS 4063 | INTA 4011 | PUBP 4214 |
| ECON 4610 | HTS 3025 | HTS 4064 | INTA 4040 | PUBP 4226 |
| ECON 4620 | HTS 3026 | HTS 4065 | INTA 4050 | PUBP 4260 |
| ECON 4811 | HTS 3028 | HTS 4081 | INTA 4060 | PUBP 4338 |
| ECON 4812 | HTS 3029 | HTS 4082 | INTA 4101 | PUBP 4410 |
| ECON 4813 | HTS 3030 | HTS 4083 | INTA 4121 | PUBP 4414 |
| ECON 4814 | HTS 3031 | HTS 4084 | INTA 4230 | PUBP 4416 |
| ECON 4815 | HTS 3032 | HTS 4085 | INTA 4240 | PUBP 4514 |
| HIST 2111 | HTS 3033 | HTS 4811 | INTA 4241 | PUBP 4600 |
| HIST 2112 | HTS 3035 | HTS 4812 | INTA 4330 | PUBP 4609 |
| HTS 1001 | HTS 3036 | HTS 4813 | INTA 4331 | PUBP 4803 |
| HTS 1031 | HTS 3038 | HTS 4814 | INTA 4332 | PUBP 4811 |
| HTS 1081 | HTS 3039 | HTS 4815 | INTA 4333 | PUBP 4812 |
| HTS 1XXX | HTS 3041 | HTS 4823 | INTA 4340 | PUBP 4813 |
| HTS 2001 | HTS 3043 | HTS 4833 | INTA 4803 | PUBP 4814 |
| HTS 2002 | HTS 3045 | HTS 4843 | INTA 4811 | PUBP 4815 |
| HTS 2006 | HTS 3051 | HTS 4XXX | INTA 4812 | PUBP 4823 |
| HTS 2007 | HTS 3061 | INTA 1110 | INTA 4813 | PUBP 4833 |
| HTS 2011 | HTS 3062 | INTA 1200 | INTA 4814 | PUBP 4843 |
| HTS 2013 | HTS 3063 | INTA 2030 | INTA 4815 | SOC 1101 |
| HTS 2016 | HTS 3064 | INTA 2040 | INTA 4823 | SS 1XXX |
| HTS 2036 | HTS 3066 | INTA 2100 | INTA 4833 | SS 2XXX |
| HTS 2037 | HTS 3067 | INTA 2210 | POL 1101 | SS 3XXX |
| HTS 2041 | HTS 3068 | INTA 2220 | POL 2101 | SS 4XXX |
| HTS 2061 | HTS 3069 | INTA 2230 | PSYC 1101 | |
| HTS 2062 | HTS 3070 | INTA 3010 | PSYC 2015 | |
| HTS 2081 | HTS 3082 | INTA 3020 | PSYC 2020 | |

**Students can receive credit for either ECON 2100 or ECON 2101,or for ECON 2105/2106. Students can not receive credit for ECON 2100 and ECON 2101 or for ECON 2100 and ECON 2105/2106 or for ECON 2101 and ECON 2105/2106**

**EFFECTIVE FALL TERM 2004, CREDIT NOT ALLOWED FOR BOTH INTA 1200 AND POL 1101.**

**Undergraduate Research courses numbered 2698, 2699, 4698, and 4699 cannot be used to fulfill requirements for Humanities or Social Science.**

## CORE AREA F - COURSES RELATED TO DEGREE AND MAJOR (EIGHTEEN HOURS)

Area F requirements vary with degree and major.

## CONSTITUTION AND HISTORY REQUIREMENTS

The Georgia law as amended March 4, 1953, requires that before receiving an undergraduate degree all students pass an examination or a comparable course in United States and Georgia history/constitution. Courses that fulfill the United States and Georgia history/constitution requirement are HIST 2111, 2112; POL 1101; PUBP 3000; or INTA 1200. (Credit not awarded for both POL 1101 and INTA 1200.)

## WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

## ROTC CREDIT

Students may apply a maximum of four hours in basic ROTC courses and six hours in advanced ROTC courses toward meeting the free elective requirements for any degree. Students should begin taking basic ROTC courses during the first term they are enrolled. For further information, see individual curricula for the schools.

## TRANSFER CREDIT

The basic policy regarding the acceptance of courses by transfer is to allow credit for courses completed with satisfactory grades (*C* or better) at other accredited colleges and universities in the United States and Canada, provided the courses correspond in time and content to courses offered at the Georgia Institute of Technology. Georgia Tech will not accept credit for courses successfully completed at another institution but previously taken at Georgia Tech unless the final grade received at Georgia Tech is a W. The student must request and file an official transcript of transfer courses before the Institute can award credit. Coursework completed at colleges and universities outside the United States and Canada will be evaluated on a case-by-case basis. Transfer credit is not calculated in the Georgia Tech grade point average.

Students may attend another institution as a transient student during terms when not enrolled at Georgia Tech. Students should discuss their course selection with their academic advisor to ensure transferability and applicability toward their degree programs. With the exception of officially sanctioned crossenrolled programs, students are not to be enrolled at Georgia Tech and another institution during the same term without the specific approval of the appropriate curriculum committee.

## TRANSFER COURSES WITH ‘X’ NUMBERS

Transfer courses for which there is no exact Georgia Tech equivalent will be listed with the numbers 1XXX, 2XXX, etc. Courses so numbered can be used as free electives or may be substituted for Georgia Tech courses at the discretion of the academic unit. Transfer courses with an "X" as the third number of the course (e.g., MATH 15X2) are lacking a component of the Georgia Tech course. These courses, in combination with another Georgia Tech course, may be considered as equivalent for prerequisite checking and degree requirements. Students should seek advisement from their academic unit regarding the use of these courses toward fulfilling degree requirements.

## B. EXAMINATIONS FOR ADVANCED STANDING

1. Students who offer satisfactory evidence that they are qualified to do so may receive credit for a course by examination. Such an examination is called an examination for advanced standing.
2. Examinations for advanced standing require the recommendation of the department of instruction in which the course is offered, payment of the appropriate fee, and authorization by the registrar.
3. Examinations for advanced standing will ordinarily be offered during the week of final examinations.
4. A student will not be allowed to take an examination for advanced standing in a given course more than twice.
5. An examination for advanced standing will be reported with an S or U grade. Neither grade will be included in the calculation of the scholastic average.

## ADVANCED PLACEMENT

Students entering Georgia Tech may receive college credit based upon their scores on the College Board Advanced Placement (AP) Exams taken in conjunction with designated high school advanced placement classes, SAT II Subject Tests, International Baccalaureate Credit, and/or Georgia Tech Departmental Exams.

Once enrolled at Georgia Tech, students are not allowed to take College Board (Advanced Placement and SAT II), International Baccalaureate or A-Level Examinations for credit. All examinations must be completed prior to the student's enrollment date. Students who offer satisfactory evidence that they are qualified to do so may receive credit for a course by examination at Georgia Tech. Such an examination is called an examination for advanced standing.

### College Board Advanced Placement Exams

| Subject | Course | Hours |
|---|---|---|
| American Government & Politics *** | AP Score: 4 or 5 = POL 1101 | 3 |
| Biology | AP Score: 5 = BIOL 1510 | 4 |
| Chemistry | AP Score: 5 = CHEM 1310 | 4 |
| Comparative Politics | AP Score: 4 or 5 = INTA 1200 | 3 |
| Computer Science (A) | AP Score: 4 or 5 = CS 1301 | 3 |
| Computer Science (AB) | AP Score: 4 or 5 = CS 1301 & 1331 | 6 |
| Economics (Macroeconomics)* | AP Score: 4 or 5 = ECON 2105 | 3 |
| Economics (Microeconomics)* | AP Score: 4 or 5 = ECON 2106 | 3 |
| English (Composition & Literature) | AP Score: 4 or 5 = ENGL 1101 | 3 |
| English (Language & Composition) | AP Score: 4 or 5 = ENGL 1101 | 3 |
| Environmental Science | AP Score: 5 = EAS 1600 | 4 |
| French (Language Lvl III or Literature Lvl III) | AP Score: 4 or 5 = FREN 2001 & 2002 | 6 |
| German (Language Lvl III or Literature Lvl III) | AP Score: 4 or 5 = GRMN 2001 & 2002 | 6 |
| History (American) | AP Score: 4 or 5 = HIST 2111 | 3 |
| History (European) | AP Score: 4 or 5 = HTS 1031 | 3 |
| History (World) | AP Score: 4 or 5 = HTS 1XXX** | 3 |
| Latin (Language or Literature) | AP Score: 4 or 5 = LATN 2XXX | 6 |
| Mathematics (AB and BC) | AP Score: AB4 or 5 BC3, 4, or 5 = MATH 1501 | 4 |
| Music (Theory) | AP Score: 3 = MUSI 2600<br>AP Score: 4 or 5 = MUSI 2600 & 3600 | 2<br>4 |
| Physics C: Part I (Mechanics, Calculus Based) | AP Score: 4 or 5 = PHYS 2211 | 4 |
| Physics C: Part II (Electricity & Magnetism) | AP Score: 4 or 5 = PHYS 2212 | 4 |
| Psychology (General) | AP Score: 4 or 5 = PSYC 1101 | 3 |
| Spanish (Language Lvl III or Literature Lvl III) | AP Score: 4 or 5 = SPAN 2001 & 2002 | 6 |

*
With a score of 4 or 5 in both macroeconomics and microeconomics, a student could instead elect to receive 3 semester hours of credit for ECON 2100.

** HTS 1XXX represents a 1000-level elective course.

*** Students cannot receive credit for both INTA 1200 and POL 1101.

## INTERNATIONAL BACCALAUREATE

| Subject | Higher Level Exam Scores | Credit |
|---|---|---|
| Biology | 5 | 4 hours (BIOL 1510) |
| | 6 or higher | 8 hours (BIOL 1510 and 1520) |
| Chemistry | 5 or higher | 4 hours (CHEM 1310) |
| Computer Science | 5 or higher | 3 hours (CS 1301) |
| Economics | 5 or higher | 3 hours (ECON 2100) |
| English | 4 or higher | 3 hours (ENGL 1101) |
| European History | 4 or higher | 3 hours (HTS 2037) |
| Foreign Language* | 5 or higher | 6 hours (2001 and 2002) |
| History of Americas | 4 or higher | 3 hours (HIST 2112) |
| Mathematics | 4 or higher | 4 hours (MATH 1501) |
| Physics | 5 or higher | 8 hours (PHYS 2211 and 2212) |
| Psychology | 5 or higher | 3 hours (PSYC 1101) |

* See Modern Foreign Language Credit.

# DEPARTMENTAL EXAMS

## ADVANCED PLACEMENT IN MATHEMATICS

If you have taken a high school calculus course and achieved an SAT I mathematics score of 650 or higher, you may take the School of Mathematics' Advanced Placement Exam in calculus during freshman orientation. This exam is an alternative to College Board Advanced Placement Exams. If you pass the exam, you will receive credit for MATH 1501. You may also be approved for subsequent course exams.

## MODERN FOREIGN LANGUAGE CREDIT

You may receive humanities credit for courses numbered 2001-2002 in a language if you

a. submit higher level scores of 5 or higher from a certified high school International Baccalaureate program, or
b. submit higher level scores of 4 or 5 from Advanced Placement exam in one of the languages taught at Georgia Tech.

To have this elective credit entered on your records, please submit your IB or AP scores to the Registrar's office. This credit can apply toward the six-hour humanities/fine arts graduation requirement; no grade is attached to it. You will not get credit for high school language study if you are a native speaker of that language or if you have taken first-year courses at a college and received transfer credit.

## REGENTS’ TESTING PROGRAM

To establish eligibility for an undergraduate degree, every student in the University System of Georgia must pass the Regents’ Test, an examination designed to measure proficiency in reading and English composition. Students are invited to take this examination when they have earned ten hours of college credit. Any student accumulating forty-five hours of college credit toward a degree without passing the Regents’ Test must schedule remedial English or reading along with other credit coursework. If a student fails in the first attempt, he or she must repeat the test. Alternative tests of competence and remediation are offered to non-native speakers of English. In addition, alternative tests are offered for students with disabilities documented through the Dean of Students’ Office. Listed below are test scores that can be used to satisfy the Regents' Test requirements.

- The READING portion of the test can be satisfied with:
  - SAT Verbal score of 510 or higher
  - ACT Reading score of 23 or higher
- The ESSAY portion of the test can be satisfied with:

  SAT II English Writing score of 650 or higher

  SAT Reasoning, Writing Section score of 560 (effective Spring 2007)

  AP English score of 3 or higher

  International Baccalaureate higher-level English score of 4 or higher

  * SAT-I Verbal score of at least 530 and a grade of "A" in English 1101

  * SAT-I Verbal score of at least 590 and a grade of "B" in English 1101

  * ACT English score of at least 23 and a grade of "A" in English 1101

  * ACT English score of at least 26 and a grade of "B" in English 1101

*
(These exemptions are only available for students enrolled in the University System Fall 2005 through Spring 2008).

Scores must be from a national administration of the SAT or ACT. Scores from institutional SAT or residual ACT tests will not be acceptable for this purpose.

## SAT II SUBJECT TESTS

| Subject | Score | Semester Course | Hours |
|---|---|---|---|
| Chemistry | 720 | CHEM 1310 | 4 |
| English | 750 | ENGL 1101 | 3 |

## UNDERGRADUATE STUDENTS TAKING GRADUATE COURSES

Seniors with a grade point average of at least 2.7 may schedule graduate courses. In order to do so, the student must obtain permission both from the student's advisor and from the chair of the school offering the course. Credit toward the master's degree for up to twelve hours of courses taken as an undergraduate may be received under the following conditions.

1. The student was in residence at Georgia Tech for at least two semesters before registering for the course(s).
2. The student did not apply credit for the course toward the baccalaureate degree. (See Graduate Course Option for special exceptions in certain schools.)

## BROWSE BACHELOR DEGREES

### College of Architecture

Architecture Program
Bachelor of Science in Architecture

Building Construction Program
Bachelor of Science in Building Construction

Industrial Design Program
Bachelor of Science in Industrial Design

### College of Computing

Bachelor of Science in Computer Science
Bachelor of Science in Computational Media (Interdisciplinary with IAC)

### College of Engineering

School of Aerospace Engineering
Bachelor of Science in Aerospace Engineering

School of Chemical and Biomolecular Engineering
Bachelor of Science in Chemical & Biomolecular Engineering

School of Civil & Environmental Engineering
Bachelor of Science in Civil Engineering
Bachelor of Science in Environmental Engineering

School of Electrical & Computer Engineering
Bachelor of Science in Computer Engineering
Bachelor of Science in Electrical Engineering

School of Industrial & Systems Engineering
Bachelor of Science in Industrial Engineering

School of Materials Science & Engineering
Bachelor of Science in Materials Science and Engineering

School of Mechanical Engineering
Bachelor of Science in Mechanical Engineering
Bachelor of Science in Nuclear and Radiological Engineering

School of Polymer, Textile & Fiber Engineering
Bachelor of Science in Polymer and Fiber Engineering

GT/Emory Department of Biomedical Engineering
Bachelor of Science in Biomedical Engineering

GT Savannah - Regional Engineering Program
Bachelor of Science in Civil Engineering - Regional Engineering Program
Bachelor of Science in Computer Engineering - Regional Engineering Program
Bachelor of Science in Electrical Engineering - Regional Engineering Program
Bachelor of Science in Mechanical Engineering - Regional Engineering Program

### College of Management

Bachelor of Science in Management

### Ivan Allen College of Liberal Arts

School of Economics
Bachelor of Science in Economics
Bachelor of Science in Economics and International Affairs
Bachelor of Science in Global Economics and Modern Languages

School of History, Technology, & Society
Bachelor of Science in History, Technology, and Society

School of International Affairs
Bachelor of Science in International Affairs

Bachelor of Science in International Affairs and Modern Language
Bachelor of Science in Economics and International Affairs

School of Literature, Communication, & Culture
Bachelor of Science in Computational Media (Interdisciplinary with COC)
Bachelor of Science in Science, Technology, and Culture

School of Modern Languages
Bachelor of Science in International Affairs and Modern Language
Bachelor of Science in Global Economics and Modern Languages

Public Policy
Bachelor of Science in Public Policy

## College of Sciences

School of Biology
Bachelor of Science in Biology

School of Chemistry & Biochemistry
Bachelor of Science in Biochemistry
Bachelor of Science in Chemistry

School of Earth & Atmospheric Sciences
Bachelor of Science in Earth and Atmospheric Science

School of Mathematics
Bachelor of Science in Applied Mathematics
Bachelor of Science in Discrete Mathematics

School of Physics
Bachelor of Science in Applied Physics
Bachelor of Science in Physics

School of Psychology
Bachelor of Science in Psychology

## GRADUATE COURSE OPTION

Students completing both the bachelor's and master's in the same discipline at Georgia Tech may use up to six credit hours of graduate-level coursework in the major discipline for both degrees. Recognizing that some master's degree programs do not have a unique undergraduate counterpart program, and that some master's programs are offered by several schools, the term "discipline" in the prior sentence will be broadly interpreted in such cases. To qualify for this option, students must complete the undergraduate degree with a cumulative grade point average of 3.5 or higher and complete the master's degree within a two-year period from the award date of the bachelor's degree. Participating programs are civil and environmental engineering, electrical and computer engineering, engineering science and mechanics, industrial and systems engineering, international affairs, mathematics, mechanical engineering, and Polymer, Textile and fiber engineering.

## F. SECOND UNDERGRADUATE DEGREE

1. A student enrolled for a second undergraduate degree shall be classified as an undergraduate student, except that a graduate student wishing to pursue a second undergraduate degree will remain classified as a graduate student. A graduate student, with approval of the major school, may work toward a second undergraduate degree while pursuing a graduate program.
2. To be a candidate for a second undergraduate degree, a student must have the recommendation of the chair of the school concerned and the approval of the Undergraduate Curriculum Committee.
3. To obtain a second undergraduate degree, a student must complete all major required courses for the degree and earn credit for a total of at least thirty-six credit hours in excess of the requirement for any previous degrees earned.
4. All regulations in section XIII apply to students completing second undergraduate degrees.

## FIVE-YEAR B.S./M.S. DEGREE PROGRAMS

Many schools at Georgia Tech offer five-year B.S./M.S. degree programs that, like the Graduate Course Option, allow eligible students to use up to six credit hours of graduate-level coursework in the major discipline for both degrees. The B.S./M.S. programs typically include research and mentoring components and have their own GPA requirements. More information is available from participating major schools/colleges.

## GRADUATE INFORMATION

The faculty of the Georgia Institute of Technology grants advanced degrees in engineering, science, management, computing, architecture, city and regional planning, public policy, and other technology-related areas. The goals for graduate studies and research are to establish an educational environment that will strengthen students' personal and professional development, to encourage students and faculty to vigorously pursue the discovery and generation of new knowledge through research, to investigate ways of applying such knowledge innovatively for the benefit of society and humanity, and to foster the development of new tools, objects, and ideas.

Students whose interests and aptitudes lead them beyond the limits of the traditional undergraduate curriculum may broaden their knowledge of a given field and pursue independent inquiry through graduate study. A graduate education is of particular benefit to students interested in careers in research, management development, design, or consulting; to those who aspire to formulate and administer policy; and to those who desire to enter the profession of education.

## GRADUATE STUDENT WORK LOADS

Full-time students must be enrolled for at least twelve credit hours on a letter grade or pass/fail basis. As an exception, the advisor and school chair may allow up to three hours out of the minimum twelve to be taken on an audit basis in fall and spring semesters; in summer semesters, the advisor and school chair may allow up to six hours out of the twelve minimum to be taken on an audit basis. Hours in excess of the required twelve may be taken on any basis. Full-time students working exclusively on thesis research should be registered for eighteen or more hours of 7000- or 9000-level courses (Master's or Doctoral Thesis) in fall and spring semesters, and for up to sixteen hours during summer semesters.

The maximum load for graduate students in good standing is twenty-one hours in fall/spring and sixteen hours in summer. The minimum load is three hours except for the semester of graduation. A student may register for only one hour of Master's or Doctoral Thesis (7000 or 9000) during the semester of graduation. This exception may be used once for each degree.

Students with fellowships, assistantships, traineeships, tuition waivers, or student visas and those assigned to the Institute by the armed forces for the purpose of pursuing a degree are required to enroll full time. Part-time doctoral students engaged in research for their Ph.D.s should register for the number of 9000-level hours consistent with the time they and their faculty advisors spend on the dissertation research.

## GRADUATE POLICIES AND REGULATIONS

The Graduate Committee, with the approval of the Academic Senate, is responsible for establishing academic policy for the graduate programs; however, final authority rests with the Senate. This committee reserves the right to change requirements for degrees as may be appropriate. Students enrolled at the time such changes appear in the catalog have the privilege of following either the regulations stated in the catalog effective the semester in which they enrolled or the regulations in the Catalog that records the change.

This catalog records the Institute-wide policies and regulations that govern the graduate program. Schools may make additional rules concerning their programs and the pursuit of their degrees, but such rules may not contradict Institute policies and regulations.

## TRANSFER OF CREDIT

A student may not apply for transfer credit until after matriculation at Georgia Tech. The courses to be transferred would typically be those appearing on the approved program of study form for the master's degree. A doctoral student normally does not request transfer credit. The rules relative to and the process for obtaining transfer of credit for graduate-level courses are as follows:

1. A student in a master's degree program requiring fewer than thirty-three semester credit hours may receive up to six hours of transfer credit for graduate-level courses taken at an institution accredited by a Canadian or U.S. regional accrediting board, or at a foreign school or university that has a signed partner agreement with Georgia Tech Lorraine, and not used for credit toward another degree. A student in a master's degree program requiring thirty-three semester credit hours or more may receive up to nine hours of transfer credit for graduate-level courses taken at an institution accredited by a Canadian or U.S. regional accrediting board, or at a foreign school or university that has a signed partner agreement with Georgia Tech Lorraine, and not used for credit toward another degree. The student must supply a current transcript for this evaluation.
2. To obtain transfer of credit, the student must complete the following procedure:
   a. The student will confer with the graduate advisor to ascertain whether the courses to be transferred are a logical part of the student's graduate program;
   b. If the courses are appropriate, the student will deliver to the school that teaches such courses a copy of the current transcript, necessary descriptive materials including catalog descriptions, and textbooks used for evaluation. The faculty of the appropriate school will determine the equivalent Georgia Tech course and the number of credit hours accepted. The faculty member who prepares the transfer credit form should have the school chair cosign it. The school should then send the form directly to the registrar with a copy of the student's Approved Program of Study attached;
   c. If the student wishes to transfer more than the number of hours permitted in paragraph 1), a petition must be submitted to the Institute Graduate Committee including statements of possible justification for the granting of such a petition, transfer credit forms, and the recommendation of the student's school chair.
3. A joint enrollment student may receive graduate credit for up to one-third of the hours required for the degree for graduate courses taken at Emory University or Georgia State University provided that
   a. Georgia Tech does not offer such courses;
   b. the student's advisor and school chair approve the courses in writing in advance; c) and the student passes the courses with a *C* or better. Advance approval is satisfied when the courses appear on the student's proposed Program of Study.
4. A student may not receive transfer credit from universities outside the United States and Canada except if the courses were taken at a foreign school or university that is accredited by a Canadian or U.S. regional accrediting board or has a signed partner agreement with Georgia Tech Lorraine. In any other case, an international student can obtain credit for courses previously taken but not applied toward another degree by filling out an Examination for Advanced Standing Authorization Request Form, paying the appropriate fee at the Cashier's Office, and passing the examination for advanced standing. The school or college that normally teaches the equivalent course will administer any necessary examinations.

## STAFF MEMBERS

No staff member beyond the rank of instructor in a school may work for a master's degree in that school. No new staff member with the rank of assistant professor in a school may work for a doctoral degree in that school.

## College of Architecture

### Architecture Program

Master of Architecture
Master of Science with a Major in Architecture
Master of Science with a Major in Architecture - Advanced Architectural Design
Master of Science with a Major in Architecture - Architecture, Culture, & Behavior
Master of Science with a Major in Architecture - Building Ecology & Emerging Technologies
Master of Science with a Major in Architecture - Building Technology
Master of Science with a Major in Architecture - Classical Design
Master of Science with a Major in Architecture - Computation, Composition, & Construction
Master of Science with a Major in Architecture - History, Theory, & Criticism of Architecture
Master of Science with a Major in Architecture - Morphology and Design
Master of Science with a Major in Architecture - Urban Design

### Building Construction Program

Master of Science in Building Construction and Integrated Facility Management-IFM Track
Master of Science in Building Construction and Integrated Facility Management-IPDS Track
Master of Science in Building Construction and Integrated Facility Management-RCD Track

### City and Regional Planning Program

Master of City and Regional Planning

### Industrial Design Program

Master of Industrial Design

### Department of Music

Master of Science in Music Technology

## College of Computing

### School of Computer Science

Master of Science in Bioengineering
Master of Science in Computer Science
Master of Science in Information Security

### School of Interactive Computing

Master of Science in Computer Science
Master of Science in Human-Computer Interaction

### Computational Science and Engineering Division

Master of Science in Bioengineering
Master of Science in Computational Science and Engineering
Master of Science in Computer Science

## College of Engineering

### School of Aerospace Engineering

Master of Science in Aerospace Engineering
Master of Science in Computational Science and Engineering

### School of Chemical and Biomolecular Engineering

Master of Science in Bioengineering
Master of Science in Chemical Engineering
Master of Science in Paper Science and Engineering
Master of Science in Polymers
Master of Science with a Major in Chemical Engineering

### School of Civil & Environmental Engineering

Master of Science in Bioengineering
Master of Science in Civil Engineering
Master of Science in Computational Science and Engineering
Master of Science in Engineering Science and Mechanics
Master of Science in Environmental Engineering
Master of Science with a Major in Civil Engineering
Master of Science with a Major in Environmental Engineering

### School of Electrical & Computer Engineering

Master of Science in Bioengineering
Master of Science in Electrical and Computer Engineering
Master of Science with a Major in Electrical and Computer Engineering

### School of Industrial & Systems Engineering

Master of Science in Computational Science and Engineering
Master of Science in Health Systems
Master of Science in Industrial Engineering - Human Integrated Systems Track
Master of Science in Industrial Engineering - Manufacturing and Logistics Track
Master of Science in International Logistics
Master of Science in Operations Research
Master of Science in Quantitative and Computational Finance
Master of Science in Statistics

### School of Materials Science & Engineering

Master of Science in Materials Science and Engineering
Master of Science in Paper Science and Engineering
Master of Science in Bioengineering
Master of Science in Polymers
Master of Science with a Major in Materials Science and Engineering

### School of Mechanical Engineering

Master of Science in Bioengineering
Master of Science in Mechanical Engineering
Master of Science in Medical Physics
Master of Science in Nuclear Engineering
Master of Science in Paper Science and Engineering

### School of Polymer, Textile & Fiber Engineering

Master of Science in Polymers
Master of Science in Polymer, Textile and Fiber Engineering

### GT/Emory Department of Biomedical Engineering

Master of Science in Computational Science and Engineering

### GT Savannah - Regional Engineering Program

Master of Science in Bioengineering (GT Savannah)
Master of Science in Civil Engineering (GT Savannah)
Master of Science in Environmental Engineering (GT Savannah)
Master of Science in Electrical and Computer Engineering (GT Savannah)
Master of Science in Mechanical Engineering (GT Savannah)

## College of Management

Master of Business Administration
Master of Business Administration - Global Business
Master of Business Administration in Management of Technology
Master of Science in Quantitative and Computational Finance

## Ivan Allen College of Liberal Arts

### School of Economics

Master of Science with a Major in Economics

### School of History, Technology, & Society

Master of Science in History and Sociology of Technology and Science

### School of International Affairs

Master of Science in International Affairs

### School of Literature, Communication, & Culture

Master of Science in Human-Computer Interaction
Master of Science in Digital Media

### Public Policy

Master of Science in Public Policy

## College of Sciences

### School of Applied Physiology

Master of Science in Prosthetics and Orthotics

School of Biology

Master of Science in Biology
Master of Science in Bioinformatics
Master of Science in Computational Science and Engineering

School of Chemistry & Biochemistry

Master of Science in Chemistry
Master of Science in Computational Science and Engineering
Master of Science in Paper Science and Engineering

School of Earth & Atmospheric Sciences

Master of Science in Earth and Atmospheric Science
Master of Science with a Major in Earth and Atmospheric Science

School of Mathematics

Master of Science in Computational Science and Engineering
Master of Science in Mathematics
Master of Science in Quantitative and Computational Finance
Master of Science in Statistics

School of Physics

Master of Science in Physics

School of Psychology

Master of Science in Human-Computer Interaction
Master of Science in Psychology

## GRADUATE COURSE OPTION

Students completing both the bachelor's and master's in the same discipline at Georgia Tech may use up to six credit hours of graduate-level coursework in the major discipline for both degrees. Recognizing that some master's degree programs do not have a unique undergraduate counterpart program, and that some master's programs are offered by several schools, the term "discipline" in the prior sentence will be broadly interpreted in such cases. To qualify for this option, students must complete the undergraduate degree with a cumulative grade point average of 3.5 or higher and complete the master's degree within a two-year period from the award date of the bachelor's degree. Participating programs are civil and environmental engineering, electrical and computer engineering, engineering science and mechanics, industrial and systems engineering, international affairs, mathematics, mechanical engineering, and Polymer, Textile and fiber engineering.

## ENROLLMENT REQUIREMENTS

While students may enroll in the master's degree program upon admission with either full or conditional standing, all conditions must be met and the student's status changed to "full" in order to graduate with the master's degree. Students enrolled for the master's degree must register for at least one semester per year in order for the original requirements for their degree to remain unchanged. In other cases, the school may reevaluate the student's credentials and impose additional degree requirements.

Students who have completed all coursework and are planning to submit a thesis in partial fulfillment of the requirements for a master's degree should register for research hours (MAJR 7000) consistent with a realistic appraisal of the amount of remaining thesis work and required faculty involvement. Students are not eligible to receive thesis guidance during any term for which they are not registered.

Students must normally enroll for a minimum of three hours each semester. Thesis students may enroll for one hour of thesis only in the semester of graduation. The Institute has no residency requirements for the master's degree. See Requirements for Award of the Master's Degree for more information.

## PROGRAM OF STUDY

The student, in conference with the faculty advisor, should prepare a program of study for the master's degree as a guide for planning an academic schedule. In some cases, the student's school may require that the proposed program be submitted to the chair of that school for approval.

The program of study must be completed satisfactorily within six consecutive calendar years and must include, at a minimum, thirty approved credit hours distributed as follows:

**WITH THESIS:**

- Minimum course credit hours in major field (a basic field of knowledge, not a department of specialization): 12
- Minimum course credit hours at 6000 to 9000 level: 12
- Minimum course credit hours for degree: 18
- Minimum Thesis hours (7000): 6
- Total credit hours: 30

**WITHOUT THESIS: (MUST HAVE APPROVAL OF SCHOOL CHAIR)**

- Minimum course credit hours in major field (a basic field of knowledge, not a department of specialization): 18
- Minimum course credit hours at 6000 to 9000 level: 21
- Total credit hours: 30

Some schools require more than the minimum credit hours. Refer to specific academic program descriptions for more detailed information.

Other than thesis hours, the student may use only three hours under the pass/fail designation in the approved program of study. As a rule, a course may not be counted toward more than one degree.

Undergraduate courses required for graduation in the discipline (designated degree) or discipline-of-origin (undesignated degree) at Georgia Tech may not be applied toward a master's degree. See Graduate Course Option for special exceptions in certain schools.

## THE MASTER'S THESIS

To complete the requirements for the master's degree, the student must submit a master's thesis unless the school chair determines that additional coursework is of more importance in meeting approved objectives.

Students who meet the requirements for the master's degree by completing a combination of coursework and thesis must register for a minimum of six hours of thesis credit. (See Program of Study.)

A candidate whose program includes a thesis must present a treatise in which the results of an investigation directed by a member of the faculty of the Institute are set forth in clear, articulate form. The purpose of the thesis is to further educational development by requiring the student to plan, conduct, and report an organized and systematic study of importance.

The *Manual for Graduate Theses*, available at www.grad.gatech.edu, specifies the formatting requirements for the thesis. Information regarding electronic thesis/dissertation submission can also be found at this Web site.

## REQUIREMENTS FOR AWARD OF THE MASTER'S DEGREE

1. Petition to graduate: To apply for master's degree candidacy, the student must submit to the registrar, during the semester preceding the anticipated final semester of work, the petition for a degree with the Approved Program of Study attached.
2. Approved Program of Study (must accompany petition to graduate): The student's Approved Program of Study must show that course requirements for the master's degree will be satisfied before or during the final semester (see Program of Study).
3. The Approved Program of Study must be successfully completed within a period of no more than six consecutive calendar years.
4. The student must have an overall grade point average of at least 2.7 and satisfy all school academic requirements.
5. The student must have completed satisfactorily any language requirement imposed.
6. The student must have passed any qualifying or comprehensive examinations required by the student's school.
7. The student must be registered for a minimum of three credit hours at all times, except that thesis students may enroll for one hour of MAJR 7000 in the semester of graduation. This reduction may be used only once. Students who have met all requirements for graduation before the last day of registration for the graduation term and who were registered the preceding semester may be eligible for a waiver of enrollment.
8. In addition, the student must have completed any required work outlined at the time of matriculation.

**ADDITIONAL REQUIREMENTS FOR MASTER'S THESIS STUDENTS**

9. The student must submit the thesis topic and committee form to the Graduate Studies Office for approval and make satisfactory progress on the thesis.
10. The student must submit the thesis electronically to the Georgia Tech Electronic Thesis and Dissertation Web site at http://etd.gatech.edu and receive final acceptance from the Graduate Studies Office.

### LANGUAGE REQUIREMENT

The student's school may require a reading knowledge of one appropriate language.

## THE DOCTORAL DEGREE

The degree of Doctor of Philosophy recognizes demonstrated proficiency and high achievement in research. After adequate preparation, the candidate must successfully complete both comprehensive examinations in his or her academic field and a searching and authoritative investigation of a special area in the chosen field, culminating in a written dissertation.

## College of Architecture

### Architecture Program
Doctor of Philosophy with a Major in Architecture

### Building Construction Program
Doctor of Philosophy with a Major in Architecture (BC & Integrated Facility Management)

### City and Regional Planning Program
Doctor of Philosophy with a Major in Architecture (City and Regional Planning)

### Industrial Design Program
Doctor of Philosophy with a Major in Architecture (Industrial Design)

## College of Computing

### School of Computer Science
Doctor of Philosophy with a Major in Algorithms, Combinatorics, Optimization
Doctor of Philosophy with a Major in Bioengineering
Doctor of Philosophy with a Major in Bioinformatics
Doctor of Philosophy with a Major in Computer Science

### School of Interactive Computing
Doctor of Philosophy with a Major in Computer Science
Doctor of Philosophy with a Major in Human-Centered Computing
Doctor of Philosophy with a Major in Robotics

### Computational Science and Engineering Division
Doctor of Philosophy with a Major in Bioengineering
Doctor of Philosophy with a Major in Bioinformatics
Doctor of Philosophy with a Major in Computational Science and Engineering
Doctor of Philosophy with a Major in Computer Science

## College of Engineering

### School of Aerospace Engineering
Doctor of Philosophy with a Major in Aerospace Engineering
Doctor of Philosophy with a Major in Computational Science and Engineering
Doctor of Philosophy with a Major in Robotics

### School of Chemical and Biomolecular Engineering
Doctor of Philosophy with a Major in Bioengineering
Doctor of Philosophy with a Major in Chemical Engineering
Doctor of Philosophy with a Major in Paper Science and Engineering

### School of Civil & Environmental Engineering
Doctor of Philosophy with a Major in Bioengineering
Doctor of Philosophy with a Major in Civil Engineering
Doctor of Philosophy with a Major in Computational Science and Engineering
Doctor of Philosophy with a Major in Engineering Science and Mechanics
Doctor of Philosophy with a Major in Environmental Engineering

### School of Electrical & Computer Engineering
Doctor of Philosophy with a Major in Bioengineering
Doctor of Philosophy with a Major in Electrical and Computer Engineering
Doctor of Philosophy with a Major in Robotics

### School of Industrial & Systems Engineering
Doctor of Philosophy with a Major in Algorithms, Combinatorics, Optimization
Doctor of Philosophy with a Major in Bioinformatics
Doctor of Philosophy with a Major in Computational Science and Engineering
Doctor of Philosophy with a Major in Industrial Engineering
Doctor of Philosophy with a Major in Industrial Engineering - Applied Statistics Track
Doctor of Philosophy with a Major in Industrial Engineering - Economic Decision Analysis Trk
Doctor of Philosophy with a Major in Industrial Engineering - Human-Integrated Systems Trk
Doctor of Philosophy with a Major in Industrial Engineering - Manufacturing / Logistics Track
Doctor of Philosophy with a Major in Industrial Engineering - Optimization Track
Doctor of Philosophy with a Major in Industrial Engineering - Stochastic Systems Track

Doctor of Philosophy with a Major in Operations Research

### School of Materials Science & Engineering
Doctor of Philosophy with a Major in Materials Science and Engineering
Doctor of Philosophy with a Major in Paper Science and Engineering
Doctor of Philosophy with a Major in Bioengineering

### School of Mechanical Engineering
Doctor of Philosophy with a Major in Bioengineering
Doctor of Philosophy with a Major in Mechanical Engineering
Doctor of Philosophy with a Major in Nuclear and Radiological Engineering
Doctor of Philosophy with a Major in Nuclear and Radiological Engineering - Medical Physics
Doctor of Philosophy with a Major in Paper Science and Engineering
Doctor of Philosophy with a Major in Robotics

### School of Polymer, Textile & Fiber Engineering
Doctor of Philosophy with a Major in Polymer, Textile and Fiber Engineering

### GT/Emory Department of Biomedical Engineering
Doctor of Philosophy with a Major in Biomedical Engineering
Doctor of Philosophy with a Major in Bioengineering
Doctor of Philosophy with a Major in Bioinformatics
Doctor of Philosophy with a Major in Computational Science and Engineering
Doctor of Philosophy with a Major in Robotics

### GT Savannah - Regional Engineering Program
Doctor of Philosophy with a Major in Bioengineering (GT Savannah)
Doctor of Philosophy with a Major in Civil Engineering (GT Savannah)
Doctor of Philosophy with a Major in Environmental Engineering (GT Savannah)
Doctor of Philosophy with a Major in Electrical & Computer Engineering (GT Savannah)
Doctor of Philosophy with a Major in Mechanical Engineering (GT Savannah)

## College of Management
Doctor of Philosophy with a Major in Management

## Ivan Allen College of Liberal Arts

### School of History, Technology, & Society
Doctor of Philosophy with a Major in History and Sociology of Technology and Science

### School of International Affairs
Doctor of Philosophy with a Major in International Affairs, Science, and Technology

### School of Literature, Communication, & Culture
Doctor of Philosophy with a Major in Digital Media

### Public Policy
Doctor of Philosophy with a Major in Public Policy

## College of Sciences

### School of Applied Physiology
Doctor of Philosophy with a major in Applied Physiology

### School of Biology
Doctor of Philosophy with a Major in Biology
Doctor of Philosophy with a Major in Bioinformatics
Doctor of Philosophy with a Major in Computational Science and Engineering

### School of Chemistry & Biochemistry
Doctor of Philosophy with a Major in Bioinformatics
Doctor of Philosophy with a Major in Chemistry
Doctor of Philosophy with a Major in Computational Science and Engineering
Doctor of Philosophy with a Major in Paper Science and Engineering

### School of Earth & Atmospheric Sciences
Doctor of Philosophy with a Major in Earth and Atmospheric Sciences

### School of Mathematics
Doctor of Philosophy with a Major in Algorithms, Combinatorics, Optimization

Doctor of Philosophy with a Major in Bioinformatics
Doctor of Philosophy with a Major in Computational Science and Engineering
Doctor of Philosophy with a Major in Mathematics

School of Physics

Doctor of Philosophy with a Major in Physics

School of Psychology

Doctor of Philosophy with a Major in Psychology - Engineering Psychology
Doctor of Philosophy with a Major in Psychology - Experimental Psychology
Doctor of Philosophy with a Major in Psychology - Industrial/Organizational Psychology
Doctor of Philosophy with a Major in Psychology - Quantitative Psychology

## ADMISSION TO CANDIDACY - GENERAL INFORMATION

Doctoral students customarily apply for degree candidacy after completing at least three semesters of coursework beyond the bachelor's degree.

### TO QUALIFY FOR CANDIDACY, STUDENTS MUST

- complete all course requirements (except the minor);
- achieve a satisfactory scholastic record;
- pass the comprehensive examination; and
- submit for approval to the school chair and the Graduate Studies Office (on behalf of the graduate dean) a formal statement naming the dissertation reading committee and delineating the research topic.

Upon satisfactory completion of these requirements, Graduate Studies formally admits the applicant to candidacy for the degree on behalf of the graduate dean.

## THE COMPREHENSIVE EXAMS

The comprehensive examination assesses both general knowledge of the degree area and specialized knowledge of the student's chosen research field. Each school is responsible for scheduling comprehensive examinations at least once a year, in the fall or spring, and for informing students of their scope. A guidance committee appointed by the chair of the school will advise each student in planning a program of study and preparing for the examination, partly through an initial evaluation of the student's background and interests, partly through periodic consultation to evaluate and aid the student's progress.

## THESIS TOPIC

Prior to the student's admission to candidacy, the candidate will present for the approval of the school chair or college dean and the Graduate Studies Office a formal statement naming the student's dissertation advisor and setting forth the topic selected for investigation, the objectives the student hopes to gain, and the steps by which the student proposes to achieve them. The thesis topic must give promise of being either a genuine addition to the fundamental knowledge of the field or a new and better interpretation of facts already known.

## TIME LIMIT FOR DEGREE COMPLETION

Students must complete all degree requirements within seven years from the end of the term in which they pass the comprehensive examination.

## THE DISSERTATION

The dissertation must demonstrate that the candidate possesses powers of original thought, talent for research, and ability to organize and present findings. Dissertations must be submitted electronically via the Georgia Tech Electronic Thesis and Dissertation Web site at http://etd.gatech.edu.

The format of the dissertation (in general appearance) must meet the criteria published in the Manual for Graduate Theses, which is available at www.grad.gatech.edu/thesis/index.html. For other format or style questions, students should refer to style manuals appropriate to their disciplines.

## THE DOCTORAL EXAMINATION

If the dissertation advisory committee finds the dissertation satisfactory, it schedules the candidate for an oral examination on the subject matter for the dissertation and the field in which it lies. An examining committee approved by the Graduate Studies office on behalf of the graduate dean will conduct the examination. The candidate's academic unit should forward the announcement of the oral examination, including the names of the examining committee members, to Graduate Studies at least ten working days prior to the exam.

If a candidate should fail to pass the final oral examination, the examining committee may recommend permission for one additional examination. In the case of failure, the registrar does not receive a report of the examination results.

## THE MINOR FIELD OF STUDY

In addition to an adequate knowledge of the major field of intended research, the student must demonstrate mastery of some other, smaller body of knowledge-the minor field-preferably outside the student's school. The purpose of the minor is to encourage a wider interest on the part of the student and to provide a broader basis for the evaluation of the student's capabilities.

The minor will normally consist of at least nine semester hours of work in related courses, chosen by the student in consultation with a guidance committee and approved by the Graduate Studies Office on behalf of the graduate dean. These courses should be at the 6000 level or above, but the use of certain 4000-level courses may also be approved. Courses taken at other institutions may be included in the minor. Once the student has satisfactorily completed the minor, the school chair sends a confirmation, accompanied by course grades, to the Graduate Studies Office for final approval and recording.

Although the student need not complete the minor as a prerequisite for admission to candidacy, the minor must be completed and approved in order to be cleared for graduation.

## ENROLLMENT REQUIREMENTS

The matriculation requirements are similar to those outlined for the master's degree with the addition of the residency requirement: doctoral students must spend at least two full-time semesters in residence at the Georgia Institute of Technology and ordinarily must complete research for the dissertation while in residence. Under special circumstances, candidates who have met the residency requirement may receive permission to pursue their research in absentia, provided the chair of the appropriate school approves and a faculty member directs the project. Although doctoral students working full-time on thesis research should normally be registered for a full course load of 9000 level dissertation hours each semester, this requirement is at the discretion of the advisor and the department: no minimum number of 9000 level dissertation hours is required for the doctoral degree. Doctoral students must be registered in the semester of graduation.

While no fixed course requirements apply for the doctoral degree, the student's thesis advisory committee may recommend graduate coursework in both a major and a minor field of study. Doctoral students must be registered in the semester of graduation. See Additional Graduation Requirements for more information.

## ADDITIONAL GRADUATION REQUIREMENTS

In addition to requirements listed elsewhere, the candidate must:

1. Submit a petition for the degree to the Registrar's Office during the term preceding the anticipated final term of work. Petition forms are available from the Registrar's Office.
2. Have an overall grade point average of at least 3.0 in order to graduate.
3. Register for a minimum of one hour of dissertation in the term of graduation. This reduction from the normal minimum course load of three hours may be used only once. If all requirements for graduation, including submission of the final approved dissertation, have been completed prior to the last day of registration, and the student was registered for the preceding term, the student may apply for a waiver of the enrollment requirement.
4. Pay the Institute a fee for archiving and distributing the dissertation through UMI Dissertations Publishing prior to the final submission of the completed dissertation to Graduate Studies via the Electronic Thesis and Dissertation Web site.

If both the dissertation and the examination are satisfactory and the candidate has completed the requirements of residence, minor field, and any additional school requirements, the Graduate Studies Office will certify the candidate as qualified to receive the degree of Doctor of Philosophy.

## LANGUAGE REQUIREMENTS

The student's school may require a reading knowledge of one or more foreign languages.

## UNDERGRADUATE MINOR GUIDELINES

Minors are intended to encourage and officially acknowledge the attainment by students of a fair measure of expertise and knowledge in more than one academic field, with the goal of broadening their education.

1. All undergraduate minor programs must be approved by the Undergraduate Curriculum Committee and by the Academic Senate.
2. All proposals for a minor must originate from the faculty of the academic unit offering the minor or, in the case of a multidisciplinary minor, from the faculty of each participating academic unit. Proposals must be endorsed by the appropriate College dean(s) and by the Provost.
3. Ordinarily a minor may be offered only in a field in which Georgia Tech offers a degree program. Exceptions, which also require approval by the University System Chancellor, may be made if (a) the proposed minor is in a recognized academic field or discipline, and (b) the school or department has in place sufficient courses, faculty, and facilities for offering the minor.
4. A minor program must comprise at least eighteen semester hours, of which at least 12 semester hours are upper-division coursework (numbered 3000 or above). The depth of the program should ensure that upon completion the student will have attained a fair measure of expertise and knowledge in the minor field.
5. No more than 6 semester hours of Special Topics courses may be included in a minor program. No more than a total of 4 semester hours of Special Problems and Undergraduate Research courses may be included in the minimum eighteen hours of a minor program.
6. Courses required by name and number and/or used to satisfy Core Areas A through E in a student's major degree program may not be used in satisfying the course requirements for a minor. However, courses used in a minor also may be used to fulfill other elective requirements (free electives, technical electives, etc.) in the student's major degree program.
7. A course may not be counted toward more than one minor and/or certificate.
8. All courses counting toward the minor must be taken on a letter-grade basis and completed with an overall grade point average of at least 2.00.
9. The minor(s) must be in field(s) outside the student's major field.
10. The availability of a minor should be noted in the catalog along with the description of the corresponding major degree program. The academic unit offering the minor shall publish and make available to students the requirements for the minor - the courses and total number of hours required, along with the enumeration of any particular courses that are mandated or excluded, and any grade requirements that differ from the general grade requirements of this policy.
11. A student may select a minor in consultation with the advisor in the major field. The student should then consult an advisor in the minor field, who can inform the student of any remaining requirements. When the student petitions for a degree, he/she should complete a petition for a minor and have it approved by the minor advisor. The petition for a minor will accompany the petition for the major degree when reviewed and approved by the major school. The two forms are then submitted to the Registrar. The minor will be conferred at the same time the degree is conferred and the degree and minor will be recorded on the student's transcript. The minor will not be on the diploma. Minors may not be conferred retroactively upon students who have graduated.
12. All minor programs are to be reviewed at least once every six years, as part of the regular program review in the sponsoring unit(s).

## UNDERGRADUATE MINORS AT GEORGIA TECH

Minors are intended to encourage and officially acknowledge the attainment by students of a fair measure of expertise and knowledge in more than one academic field, with the goal of broadening their education.

### UNDERGRADUATE MINOR GUIDELINES

- **AEROSPACE ENGINEERING**
- **ARCHITECTURAL HISTORY**
- **BIOLOGY**
- **BIOMEDICAL ENGINEERING**
- **CHINESE**
- **COMPUTER SCIENCE**
- **EARTH AND ATMOSPHERIC SCIENCES**
- **ECONOMICS**
- **FILM AND MEDIA STUDIES**
- **FRENCH**
- **GERMAN**
- **HISTORY**
- **INTERNATIONAL AFFAIRS**
- **JAPANESE**
- **LAW, SCIENCE, AND TECHNOLOGY**
- **MATHEMATICS**
- **MATERIALS SCIENCE AND ENGINEERING**
- **MULTIDISCIPLINARY DESIGN/ARTS HISTORY**
- **MUSIC**
- **NUCLEAR AND RADIOLOGICAL ENGINEERING**
- **PERFORMANCE STUDIES**
- **PHILOSOPHY, SCIENCE, AND TECHNOLOGY**
- **POLITICAL SCIENCE**
- **POLYMER/FIBER ENTERPRISE MANAGEMENT**
- **PSYCHOLOGY**
- **PUBLIC POLICY**
- **RUSSIAN STUDIES**

- **SOCIOLOGY**
- **SPANISH**
- **WOMEN, SCIENCE, AND TECHNOLOGY**

# Approved Program of Study for Undergraduate Minors
# Georgia Institute of Technology
# Office of the Registrar
# 2008-2009
# Minor in Aerospace Engineering

Please type or print in ink:

| | |
|---|---|
| Name (first/last): | GT Student ID Number: |
| GT Email Address: | Daytime Phone: |
| Major: | Anticipated Graduation Date: |

**In addition to the guidelines listed below, you are responsible for reviewing and following the general guidelines for minors: http://www.catalog.gatech.edu/academics/minorguide.php**

A. The AE minor must comprise at least 18 semester hours, of which at least 12 semester hours are upper-division coursework (numbered 3000 or above). **Statics (COE 2001 or equivalent) and Dynamics (AE 2220 or equivalent) are pre-requisites. Required courses include: AE 1350, 2020, 3310. The following required coursework must include completion of one of the following tracks:**

**Aerodynamics Track**: AE 3450, 3021, and AE Electives
**Propulsion Track**: AE 3450, 4451, and AE Electives
**Avionics Track**: AE 3801 (3-D Dynamics, bridge course, if needed), 3515, 3521, 4580
**Aeroelasticity Track**: AE 2801 (Deformable Bodies, bridge course, if needed) 3120, 3122, 4220
**Structures Track**: AE 2801 (if needed), 3120, 3122, and AE Electives
**Flight Dynamics and Control Track**: AE 3801 (3-D Dynamics, bridge course, if needed), 3515, 3521, AE Electives

B. A maximum of 3 hours of AE 3355/4335 may be applied to satisfy the minor. Students may not use AE 3515 to satisfy their minor requirements if they use ME 3015 or ECE 3085 to satisfy their major requirements. Students may not use AE 3120 to satisfy their minor requirements if they use ME 3201 or CEE 3050 to satisfy their major requirements.

It is the **major advisor's responsibility** to verify that students are not using any courses required by name and number for their major, that they are not using any core area A-E courses (including humanities and social sciences), and that they are not using any courses for more than one minor or certificate. Free electives and technical electives may be used towards minors.

List the courses completed for the requested minor:

| Course and Section | Course Title | Credit Hours | Grade | Semester Completed |
|---|---|---|---|---|
| AE 1350 | Introduction to Aerospace Engineering | 2 | | |
| AE 2020 | Low-Speed Aerodynamics | 3 | | |
| AE 3310 | Introduction to Aerospace Vehicle Performance | 3 | | |
| | | | | |
| | | | | |
| | | | | |

| |
|---|
| Student Signature: |
| Major School Signature: |
| Minor School Signature: |

# Approved Program of Study for Undergraduate Minors
# Georgia Institute of Technology
# Office of the Registrar
# 2008-2009
# Minor in Architectural History

Please type or print in ink:

| Name (first/last): | GT Student ID Number: |
|---|---|
| GT Email Address: | Daytime Phone: |
| Major: | Anticipated Graduation Date: |

**In addition to the guidelines listed below, you are responsible for reviewing and following the general guidelines for minors: http://www.catalog.gatech.edu/academics/minorguide.php**

A. The Architectural History minor must comprise at least 18 semester hours, of which at least 12 semester hours are upper-division coursework (numbered 3000 or above). **Required courses include: ARCH 2111 and ARCH 2112 or ARCH 4105 and ARCH 4106. Completion of the minor must include four courses (six for Architecture Program students)from the following: ARCH 2115, 4113, 4114, 4117, 4118, 4119, 4120, 4123, 4124, 4125, 4821 or 4822 or 4823 (approval needed for those courses), COA 3115, 3116**

B. Cross registration course work in architectural history from other Atlanta universities may be considered on a case by case basis.

C. This minor requires an overall GPA of 2.5.

D. Special Problem courses cannot be used towards the minor.

It is the **major advisor's responsibility** to verify that students are not using any courses required by name and number for their major, that they are not using any core area A-E courses (including humanities and social sciences), and that they are not using any courses for more than one minor or certificate. Free electives and technical electives may be used towards minors.

List the courses completed for the requested minor:

| Course and Section | Course Title | Credit Hours | Grade | Semester Completed |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| Student Signature: |
|---|
| Major School Signature: |
| Minor School Signature: |

# Approved Program of Study for Undergraduate Minors
# Georgia Institute of Technology
# Office of the Registrar
## 2008-2009
## Minor in Biology

Please type or print in ink:

| | |
|---|---|
| Name (first/last): | GT Student ID Number: |
| GT Email Address: | Daytime Phone: |
| Major: | Anticipated Graduation Date: |

**In addition to the guidelines listed below, you are responsible for reviewing and following the general guidelines for minors: http://www.catalog.gatech.edu/academics/minorguide.php**

The Biology minor must comprise at least 18 semester hours, of which at least 12 semester hours are upper-division coursework (numbered 3000 or above).

It is the **major advisor's responsibility** to verify that students are not using any courses required by name and number for their major, that they are not using any core area A-E courses (including humanities and social sciences), and that they are not using any courses for more than one minor or certificate. Free electives and technical electives may be used towards minors.

List the courses completed for the requested minor:

| Course and Section | Course Title | Credit Hours | Grade | Semester Completed |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| |
|---|
| Student Signature: |
| Major School Signature: |
| Minor School Signature: |

# Approved Program of Study for Undergraduate Minors
# Georgia Institute of Technology
# Office of the Registrar
## 2008-2009
## Minor in Biomedical Engineering

Please type or print in ink:

| Name (first/last): | GT Student ID Number: |
|---|---|
| GT Email Address: | Daytime Phone: |
| Major: | Anticipated Graduation Date: |

**In addition to the guidelines listed below, you are responsible for reviewing and following the general guidelines for minors: http://www.catalog.gatech.edu/academics/minorguide.php**

The Biomedical Engineering minor must comprise at least 18 semester hours, of which at least 12 semester hours are upper-division coursework (numbered 3000 or above). **Required courses include APPH/BIOL 3751 and BMED/CHBE/ECE/ME/MSE 1750. In addition, please select from the following:**

**Biosciences Coursework (minimum of 3 hours required)**:
Choose from the following:

| | |
|---|---|
| APPH | 4100, 4200, 4600; |
| BIOL | 2344, 3340, 4478, 4570; |
| BIOL/BMED | 4752; |
| CHEM | 3511, 4511, 4512 |

**Biomedical Engineering Coursework (minimum of 6 hours required)**:
Choose from the following:

| | |
|---|---|
| AE/BMED/CHBE/ME | 4757, 4758; |
| BMED | 4400, 4500, 4783; |
| BMED/CHBE/CHEM | 4765; |
| BMED/ECE | 4783, 4784; |
| BMED/MSE | 4571; |
| BMED/NRE/MP | 4750; |
| CHE/ECE/ME | 4781, 4782 |

It is the **major advisor's responsibility** to verify that students are not using any courses required by name and number for their major, that they are not using any core area A-E courses (including humanities and social sciences), and that they are not using any courses for more than one minor or certificate. Free electives and technical electives may be used towards minors.

List the courses completed for the requested minor:

| Course and Section | Course Title | Credit Hours | Grade | Semester Completed |
|---|---|---|---|---|
| APPH/BIOL 3751 | Human Anatomy and Physiology | 3 | | |
| BMED/CHBE/ECE/ME/MSE | Introduction to Bioengineering | 3 | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| Student Signature: |
|---|
| Major School Signature: |
| Minor School Signature: |

# Approved Program of Study for Undergraduate Minors
# Georgia Institute of Technology
# Office of the Registrar
# 2008-2009
# Minor in Cognitive Science
(Cross-listed with CS/PSY/PST/ISYE)

Please type or print in ink:

| | |
|---|---|
| Name (first/last): | GT Student ID Number: |
| GT Email Address: | Daytime Phone: |
| Major: | Anticipated Graduation Date: |

**In addition to the guidelines listed below, you are responsible for reviewing and following the general guidelines for minors: http://www.catalog.gatech.edu/academics/minorguide.php**

The Cognitive Science minor must comprise at least 18 semester hours, **with one required course CS/PSY/PST/ISYE 3790**, 12 additional semester credit hours from courses on the list, and a 4000-level integrative experience in Cognitive Science (Area F below). Six of the additional 12 credits must be chosen from two different specialty units (A through D), not including the student's major area. The other six credit hours may be chosen from any courses within the listed areas A through E.

List of Unit Courses in Specialty Areas:

A. Cognitive Psychology
PSY 1101, 2103, 3010, 3040, 4010, 4090, 4200

B. Artificial Intelligence
CS 4600, 4610, 4630m 4640, 4650

C. Philosophy
PST 3115, 4110, 4174, PST/CS 4752

D. Cognitive Science
ISYE 4009

E. Applications and Other
PSY 4030, CS 4660, CS 4665, Cs 4670, CS/PSY 4750

F. Required Course (one of the following)
CS/PSY/PST/ISYE 4790 or 4791 or 4792

It is the **major advisor's responsibility** to verify that students are not using any courses required by name and number for their major, that they are not using any core area A-E courses (including humanities and social sciences) counted towards the major, and that they are not using courses for more than one minor or certificate. Free electives and technical electives may be used towards minors.

List the courses completed for the requested minor:

| Course and Section | Course Title | Credit Hours | Grade | Semester Completed |
|---|---|---|---|---|
| CS/PSY/PST/ISYE 3790 | Introduction to Cognitive Science | 3 | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| |
|---|
| Student Signature: |
| Major School Signature: |
| Minor School Signature: |

# Approved Program of Study for Undergraduate Minors
# Georgia Institute of Technology
# Office of the Registrar
## 2008-2009
## Minor in Computer Science

Please type or print in ink:

| | |
|---|---|
| Name (first/last): | GT Student ID Number: |
| GT Email Address: | Daytime Phone: |
| Major: | Anticipated Graduation Date: |

**In addition to the guidelines listed below, you are responsible for reviewing and following the general guidelines for minors: http://www.catalog.gatech.edu/academics/minorguide.php**

A. The Computer Science minor must comprise at least 18 semester hours of computer science coursework of which at least 12 hours must be at the 3000 level or higher. Courses at the 3000 – level or higher must be selected from any existing required or elective Computer Science course in any "Thread." At least two of those courses must be in the same Thread.

B. **Prerequisite for the minor is CS 1331.**

C. No Special Problems or Internship coursework may be used towards the CS minor.

D. All courses must be completed with a grade of C or better.

It is the **major advisor's responsibility** to verify that students are not using any courses required by name and number for their major, that they are not using any core area A-E courses (including humanities and social sciences), and that they are not using any courses for more than one minor or certificate. Free electives and technical electives may be used towards minors.

List the courses completed for the requested minor:

| Course and Section | Course Title | Credit Hours | Grade | Semester Completed |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| |
|---|
| Student Signature: |
| Major School Signature: |
| Minor School Signature: |

# Approved Program of Study for Undergraduate Minors
# Georgia Institute of Technology
# Office of the Registrar
## 2008-2009
## Minor in Earth and Atmospheric Sciences

Please type or print in ink:

| | |
|---|---|
| Name (first/last): | GT Student ID Number: |
| GT Email Address: | Daytime Phone: |
| Major: | Anticipated Graduation Date: |

**In addition to the guidelines listed below, you are responsible for reviewing and following the general guidelines for minors: http://www.catalog.gatech.edu/academics/minorguide.php**

The EAS minor must comprise at least 18 semester hours, of which at least 12 semester hours are upper-division coursework (numbered 3000 or above). **Required courses include: One of EAS 2750 or EAS 2600; Two of EAS 3620, 4630, 4740, 4655, and/or 4420; One of EAS 4610 or 4602; and 4-6 additional credit hours of EAS courses to reach 18 credit hours total.**

It is the **major advisor's responsibility** to verify that students are not using any courses required by name and number for their major, that they are not using any core area A-E courses (including humanities and social sciences), and that they are not using any courses for more than one minor or certificate. Free electives and technical electives may be used towards minors.

List the courses completed for the requested minor:

| Course and Section | Course Title | Credit Hours | Grade | Semester Completed |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| |
|---|
| Student Signature: |
| Major School Signature: |
| Minor School Signature: |

# Approved Program of Study for Undergraduate Minors
# Georgia Institute of Technology
# Office of the Registrar
## 2008-2009
## Minor in Economics

Please type or print in ink:

| | |
|---|---|
| Name (first/last): | GT Student ID Number: |
| GT Email Address: | Daytime Phone: |
| Major: | Anticipated Graduation Date: |

**In addition to the guidelines listed below, you are responsible for reviewing and following the general guidelines for minors: http://www.catalog.gatech.edu/academics/minorguide.php**

A. The Economics minor must comprise at least 18 semester hours, of which at least 12 semester hours are upper-division coursework (numbered 3000 or above).

B. Courses required by name and number and/or used to satisfy Core Areas A through E in a student's major degree program may not be used in satisfying the course requirements for a minor **(courses used to fulfill social science requirements cannot be applied towards the minor)**. However, courses used in a minor also may be used to fulfill other elective requirements (free electives, technical electives, etc.) in the student's major degree program.

List the courses completed for the requested minor:

| Course and Section | Course Title | Credit Hours | Grade | Semester Completed |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| |
|---|
| Student Signature: |
| Major School Signature: |
| Minor School Signature: |

# Approved Program of Study for Undergraduate Minors
# Georgia Institute of Technology
# Office of the Registrar
## 2008-2009
## Minor in Film and Media Studies

Please type or print in ink:

| | |
|---|---|
| Name (first/last): | GT Student ID Number: |
| GT Email Address: | Daytime Phone: |
| Major: | Anticipated Graduation Date: |

**In addition to the guidelines listed below, you are responsible for reviewing and following the general guidelines for minors: http://www.catalog.gatech.edu/academics/minorguide.php**

The Film and Media Studies minor must comprise at least 18 semester hours, of which at least 12 semester hours are upper-division coursework (numbered 3000 or above).

I. Each student must take two courses from this group (6 hours): LCC 2500 or LCC 2400 and LCC 3254.
II. Each student must also take three courses from this group (9 hours): LCC 3206, 3252, 3256, 3314, 3352, 3406, 3853
III. Each student must also take either a capstone-type course or a course from a closely related area that will provide additional depth and perspective to the study of film and media (3 hours): Capstone courses: LCC 4400, 4500 or Related courses: HTS course on film/media (e.g. HTS 2085) or modern language course on film/media (e.g. GRMN 4024)

It is the **major advisor's responsibility** to verify that students are not using any courses required by name and number for their major, that they are not using any core area A-E courses (including humanities and social sciences), and that they are not using any courses for more than one minor or certificate. Free electives and technical electives may be used towards minors.

List the courses completed for the requested minor:

| Course and Section | Course Title | Credit Hours | Grade | Semester Completed |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| |
|---|
| Student Signature: |
| Major School Signature: |
| Minor School Signature: |

# Approved Program of Study for Undergraduate Minors
# Georgia Institute of Technology
# Office of the Registrar
## 2008-2009
## Minor in History

Please type or print in ink:

| | |
|---|---|
| Name (first/last): | GT Student ID Number: |
| GT Email Address: | Daytime Phone: |
| Major: | Anticipated Graduation Date: |

**In addition to the guidelines listed below, you are responsible for reviewing and following the general guidelines for minors: http://www.catalog.gatech.edu/academics/minorguide.php**

The History minor must comprise at least 18 semester hours, of which at least 12 semester hours are upper-division coursework (numbered 3000 or above). Three hours taken outside of History may be counted toward the minor with approval from the School.

It is the **major advisor's responsibility** to verify that students are not using any courses required by name and number for their major, that they are not using any core area A-E courses (including humanities and social sciences), and that they are not using any courses for more than one minor or certificate. Free electives and technical electives may be used towards minors.

List the courses completed for the requested minor:

| Course and Section | Course Title | Credit Hours | Grade | Semester Completed |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| |
|---|
| Student Signature: |
| Major School Signature: |
| Minor School Signature: |

# Approved Program of Study for Undergraduate Minors
# Georgia Institute of Technology
# Office of the Registrar
## 2008-2009
## Minor in International Affairs

Please type or print in ink:

| Name (first/last): | GT Student ID Number: |
|---|---|
| GT Email Address: | Daytime Phone: |
| Major: | Anticipated Graduation Date: |

**In addition to the guidelines listed below, you are responsible for reviewing and following the general guidelines for minors: http://www.catalog.gatech.edu/academics/minorguide.php**

A. The International Affairs minor must comprise at least 18 semester hours, of which at least 12 semester hours are upper-division coursework (numbered 3000 or above). **Required courses include INTA 1110 and one course at the 2000-level (not to include INTA 2010).** A student may seek permission from the School to allow 3 hours of upper-division, non-INTA coursework to count toward the completion of the minor if that coursework is clearly relevant to International Affairs.

B. All coursework must be completed with a grade of C or higher.

It is the **major advisor's responsibility** to verify that students are not using any courses required by name and number for their major, that they are not using any core area A-E courses (including humanities and social sciences), and that they are not using any courses for more than one minor or certificate. Free electives and technical electives may be used towards minors.

List the courses completed for the requested minor:

| Course and Section | Course Title | Credit Hours | Grade | Semester Completed |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| Student Signature: |
|---|
| Major School Signature: |
| Minor School Signature: |

# Approved Program of Study for Undergraduate Minors
# Georgia Institute of Technology
# Office of the Registrar
# 2008-2009
# Minor in Law, Science and Technology

Please type or print in ink:

| | |
|---|---|
| Name (first/last): | GT Student ID Number: |
| GT Email Address: | Daytime Phone: |
| Major: | Anticipated Graduation Date: |

**In addition to the guidelines listed below, you are responsible for reviewing and following the general guidelines for minors http://www.catalog.gatech.edu/academics/minorguide.php. Pre-Law Minor details may be found here: http://www.prelaw.gatech.edu/certminorrules_spring08.pdf.**

A. The LST minor must comprise at least 18 semester hours, of which at least 15 semester hours are upper-division coursework (numbered 3000 or above). **Required courses include one of the following: PUBP 3000, PUBP 3016, PUBP 3610 or PUBP 4609**.

B. No more than 9 semester hours of Special Topics courses may be included in a minor program.

C. Students who began the LST minor prior to Fall 2003, may apply under an earlier set of guidelines. Please see Professor Robert Pikowsky, Director of the Pre-Law Program, for details.

It is the **major advisor's responsibility** to verify that students are not using any courses required by name and number for their major, that they are not using any core area A-E courses (including humanities and social sciences), and that they are not using any courses for more than one minor or certificate. Free electives and technical electives may be used towards minors.

List the courses completed for the requested minor:

| Course and Section | Course Title | Credit Hours | Grade | Semester Completed |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| |
|---|
| Student Signature: |
| Recommended (Major School Signature): |
| Approved (Minor School Signature): |

# Approved Program of Study for Undergraduate Minors
# Georgia Institute of Technology
# Office of the Registrar
# 2008-2009
# Minor in Mathematics

Please type or print in ink:

| | |
|---|---|
| Name (first/last): | GT Student ID Number: |
| GT Email Address: | Daytime Phone: |
| Major: | Anticipated Graduation Date: |

**In addition to the guidelines listed below, you are responsible for reviewing and following the general guidelines for minors: http://www.catalog.gatech.edu/academics/minorguide.php**

A. The Mathematics minor must comprise 18 semester hours of upper-division coursework (numbered 3000 or above).
**Required courses include choosing either Track I or Track II:**

**Track I**:
MATH 4317, 4107, 4305 and 9 additional hours of Mathematics courses at the 3000 level or above

**Track II**: Choose 9 hours in one of the following fields:
Analysis: Math 4317, 4318, 4320, 4581, 4640, 4641
Algebra and Number Theory: MATH 4107, 4108, 4150, 4305, 4012
Probability and Statistics: MATH 3215, 3770, 4221, 4222, 4225, 4261, 4262, 4280
Dynamics and Differential Equations: MATH 4347, 4348, 4541, 4542, 4581
Discrete Mathematics: MATH 3012, 4012, 4022, 4032, 4580
Geometry and Topology: MATH 4431, 4432, 4441

And 9 additional hours of Mathematics courses at the 3000 level or above

It is the **major advisor's responsibility** to verify that students are not using any courses required by name and number for their major, that they are not using any core area A-E courses (including humanities and social sciences), and that they are not using any courses for more than one minor or certificate. Free electives and technical electives may be used towards minors.

List the courses completed for the requested minor:

☐ Track I ☐ Track II/Field:________________________________________

| Course and Section | Course Title | Credit Hours | Grade | Semester Completed |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| |
|---|
| Student Signature: |
| Major School Signature: |
| Minor School Signature: |

# Approved Program of Study for Undergraduate Minors
# Georgia Institute of Technology
# Office of the Registrar
## 2008-2009
## Minor in Chinese, French, German, Japanese, Russian Studies or Spanish

Please type or print in ink:

| | |
|---|---|
| Name (first/last): | GT Student ID Number: |
| GT Email Address: | Daytime Phone: |
| Major: | Minor: |
| Anticipated Graduation Date: | |

**In addition to the guidelines listed below, you are responsible for reviewing and following the general guidelines for minors: http://www.catalog.gatech.edu/academics/minorguide.php**

1. Students must earn 18 credit hours of language electives in a single language:
   a. French, German, and Spanish
      i. Beyond the 2002 course for students enrolled at GT through Spring 2007
      ii. Beyond the 2001 course for new students enrolled at GT after Spring 2007
   b. Chinese, Japanese, and Russian Studies, beyond the 2001 course
   c. Students pursuing a minor in Russian Studies should take their electives in at least two different departments/schools (Modern Languages, International Affairs, and/or Literature, Communication, and Culture)
2. A maximum of 6 semester hours of Special Topics is allowed in each minor except for Russian Studies which allows a maximum of 9 semester hours.
3. A maximum of 9 semester hours of transfer credit is allowed in each minor.

It is the **major advisor's responsibility** to verify that students are not using any courses required by name and number for their major, that they are not using any core area A-E courses (including humanities and social sciences), and that they are not using any courses for more than one minor or certificate. Free electives and technical electives may be used towards minors.

List the courses completed for the requested minor:

| Course and Section | Course Title | Credit Hours | Grade | Semester Completed |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| |
|---|
| Student Signature: |
| Major School Signature: |
| Minor School Signature: |

# Approved Program of Study for Undergraduate Minors
# Georgia Institute of Technology
# Office of the Registrar
## 2008-2009
## Minor in Materials Science and Engineering

Please type or print in ink:

| Name (first/last): | GT Student ID Number: |
|---|---|
| GT Email Address: | Daytime Phone: |
| Major: | Anticipated Graduation Date: |

**In addition to the guidelines listed below, you are responsible for reviewing and following the general guidelines for minors: http://www.catalog.gatech.edu/academics/minorguide.php**

The MSE minor must comprise at least 18 semester hours, of which at least 12 semester hours are upper-division coursework (numbered 3000 or above).

It is the **major advisor's responsibility** to verify that students are not using any courses required by name and number for their major, that they are not using any core area A-E courses (including humanities and social sciences), and that they are not using any courses for more than one minor or certificate. Free electives and technical electives may be used towards minors.

List the courses completed for the requested minor:

| Course and Section | Course Title | Credit Hours | Grade | Semester Completed |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| |
|---|
| Student Signature: |
| Major School Signature: |
| Minor School Signature: |

# Approved Program of Study for Undergraduate Minors
# Georgia Institute of Technology
# Office of the Registrar
## 2008-2009
## Minor in Multi-disciplinary Design/Arts History

Please type or print in ink:

| | |
|---|---|
| Name (first/last): | GT Student ID Number: |
| GT Email Address: | Daytime Phone: |
| Major: | Anticipated Graduation Date: |

**In addition to the guidelines listed below, you are responsible for reviewing and following the general guidelines for minors: http://www.catalog.gatech.edu/academics/minorguide.php**

The Multi-disciplinary Design/Arts History minor must comprise at least 18 semester hours, of which at least 12 semester hours are upper-division coursework (numbered 3000 or above). **Required courses include: ARCH 2111 and 2112 or ARCH 4105 and 4106 or COA 2241 and 2242 or ID 2011 or 2012. Completion of the minor must include 4 courses from at least 3 of the 5 lists:**

**I. Architecture of History:**
ARCH 2111, 2112, 4105, 4106, 4114, 4117, 4151, 4821-3 (with approval)

**II. History of Industrial Design**:
ID 2202, 3801 -2 (with approval), 4204, 4205, 4803, 4804,4805

**III. History of the City; Landscape/Garden History**:
ARCH 4151, 4821 – 3 (with approval), CP 4010, 4020, 4040

**IV. History of Art and Foreign Study**:
ARCH 2115, COA 1060, 2115, 2116, 2241, 2242, 4121

**V. Music History**:
MUSI 3450, 3610, 3611, 3801-3 (with approval), 4801-3 (with approval), 4450

It is the **major advisor's responsibility** to verify that students are not using any courses required by name and number for their major, that they are not using any core area A-E courses (including humanities and social sciences), and that they are not using any courses for more than one minor or certificate. Free electives and technical electives may be used towards minors.

List the courses completed for the requested minor:

| Course and Section | Course Title | Credit Hours | Grade | Semester Completed |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| |
|---|
| Student Signature: |
| Major School Signature: |
| Minor School Signature: |

# Approved Program of Study for Undergraduate Minors
# Georgia Institute of Technology
# Office of the Registrar
## 2008-2009
## Minor in Music

Please type or print in ink:

| Name (first/last): | GT Student ID Number: |
|---|---|
| GT Email Address: | Daytime Phone: |
| Major: | Anticipated Graduation Date: |

**In addition to the guidelines listed below, you are responsible for reviewing and following the general guidelines for minors: http://www.catalog.gatech.edu/academics/minorguide.php**

The Music minor must comprise at least 18 semester hours, of which at least 12 semester hours are upper-division coursework (numbered 3000 or above). **Required courses include MUSI 2600, 3450, 3600, 3610, 3620, 3710, 3720, 3730, and one semester hour of a Music Technology elective or upper-division coursework approved by the department. In addition, 3 semester hours participation in one vocal or instrumental ensemble at the 3000 level or above chosen from the following list: Concert Band, Symphonic Band, Jazz Ensemble, Orchestra/Choral, Vocal Ensemble, Men's Glee Club, or Percussion Ensemble.**

It is the **major advisor's responsibility** to verify that students are not using any courses required by name and number for their major, that they are not using any core area A-E courses (including humanities and social sciences), and that they are not using any courses for more than one minor or certificate. Free electives and technical electives may be used towards minors.

List the courses completed for the requested minor:

| Course and Section | Course Title | Credit Hours | Grade | Semester Completed |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| |
|---|
| Student Signature: |
| Major School Signature: |
| Minor School Signature: |

# Approved Program of Study for Undergraduate Minors
# Georgia Institute of Technology
# Office of the Registrar
## 2008-2009
## Minor in Nuclear and Radiological Engineering

Please type or print in ink:

| Name (first/last): | GT Student ID Number: |
|---|---|
| GT Email Address: | Daytime Phone: |
| Major: | Anticipated Graduation Date: |

**In addition to the guidelines listed below, you are responsible for reviewing and following the general guidelines for minors: http://www.catalog.gatech.edu/academics/minorguide.php**

The NRE minor must comprise at least 18 semester hours, of which at least 12 semester hours are upper-division coursework (numbered 3000 or above). **Required courses include NRE 3301, 3212, and 3316. Completion of the minor includes 9 hours from the following: NRE 2110, 4204, 4206, 4214, 4232, 4234, 4266, 4328, 4404, 4750, 4610, 4770.**

It is the **major advisor's responsibility** to verify that students are not using any courses required by name and number for their major, that they are not using any core area A-E courses (including humanities and social sciences), and that they are not using any courses for more than one minor or certificate. Free electives and technical electives may be used towards minors.

List the courses completed for the requested minor:

| Course and Section | Course Title | Credit Hours | Grade | Semester Completed |
|---|---|---|---|---|
| NRE 3301 | Radiation Physics | 3 | | |
| NRE 3212 | Fundamentals of Nuclear and Radiological Engineering | 3 | | |
| NRE 3316 | Radiation Protection Engineering | 3 | | |
| | | | | |
| | | | | |
| | | | | |

| |
|---|
| Student Signature: |
| Major School Signature: |
| Minor School Signature: |

# Approved Program of Study for Undergraduate Minors
# Georgia Institute of Technology
# Office of the Registrar
# 2008-2009
# Minor in Performance Studies

Please type or print in ink:

| | |
|---|---|
| Name (first/last): | GT Student ID Number: |
| GT Email Address: | Daytime Phone: |
| Major: | Anticipated Graduation Date: |

**In addition to the guidelines listed below, you are responsible for reviewing and following the general guidelines for minors: http://www.catalog.gatech.edu/academics/minorguide.php**

The Performance Studies minor must comprise at least 18 semester hours, of which at least 12 semester hours are upper-division coursework (numbered 3000 or above). **Required courses include:**

Performance Studies (3 hours)
LCC 2600

Focused Studies in Performance (3 hours)
Select one: LCC 3262 or 3362 or 3863

Seminars in Performance (3 hours)
LCC 4600

Theatre, Film, Media Studies, Performance Practicum (9 hours)
Select three: LCC 2400 **or** 2500, 3216, 3218, 3220, 3226, 3228, 3252, 3254, 3256, 3352, 3406, 3853, 4400, 4500, 4602

It is the **major advisor's responsibility** to verify that students are not using any courses required by name and number for their major, that they are not using any core area A-E courses (including humanities and social sciences), and that they are not using any courses for more than one minor or certificate. Free electives and technical electives may be used towards minors.

List the courses completed for the requested minor:

| Course and Section | Course Title | Credit Hours | Grade | Semester Completed |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| |
|---|
| Student Signature: |
| Major School Signature: |
| Minor School Signature: |

# Approved Program of Study for Undergraduate Minors
# Georgia Institute of Technology
# Office of the Registrar
# 2008-2009
## Minor in Polymer/Fiber Enterprise Management

Please type or print in ink:

| Name (first/last): | GT Student ID Number: |
|---|---|
| GT Email Address: | Daytime Phone: |
| Major: | Anticipated Graduation Date: |
| **In addition to the guidelines listed below, you are responsible for reviewing and following the general guidelines for minors: http://www.catalog.gatech.edu/academics/minorguide.php** | |

A. The Fiber Enterprise Management minor must comprise at least 19 semester hours, of which at least 12 semester hours are upper-division coursework (numbered 3000 or above). **Required courses include:**
   1. PTFE 3720 Introduction to the Fiber Enterprise
   2. PTFE 4720 Fiber Processing for Managers OR PTFE 3200 Yarn & Fabrication Formation
   3. PTFE 4721 Fabric Processing for Color & Performance OR PTFE 4100 Chemical Processing of Textile Materials
   4. PTFE 3220 Fiber Operations & Management
   5. PTFE 4723 Properties of Textile Materials OR PTFE 2200 Structure & Properties of Fibers/Polymers
   6. PTFE 3221 Textile Formation & Testing Laboratory
   7. PTFE 4122 Chemical Processing Laboratory
   8. PTFE Elective (must be PTFE 4101 Carpet Technology OR PTFE 4108 Textile Productions Economics, OR another PTFE course approved by the School).

B. This minor requires a total of **19** semester hours.

It is the **major advisor's responsibility** to verify that students are not using any courses required by name and number for their major, that they are not using any core area A-E courses (including humanities and social sciences), and that they are not using any courses for more than one minor or certificate. Free electives and technical electives may be used towards minors.

List the courses completed for the requested minor:

| Course and Section | Course Title | Credit Hours | Grade | Semester Completed |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| Student Signature: |
|---|
| Major School Signature: |
| Minor School Signature: |

# Approved Program of Study for Undergraduate Minors
# Georgia Institute of Technology
# Office of the Registrar
## 2008-2009
## Minor in Political Science

Please type or print in ink:

| | |
|---|---|
| Name (first/last): | GT Student ID Number: |
| GT Email Address: | Daytime Phone: |
| Major: | Anticipated Graduation Date: |

**In addition to the guidelines listed below, you are responsible for reviewing and following the general guidelines for minors: http://www.catalog.gatech.edu/academics/minorguide.php**

A. The Political Science minor must comprise at least 18 semester hours, of which at least 12 semester hours are upper-division coursework (numbered 3000 or above). A student may seek permission from the School of Public Policy to allow 3 hours of upper-division coursework taught outside the School to count toward the completion of the minor if that coursework is clearly relevant to Political Science. **Required courses include:**

Choose 6 from the following (at least 4 at 3000+ level):
INTA 2210, POL 2101, PUBP 2012, 2014, 3000, 3010, 3016, 3200, 3201, 3212, 3214, 4120, 4200, 4212, 4226, 4314, 4410, 4416, 4512, 4514

B. Courses required by name and number and/or used to satisfy Core Areas A through E in a student's major degree program may not be used in satisfying the course requirements for a minor **(courses used to fulfill social science requirements cannot be applied towards the minor)**. However, courses used in a minor also may be used to fulfill other elective requirements (free electives, technical electives, etc.) in the student's major degree program. **Major advisors, please verify.**

List the courses completed for the requested minor:

| Course and Section | Course Title | Credit Hours | Grade | Semester Completed |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| |
|---|
| Student Signature: |
| Major School Signature: |
| Minor School Signature: |

# Approved Program of Study for Undergraduate Minors
# Georgia Institute of Technology
# Office of the Registrar
## 2008-2009
## Minor in Philosophy, Science, and Technology

Please type or print in ink:

| | |
|---|---|
| Name (first/last): | GT Student ID Number: |
| GT Email Address: | Daytime Phone: |
| Major: | Anticipated Graduation Date: |

**In addition to the guidelines listed below, you are responsible for reviewing and following the general guidelines for minors: http://www.catalog.gatech.edu/academics/minorguide.php**

The PST minor must comprise at least 18 semester hours, of which at least 12 semester hours are upper-division coursework (numbered 3000 or above). **Required courses include: PST 3103, 3115.**

Choose 4 from the following list (at least 2 at 3000+ level):
PST 1101, INTA 2030, PST 2050, 2068, 3102, 3103, 3105, 3109, 3113, 4110, 4112, 4752, 4174, 4176, 4801-2-3.

It is the **major advisor's responsibility** to verify that students are not using any courses required by name and number for their major, that they are not using any core area A-E courses (including humanities and social sciences), and that they are not using any courses for more than one minor or certificate. Free electives and technical electives may be used towards minors.

List the courses completed for the requested minor:

| Course and Section | Course Title | Credit Hours | Grade | Semester Completed |
|---|---|---|---|---|
| PST 3103 | Modern Philosophy | 3 | | |
| PST 3115 | Philosophy of Science | 3 | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| |
|---|
| Student Signature: |
| Major School Signature: |
| Minor School Signature: |

# Approved Program of Study for Undergraduate Minors
# Georgia Institute of Technology
# Office of the Registrar
## 2008-2009
## Minor in Psychology

Please type or print in ink:

| | |
|---|---|
| Name (first/last): | GT Student ID Number: |
| GT Email Address: | Daytime Phone: |
| Major: | Anticipated Graduation Date: |

Guidelines:

1. The Psychology minor must comprise at least 18 semester hours, of which at least 12 semester hours are upper-division coursework (numbered 3000 or above). **Required courses include: PSYC 2015 and PSYC 2020. Courses excluded from the minor include: PSYC 3031 and PSYC 4031.**
2. No more than 6 semester hours of Special Topics courses may be included in a minor program.
3. No more than 4 semester hours of Special Problems or Undergraduate Research courses may be included in the minimum 18 hours of a minor program.
4. No more than 6 hours of Advanced Standing may be included in a minor program.
5. All courses counting toward the minor must be taken on a letter-grade basis, and completed with an overall average of at least 2.0.
6. No more than two minors may be awarded with a degree. Each must contain 18 semester hours not used in the other minor.
7. Courses required by name and number and/or used to satisfy Core Areas A through E in a student's major degree program may not be used in satisfying the course requirements for a minor. However, courses used in a minor also may be used to fulfill other elective requirements (free electives, technical electives, etc.) in the student's major degree program. **Major advisors, please verify.**
8. The minor will be conferred at the same time the degree is conferred and the degree and minor will be recorded on the student's transcript. The minor will not appear on the diploma. Minors may not be conferred retroactively upon students who have graduated.

List the courses completed for the requested minor:

| Course and Section | Course Title | Credit Hours | Grade | Semester Completed |
|---|---|---|---|---|
| PSYC 2015 | Research Methods | 4 | | |
| PSYC 2020 | Psychological Statistics | 4 | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| |
|---|
| Student Signature: |
| Major School Signature: |
| Minor School Signature: |

# Approved Program of Study for Undergraduate Minors
# Georgia Institute of Technology
# Office of the Registrar
## 2008-2009
## Minor in Public Policy

Please type or print in ink:

| | |
|---|---|
| Name (first/last): | GT Student ID Number: |
| GT Email Address: | Daytime Phone: |
| Major: | Anticipated Graduation Date: |

**In addition to the guidelines listed below, you are responsible for reviewing and following the general guidelines for minors: http://www.catalog.gatech.edu/academics/minorguide.php**

The Public Policy minor must comprise at least 18 semester hours, of which at least 12 semester hours are upper-division coursework (numbered 3000 or above). **POL 1101 or equivalent as determined by the administrator of the minor program is required in addition to the 18 semester hours for the minor.** A student may seek permission from the School of Public Policy to allow 3 hours of upper-division coursework taught outside the School to count toward the completion of the minor if that coursework is clearly relevant to Public Policy.

It is the **major advisor's responsibility** to verify that students are not using any courses required by name and number for their major, that they are not using any core area A-E courses (including humanities and social sciences), and that they are not using any courses for more than one minor or certificate. Free electives and technical electives may be used towards minors.

List the courses completed for the requested minor:

| Course and Section | Course Title | Credit Hours | Grade | Semester Completed |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| Student Signature: | | | | |
| Major School Signature: | | | | |
| Minor School Signature: | | | | |

# Approved Program of Study for Undergraduate Minors
# Georgia Institute of Technology
# Office of the Registrar
## 2008-2009
## Minor in Sociology
not available to HTS majors

Please type or print in ink:

| | |
|---|---|
| Name (first/last): | GT Student ID Number: |
| GT Email Address: | Daytime Phone: |
| Major: | Anticipated Graduation Date: |

**In addition to the guidelines listed below, you are responsible for reviewing and following the general guidelines for minors: http://www.catalog.gatech.edu/academics/minorguide.php**

The Sociology minor must comprise at least 18 semester hours, of which at least 12 semester hours are upper-division coursework (numbered 3000 or above). Three hours taken outside of sociology may be counted toward the minor, with the approval of the school.

It is the **major advisor's responsibility** to verify that students are not using any courses required by name and number for their major, that they are not using any core area A-E courses (including humanities and social sciences), and that they are not using any courses for more than one minor or certificate. Free electives and technical electives may be used towards minors.

List the courses completed for the requested minor:

| Course and Section | Course Title | Credit Hours | Grade | Semester Completed |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| |
|---|
| Student Signature: |
| Major School Signature: |
| Minor School Signature: |

# Approved Program of Study for Undergraduate Minors
# Georgia Institute of Technology
# Office of the Registrar
# 2008-2009
# Minor in Women Science and Technology

Please type or print in ink:

| Name (first/last): | GT Student ID Number: |
|---|---|
| GT Email Address: | Daytime Phone: |
| Major: | Anticipated Graduation Date: |

**In addition to the guidelines listed below, you are responsible for reviewing and following the general guidelines for minors: http://www.catalog.gatech.edu/academics/minorguide.php**

I. The WST minor must comprise at least 18 semester hours, of which at least 12 semester hours are upper-division coursework (numbered 3000 or above).

A. Required courses – Choose two from two different schools from the following: LCC 3304, HTS 3020, HTS 3021, PUBP 4212, PUBP 4803

B. Elective Courses – Choose four from the following list OR the A list; the four elective courses must be offered by at least two different Ivan Allen College schools:

**History Technology and Society** - HTS 2082, 2084, 3007, 3016, 3017, 3082, 3084, 3088
**Literature, Communication, and Culture** – LCC 2100, 3212, 3219, 3225, 3302, 3306, 3308, 3316, 3318
**Public Policy** – PUBP 2012, 4410, 4416, 4200
**International Affairs** – INTA 4803
**Modern Languages** – SPAN 3241, 3242
**Economics** – ECON 2100, 2101, 2106 – students cannot receive credit for ECON 2100 and ECON 2101 or for ECON 2100 and ECON 2105/6 or for ECON 2101 and ECON 2105/6.

II. Only one independent study course from another GT unit can substitute for one elective course as noted in B.

It is the **major advisor's responsibility** to verify that students are not using any courses required by name and number for their major, that they are not using any core area A-E courses (including humanities and social sciences), and that they are not using any courses for more than one minor or certificate. Free electives and technical electives may be used towards minors.

List the courses completed for the requested minor:

| Course and Section | Course Title | Credit Hours | Grade | Semester Completed |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| |
|---|
| Student Signature: |
| Major School Signature: |
| Minor School Signature: |

## ACADEMIC ADVISING

The appointed academic advisor is the key source of information about the college. All entering students are assigned an academic advisor depending on their declared majors at Georgia Tech. To find the assigned advisor, please visit the advising Web page. Students will meet their assigned advisors at orientation and at regular intervals during their college careers. Advisors welcome questions about different programs and areas.

Academic advisors are the guides through the college experience. They will help to identify the correct major, curriculum, minor, certificates, study abroad, internships, campus resources, and much more.

While the degree requirements are posted on the Registrar's Office Web page, it is essential to check in with the assigned advisor at least once a year (if not more) to ensure that requirements are being met and communication lines are open. Also, regular contact with the advisor will enhance each student's college experience and help them reach their future goals.

## FELLOWSHIP COMMUNICATION PROGRAM

The Fellowship Communication Program provides advice and instruction for all students — undergraduate and graduate — as they consider pursuing graduate school, national graduate fellowships, external prestigious undergraduate or graduate scholarships, and other awards.

General information is available from workshops and through the T-Square Fellowship Communication site. Students may schedule individual appointments to receive specialized advice and information about how to write effective essays for graduate fellowship and prestigious scholarship applications, how to manage the application process, and how to prepare for prestigious scholarship interviews. Early in their academic career, students are encouraged to sign up for the Fellowship Communication Program T-Square information site, attend a Fellowship workshop, schedule an appointment with a Fellowship adviser to learn about applications appropriate to their field and goals, and learn more about graduate fellowship and prestigious scholarship opportunities by going to the websites of organizations and foundations offering funding.

Georgia Tech students compete for a variety of external fellowships and prestigious scholarships offered by government agencies, private foundations, or corporate entities (such as National Science Foundation, NASA, the Hertz Foundation, the Ford Foundation, AT&T Labs), and prestigious scholarships for undergraduate or graduate study (such as the Rhodes, Marshall, Churchill, Gates-Cambridge, Mitchell, Fulbright, Jack Kent Cooke, Soros, Truman, Udall, Goldwater).

### Helpful Information

- Log onto T-Square (https://t-square.gatech.edu/portal) with the usual GT ID and password. The login link is in the upper right hand corner.
- In the ‘My Workspace’ tab (normally the first screen after log-in), click on the ‘Membership’ link to the left.
- Click the ‘Joinable Sites’ link, find our site: ‘Fellowship Comm Prog’ and click ‘join.’
- Follow the directions on the site to be added to email groups.

## GEORGIA TECH HONORS PROGRAM

The Georgia Tech Honors Program combines the challenging academic standards of one of the finest technological universities in the world with the closer connections between students and faculty one might expect to find at a small, selective college. The goal is to create a lively learning environment in which students and faculty members learn from each other through a common commitment to intellectual inquiry, careful analysis, and the energetic exchange of ideas. To promote and sustain this sort of close engagement between students and faculty, the Honors Program offers several features for students in the first two years of their studies at Georgia Tech, including the following:

- an Honors Program residence
- small sections of standard introductory courses
- a selection of small, topically oriented seminars
- a system of careful advising

## THE INTERNATIONAL PLAN

The International Plan is a challenging and coherent academic program for undergraduates that is designed to develop global competence within the context of a student's major. It is a degree-long program that integrates international studies and experiences into any participating major at Georgia Tech. It helps to prepare Georgia Tech graduates professionally and personally for successful lives in the twenty-first century.

The International Plan is not intended to replace current international programs; it supplements them. Existing study abroad opportunities continue to be offered. It is also not intended to be an add-on to the current degree programs. It is intended to be another curriculum path to earn a degree in which international competence is integrated into the program of study. The plan can be completed within the normal time frame of four years of undergraduate study.

In order to earn the International Plan designation in a participating major, students must complete the following four components:

- International Coursework: three courses, to include one from each of the following categories:
    1. International relations
    2. Global economics
    3. A course about a specific country or region
- International Experience: Two terms abroad (not less than twenty-six weeks) engaged in any combination of study abroad, research, or internship
- Second language proficiency: All students in the program are expected to reach at least the proficiency level equivalent to two years of college-level language study. Students who use the language to study, conduct research, or participate in an internship during their international experience are expected to attain a higher level of proficiency. Language proficiency is determined by testing (not course credits).
- Culminating Course: A capstone course in the major designed to tie the international studies and experiences together with the student's major

Completion of the International Plan is recognized by a designation on the student's diploma indicating completion of the degree with global competence, e.g., "B.S. in Electrical Engineering: International Plan."

For additional information about the International Plan visit www.internationalplan.gatech.edu.

### INTERNATIONAL RELATIONS-INTERNATIONAL PLAN ELECTIVES

| Course | Course Title | HUM | SS | ETHICS |
|---|---|---|---|---|
| GRMN 4012 | German Identity | x | | |
| GRMN 4065 | European Union | x | | |
| HTS 1031 | Europe Since Renaissance | | x | |
| HTS 2036 | Revolutionary Europe | | x | |
| HTS 2037 | 20th Century Europe | | x | |
| HTS 2061 | Traditional Asia | | x | |
| HTS 2062 | Asia in the Modern World | | x | |
| HTS 3012 | Urban Sociology | | x | |
| HTS 3032 | Europe Intellectual Hist | | x | x |
| HTS 3038 | French Revolution | | x | |
| HTS 3045 | Nazi Germany-Holocaust | | x | |
| HTS 3064 | Sociology of Development | | x | |
| HTS 3066 | Soc-Politics & Society | | x | |
| HTS 3067 | Revolutionary Movement | | x | |
| INTA 1110 | Intro to Int'l Relations | | x | |
| INTA 2030 | Ethics in Int'l Affairs | | x | x |
| INTA 2040 | Sci,Tech & Int'l Affairs | | x | |
| INTA 2100 | Great Power Relations | | x | |
| INTA 2210 | Pol Phil & Ideologies | | x | |
| INTA 3031 | Human Rights | | x | |
| INTA 3102 | Problem of Proliferation | | x | |

| | | | | |
|---|---|---|---|---|
| INTA 3103 | Challenge of Terrorism | | x | |
| INTA 4050 | Int'l Affair&Tech Policy | | x | |
| INTA 4060 | International Law | | x | |
| INTA 4241 | Democracy-Third World | | x | |
| INTA 4743 | Japan Society & Politics | x | | |
| JAPN 4123 | Tech&Bus Jpn Translation | x | | |
| JAPN 4743 | Japan Society & Politics | x | | |
| PUBP 3600 | Sustain,Tech & Policy | | x | x |

### COUNTRY OR REGIONAL-INTERNATIONAL PLAN ELECTIVES

| Course | Course Title | HUM | SS | ETHICS |
|---|---|---|---|---|
| ARCH 4113 | Renaissance&Manner Arch | x | | |
| ARCH 4123 | European Modernism | | | |
| ARCH 4125 | French Arch | | | |
| ARCH 4126 | Paris Urban History | | x | |
| ARCH 4128 | Barcelona Architecture | x | | |
| COA 3115 | Art & Arch in Italy I | x | | |
| COA 3116 | Art & Arch in Italy II | x | | |
| FREN 3001 | French Lit 1800-1900 | x | | |
| FREN 3002 | French Lit 1900-Present | x | | |
| FREN 3004 | Drama Workshop | x | | |
| FREN 3007 | Survey of French Lit I | x | | |
| FREN 3008 | Survey of French Lit II | x | | |
| FREN 3011 | France Today I | x | | |
| FREN 3012 | France Today II | x | | |
| FREN 3061 | Adv Business French I | x | | |
| FREN 3062 | Adv Business French II | x | | |
| FREN 3691 | French LBAT I | x | | |
| FREN 3692 | French LBAT II | x | | |
| FREN 3693 | French LBAT III | x | | |
| FREN 3694 | LBAT French Sem Abroad | x | | |
| FREN 4061 | Fren Science & Tech I | x | | |
| FREN 4062 | Fren Science & Tech II | x | | |
| FREN 4101 | Francophone Lit I | x | | |
| FREN 4102 | Francophone Lit II | x | | |
| GRMN 3034 | German Novella | x | | |
| GRMN 3035 | Dramatic & Lyrical Lit | x | | |
| GRMN 3036 | German Novel | x | | |
| GRMN 3071 | Intro-Business German I | x | | |
| GRMN 3072 | Intro-Business German II | x | | |
| GRMN 3695 | Structure,Commun&Corr | x | | |
| GRMN 3696 | Current Issues | x | | |
| GRMN 3697 | Communication & Culture | x | | |
| GRMN 4023 | Select Readings-Ger Lit | x | | |
| GRMN 4024 | Ger Film and Literature | x | | |
| GRMN 4061 | Adv Business German I | x | | |
| GRMN 4062 | Adv Business German II | x | | |
| HTS 3031 | European Labor History | | x | |
| HTS 3033 | Medieval England | | x | |
| HTS 3035 | Britain 1815-1914 | | x | |
| HTS 3036 | Britain Since 1914 | | x | |
| HTS 3039 | Modern France | | x | |
| HTS 3041 | Modern Spain | | x | |

| | | | | |
|---|---|---|---|---|
| HTS 3043 | Modern Germany | | x | |
| HTS 3061 | Modern China | | x | |
| HTS 3062 | Modern Japan | | x | |
| HTS 3063 | British Colonization | | x | |
| ID 4203 | French Society & Culture | | | |
| ID 4205 | French Design & Culture | | | |
| INTA 1200 | American Government | | x | |
| INTA 2220 | Govt& Pol-Western Europe | | x | |
| INTA 2230 | Govt & Politics of Asia | | x | |
| INTA 3120 | European Security Issues | | x | |
| INTA 3121 | Russia and Eurasia | | x | |
| INTA 3130 | Foreign Policy of China | | x | |
| INTA 3131 | Pacific Security Issues | | x | |
| INTA 3203 | Comparative Politics | | x | |
| INTA 3220 | Gov't & Politics-Germany | | x | |
| INTA 3221 | Post-Soviet Politics | | x | |
| INTA 3230 | Gov't & Politics-China | | x | |
| INTA 3231 | Gov't & Politics-Japan | | x | |
| INTA 3240 | Gov't & Politics-Africa | | x | |
| INTA 3241 | Latin American Politics | | x | |
| INTA 3321 | Pol Econ-Europe Integrat | | x | |
| INTA 3330 | Political Economy-China | | x | |
| INTA 3331 | Political Economy-Japan | | x | |
| INTA 4121 | Sem Europe-Euro Security | | x | |
| INTA 4230 | Sem in Europe-Euro Union | | x | |
| INTA 4240 | Argentine Politics | | x | |
| INTA 4330 | Chinese Economic Reform | | x | |
| INTA 4331 | Chinese Politics | | x | |
| INTA 4332 | Chinese Institutions | | x | |
| INTA 4333 | Korean Security Policy | | x | |
| INTA 4340 | Latin American Economics | | x | |
| JAPN 3061 | Technical Japanese I | x | | |
| JAPN 3062 | Technical Japanese II | x | | |
| JAPN 3691 | Tech & Scientific Japn | x | | |
| JAPN 3692 | Business Japanese | x | | |
| JAPN 3693 | Japan Today | x | | |
| LCC 2102 | The Classical Tradition | x | | |
| LCC 2104 | Age-Scientific Discovery | x | | |
| LCC 2106 | Age of Sci Revolution | x | | |
| LCC 2218 | Lit/Cult Postmodernism | x | | |
| LCC 3212 | Women, Lit & Culture | x | | |
| LCC 3302 | Science, Tech & Ideology | x | | |
| LCC 3316 | Postcolonialism | x | | |
| SPAN 3061 | Business Spanish I | x | | |
| SPAN 3062 | Business Spanish II | x | | |
| SPAN 3122 | Cultural Hist-Spain II | x | | |
| SPAN 3235 | Latin America Today | x | | |
| SPAN 3241 | Indiv&Family in Hisp Lit | x | | |
| SPAN 3242 | Society in Hispanic Lit | x | | |
| SPAN 3691 | Bus Comm& Correspondence | x | | |
| SPAN 3692 | Business And Culture | x | | |
| SPAN 3693 | Science And Technology | x | | |
| SPAN 3694 | Seminar Abroad | x | | |
| SPAN 4061 | Science & Technology I | x | | |

| | | | | |
|---|---|---|---|---|
| SPAN 4062 | Science & Technology II | x | | |
| SPAN 4170 | Span Applied Linguistics | x | | |
| SPAN 4255 | Hispanic Drama Workshop | x | | |

### GLOBAL ECONOMICS-INTERNATIONAL PLAN ELECTIVES

| Course # | Course Title | HUM | SS | ETHICS |
|---|---|---|---|---|
| ECON 2101 | The Global Economy | | x | |
| ECON 4311 | Strategic Economics for Global Enterprise | | x | |
| ECON 4350 | International Economics | | x | |
| INTA 3301 | International Political Economy | | x | |
| INTA 3303 | Political Economy of Development | | x | |
| INTA 3304 | International Trade and Production | | x | |
| MGT 3660 | International Business | | | |

## OMED: EDUCATIONAL SERVICES

The Office of Minority Education Development (OMED) is an academic service organization charged with the academic retention and performance of African American, Native American, and Latino/Hispanic students at Georgia Tech. OMED runs bridge, transition, peer-mentor, tutorial, parent, corporate, and intervention programs that are targeted to the above groups; however, these programs are open to all Georgia Tech students. OMED programs have received national recognition and accolades. OMED has served the Georgia Tech community for more than twenty-five years and has helped Georgia Tech become one of the leading producers of engineering degrees awarded to traditionally underrepresented students.

## PREPROFESSIONAL PROGRAMS

Georgia Tech degree programs offer a well-balanced basic education in addition to outstanding training in the chosen field. As such, they provide an excellent basis for subsequent study of medicine, dentistry, veterinary medicine, or law. These professional programs typically require a limited number of courses in specific areas, which, if not required as a part of the student's Georgia Tech degree program, may be included as electives. There are Pre-Health, Pre-Law and Pre-Teaching (K-12) for the campus. Students can look these advisors up on the advising Web page.

Georgia Tech has elected not to have majors designated as premedicine, predentistry, or prelaw. This approach to preprofessional education has two major advantages. First, students who elect not to enter professional school upon graduation are prepared for alternative careers immediately. Second, students who do continue to professional school have backgrounds that often provide them with unique opportunities within their selected professions. Examples include medical research, development of medical devices and apparatus, patent law, or the legal aspects of design and construction.

Professional schools typically admit students with strong academic credentials, a well-balanced education, good communication skills, and a broad range of experiences. With the appropriate selection of elective courses, most majors at Georgia Tech provide suitable preparation for professional school in any area. No specific major offers an obvious competitive advantage in assuring admission to professional schools. The best choice of major is usually the one in which the student has the greatest inherent interest.

## PROGRESS REPORTS

Progress Report grades of "*S*" or "*U*" are issued for all students enrolled in 1000- and 2000-level courses prior to midterm, a Progress Report grade of "*U*" indicates a performance level of "*D*" or lower. These are not permanent grades and never appear on a transcript, but are issued to help students assess where they stand in the class and obtain academic help from the faculty and the many academic resource services available on campus.

## UNDERGRADUATE RESEARCH OPPORTUNITIES PROGRAM

Undergraduate research offers students a unique opportunity to apply knowledge in a meaningful, real-world context to solve problems and explore issues no one has ever addressed before. Students doing undergraduate research also have the chance to develop deeper relationships with faculty and graduate students and to add a résumé item that will make them stand out to both graduate schools and potential employers.

The Undergraduate Research Opportunities Program (UROP) facilitates research experiences for undergraduates across all disciplines. UROP creates initiatives to encourage students to participate in knowledge creation and research enterprise with Georgia Tech's world-class faculty. Students may participate in laboratory, scientific, or computing research, or they may be involved in new discoveries in literature, social sciences, architecture, or business. Undergraduate students can participate in part-time or full-time research for course credit or pay. Opportunities are available Institute-wide, within specific colleges and schools, or in interdisciplinary settings. Additional opportunities include the President's Undergraduate Research Awards (PURA), Research Option, spring symposia, and research best practices workshops and training sessions.

For information on how to participate, visit www.undergradresearch.gatech.edu.

### THE RESEARCH OPTION

The Research Option offers students the opportunity for an in-depth, longer-term research experience that culminates in a final paper or thesis. While the exact requirements for a research option vary by academic unit, students typically take the following steps:

1. Complete at least nine units of undergraduate research.
    - Over at least two, preferably three, terms.
    - Research may be for either pay or credit (specific option plans differ by department).
        - For research for pay to count towards the Research Option, you must register for an audit-only class (2698 or 4698 in most but not all academic units).
2. Take the class LCC 4700 "Writing an Undergraduate Thesis" or an equivalent course during the thesis-writing semester.
3. Write an undergraduate thesis/report of research on their findings.

For more information on specific plans and a list of participating schools, visit http://undergradresearch.gatech.edu/research_option.

## TUTORING AND WORKSHOPS

There are a number of free tutoring services available on campus for students who need extra help or just want to stay on top of class material. Tutoring is offered in the Freshman Experience, on Georgia Tech's Cable TV Channel 20 Tutor Vision, the Office of Minority Development (OMED), Success Programs, and in various schools.

## WORKSHOPS AND INDIVIDUAL ASSISTANCE FOR ACADEMIC SUCCESS

Georgia Tech has a variety of services to help students achieve their personal and academic goals. Both fall and spring workshops are available on a number of topics in a variety of venues: Counseling Center, Office of Minority Development (OMED), Success Programs, Freshman Experience, and others.

## THE OFFICE OF UNDERGRADUATE STUDIES

The Office of Undergraduate Studies includes the following:

- Academic Advising
- Academic Resources
- Fellowship Communication Program
- Transfer Student Ombudsperson
- Undergraduate Research

## FIVE-YEAR B.S./M.S. DEGREE PROGRAMS

Many schools at Georgia Tech offer five-year B.S./M.S. degree programs that, like the Graduate Course Option, allow eligible students to use up to six credit hours of graduate-level coursework in the major discipline for both degrees. The B.S./M.S. programs typically include research and mentoring components and have their own GPA requirements. More information is available from participating major schools/colleges.

## UNDERGRADUATE ACADEMIC COMMON MARKET

The Academic Common Market (ACM) is an interstate agreement for sharing educational programs and facilities, allowing students to participate in selected programs not offered in their home states without having to pay out-of-state tuition charges. The Southern Regional Education Board (SREB) coordinates the activities of the Academic Common Market for the sixteen participating states, which include Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia.

One of the primary functions of the Academic Common Market is to assist states in offering together what they cannot offer alone. Programs are added to and removed from the Market on an annual basis in order to reflect the changing needs of participating states. The state of Georgia currently makes program changes once annually during the spring.

For a list of undergraduate degree programs non-Georgia residents may study without having to pay out-of-state tuition, as well as the ACM policies and procedures, visit www.admiss.gatech.edu/acm or call the Office of Undergraduate Admission at 404.894.4154.

## GRADUATE ACADEMIC COMMON MARKET

The Institute participates in the Academic Common Market (ACM) Program managed by the Southern Regional Education Board. By interstate agreement, the Market enables southern states to share academic programs. Residents of the participating states who qualify for admission and gain the approval of their state coordinators may enroll on an in-state tuition basis. The Georgia Tech programs currently participating in ACM are graduate programs in building construction and integrated facility management, architecture, city and regional planning, city planning/architecture joint program; as well as undergraduate programs in nuclear and radiological engineering, and polymer and fiber engineering.

## CENTER FOR THE ENHANCEMENT OF TEACHING AND LEARNING (CETL)

The Center for the Enhancement of Teaching and Learning (CETL) was founded in 1986 with a mission to assist faculty and teaching assistants in becoming more effective instructors and hence to improve the learning of Georgia Tech students. CETL offers undergraduate courses in Undergraduate Teaching Assistant Preparation, Fundamentals of Tutoring, and Principles of Learning and Teaching, as well as graduate-level courses in Classroom Management, Academic Writing, and Academic Professionalism. For international graduate students and teaching assistants who need to improve their English communication skills, CETL offers courses in conjunction with the Georgia Tech Language Institute. Finally, CETL offers training and assistantships associated with its National Science foundation-(NSF) sponsored Student and Teacher Enhancement Partnership (STEP) program.

All CETL graduate courses may be taken either for audit or pass/fail, and these hours may not be counted toward any degree requirements. No graduate student may take more than two CETL courses in any one semester, and all of these courses require the permission of both the student's home unit and CETL. A non-credit option remains for those students whose home units will not permit the credit version of any of the courses.

Students wishing to enroll in any of CETL's undergraduate or graduate courses must request a permit through the CETL home page (www.cetl.gatech.edu). The STEP courses are only open to participants in the STEP program, which has its own application process. Interested students should contact CETL directly.

Courses offered by the Center for the Enhancement of Teaching and Learning (CETL) can be viewed on the course catalog .

## DIVISION OF PROFESSIONAL PRACTICE (COOPERATIVE EDUCATION, INTERNSHIPS, & WORK ABROAD)

Georgia Tech believes that obtaining relevant, academically related experience outside of the classroom is an integral part of the educational process. The Division of Professional Practice offers several methods to obtain such experience: the Cooperative Education Program (both undergraduate and graduate), the Undergraduate Professional Internship Program, and an innovative Work Abroad Program.

The Undergraduate Cooperative Plan (Co-op) has been offered at Georgia Tech since 1912. It is a five-year program for students who wish to integrate practical experience with theory learned in the classroom. Approximately 2,500 students currently participate, working full time on alternate semesters for more than 650 employers throughout the United States (as well as numerous international assignments). Accredited by the Accreditation Council for Cooperative Education, it is the largest totally optional program in the country and the highest ranked program among public universities.

The Undergraduate Co-op Plan is available for all engineering majors as well as those students studying biology, chemistry, mathematics, physics, computer science, management, economics, earth and atmospheric sciences, international affairs, industrial design, building construction, and science, technology, and culture. The academic curricula are identical to those offered to regular four-year students, and co-ops remain on the school rolls while on work periods by registering for the appropriate co-op courses. The Graduate Co-op Program is described in greater detail in another section in this catalog.

Co-op offers the student practical experience and insight into human relations, as well as financial assistance. The work experience received is a valuable asset to graduates starting out in their chosen professions. Neither college laboratory experience nor employment during vacations can take the place of organized co-op training. The plan provides, to a substantial degree, the experience most companies require of their employees before promoting them to positions of higher responsibility. Work experience may also assist students who are undecided about their future plans in determining early in their college careers whether they wish to continue in a particular field.

Moreover, daily contact with diverse groups among their fellow employees offers students practical insight into sociology, psychology, economics, and ethics that no textbook can supply. Finally, students receive compensation for their services from the employer. Typically, co-op students can save enough from their earnings to pay for more than half of their school expenses.

Undergraduate professional internships provide practical experience for students who choose not to follow the Undergraduate Co-op Plan. Although internships normally do not provide the same depth provided by the Co-op Plan experience, they are an extremely viable way to obtain out-of-classroom experience. Similar to cooperative education, the jobs and the students' performance are monitored by the Division of Professional Practice to ensure maximum benefit by all parties.

Students in all majors may participate in the internship program and may work any term during the academic year.

The Division of Professional Practice now offers an extensive Work Abroad Program for those students interested in pursuing global careers and work experience. In the current global economy, Georgia Tech realizes the importance of students obtaining relevant experience in cultures outside of the United States. In order for students to have a complete "immersion" experience, it is necessary to live and work in those environments. Each year, Georgia Tech has dozens of students, both undergraduate and graduate, who take advantage of this opportunity. The Work Abroad Program is available to students in any major, and also for those who may be in the Co-op or UPI programs.

For more information on any programs offered through the Division of Professional Practice, visit our Web site at www.profpractice.gatech.edu or write to:

Division of Professional Practice
Georgia Institute of Technology
Atlanta, Georgia 30332-0260

## GRADUATE COOPERATIVE PLAN

The Graduate Cooperative Education (Graduate Co-op) Program, one of four programs offered by the Georgia Tech Division of Professional Practice (DoPP), provides master's and doctoral students majoring in any discipline at Georgia Tech the opportunity to supplement their graduate studies with specialized work experience. Graduate Co-op students are paid by participating employers at salary levels consistent with the compensation of regular employees with comparable education and experience levels.

The Graduate Co-op program is a certificate program that requires students to complete a minimum of one full-time and one part-time work term, or three part-time work terms. Students may chose to work two consecutive semesters, alternate semesters, or during summers only.

To participate in the Graduate Co-op Program, a student must have a 3.0 or better GPA, obtain a program participation letter from his or her major school, and attend a mandatory orientation session. After getting the participation letter and attending the orientation session, the student should arrange to meet with the Graduate Co-op Program advisor regarding required authorization letters, approvals, permits and the student's job offer letter. Enrollment in a 6000-level co-op course, a non-credit/no-cost audit course with no student or Institute fees attached, is also required.

Participating students are normally responsible for identifying their own job opportunities, but, in some cases, the Graduate Co-op Office can provide limited assistance in this area.

International students (i.e., those on F-1 or J-1 visas) are required to be enrolled at Georgia Tech for a minimum of nine months before being eligible to work as graduate co-op students, and must work with the Office of International Education (OIE; www.oie.gatech.edu) to secure work authorization documentation.

For more information on the Georgia Tech Division of Professional Practice Graduate Co-op Program, visit: www.gradcoop.gatech.edu, or

# CROSS ENROLLMENT

## A. GENERAL

1. Students who are enrolled at Georgia Tech may not receive credit for courses completed at another institution during the same academic term, unless prior permission has been obtained for cross enrollment or concurrent registration, as described in this section.
2. With the approval of the student's major school, a student may schedule courses at any one of the colleges or universities comprising the Atlanta Regional Consortium for Higher Education (ARCHE), if such courses are not available in a particular term at Georgia Tech. A list of participating institutions is available from the Office of the Registrar.
3. Cross enrollment also is permitted among institutions participating in the Georgia Tech Regional Engineering Program (GTREP) and selected institutions in the Regents' Engineering Transfer Program (RETP).
4. All cross enrollment registration activities are performed at the student's home institution.
5. For institutions not participating in cross enrollment, a student must apply in advance for permission to be concurrently registered at both Georgia Tech and the other institution, except during the Summer.

## B. ELIGIBILITY

1. Cross enrollment and concurrent registration are available only to degree-seeking juniors, seniors, and graduating students, except during the Summer term, when cross enrollment and concurrent registration are available to all degree-seeking students. Ordinarily students will not be allowed to participate during their first term at Georgia Tech, nor will students be allowed to cross enroll for more than two courses per term. Special rules apply to students participating in the GTREP and RETP programs. International Plan students may cross enroll or register concurrently for a language course(s) NOT offered at Georgia Tech as early as the second semester of their first year of enrollment. Special permission to do this will be granted to accepted IP students ONLY. Forms and procedures are available from the Registrar’s Office. Any student seeking an exception to these eligibility requirements should contact the Office of the Registrar.
2. To participate in cross enrollment or concurrent registration, a student must be in good standing during the term when the application is processed.
3. During the term of cross enrollment or concurrent registration, the student must be carrying three or more credit hours at Georgia Tech and be in good standing. The total academic load carried at all institutions combined may not exceed the number of hours for which the student would be allowed to register at Georgia Tech.
4. Cross enrollment and concurrent registration courses must be completed with a *C* or better in order to receive credit for the course. Credits earned under cross enrollment will be handled as transfer credit, but will count as resident credit toward a degree. Credits earned under concurrent registration will be handled as regular transfer credit. Grades received in cross enrollment or concurrent registration courses will not be included in the calculation of the grade point average. No credit will be awarded until an official transcript from the participating institution is received by the Georgia Tech Registrar's Office.

## DISTANCE LEARNING

Georgia Institute of Technology’s distance-delivered graduate engineering programs provide you with an advanced graduate education with the proper mix of theory, case studies, and their applications.

Georgia Tech offers eight master’s degrees via distance delivery:

- Aerospace Engineering
- Electrical and Computer Engineering
- Environmental Engineering
- Industrial Engineering
- Mechanical Engineering
- Medical Physics and
- Operations Research

You may apply at any time for admission for the fall, spring, and summer semesters. Students must meet the same academic standards as other campus graduate students. Upon acceptance to the program, working engineers typically enroll in one or two courses per term. Many companies provide tuition reimbursement for these classes.

### How You Will Benefit

- Meet the same academic standards as on campus
- Directly apply class lessons at work
- Advance yourself with a Georgia Tech degree
- Utilize Distance Learning student-support staff
- Access a dedicated Distance Learning librarian
- Study at a top-ranked university with all its graduate engineering programs consistently in the top 10 of *U.S. News & World Report’s* annual rankings

### How Distance Learning Works

Distance Learning courses are offered via the Internet. Lectures and student-faculty interaction are digitally recorded during regular graduate courses each year and then posted for students to view or download on demand.

Distance Learning students are assigned a unique Web account to access and post class assignments, as well as download graded assignments. Students also interact with classmates and faculty members through telephone, e-mail, fax server, electronic bulletin boards, and threaded-discussions with Georgia Tech’s course management systems providing full access to campus resources.

Georgia Tech offers more than 90 courses each semester, except during the summer when there are a smaller number of courses available. Visit www.dl.gatech.edu/dl/servlet/DLHome for class offerings.

For more information, visit http://www.dl.gatech.edu/, call 404-894-3378, or write to:
Distance Learning and Professional Education
Georgia Institute of Technology
84 Fifth St. N.W.
Atlanta, GA 30308-1031

## LANGUAGE INSTITUTE

Since 1958, Georgia Tech's Language Institute has helped thousands of students and professionals from around the world, Atlanta, and Georgia Tech improve their English proficiency through full-time and part-time instruction in English as a second language through

- The **Intensive English Program,** which offers core courses in writing, grammar, reading, and speaking/listening at seven levels of proficiency and electives in TOEFL preparation, GRE/GMAT writing preparation, SAT/GRE vocabulary building, accent reduction, movie making, and drama
- Evening ESL classes in grammar/writing, practical writing, conversation, public speaking, and TOEFL preparation
- Summer courses in conversation, writing, speaking, and GTA training
- Courses for corporate clients
- Online courses

More than 1,000 students attend programs offered by the Language Institute each year, including academic support for international students in degree programs at Georgia Tech, preparing international students for academic work at an American university, and helping professionals improve their English to further their careers.

A member of UCEIP and AAIEP, Georgia Institute of Technology's Language Institute is committed to the standards of excellence in English as a second language teaching. The Language Institute is located on the campus of one of the top 10 public universities in the United States.

For information, visit www.esl.gatech.edu, call 404.894.2425, or write to:

Language Institute
Georgia Institute of Technology
151 6th Street N.W.
Atlanta, Georgia 30332-0374

## PROFESSIONAL EDUCATION

Distance Learning and Professional Education coordinates the delivery of noncredit short courses and professional development programs to the public and to corporate clients. Programs are held on campus and at other selected locations. Some courses are available online, in DVD/CD-ROM format, and through videoconferencing.

Short courses, varying in length from one to five days, are offered throughout the year to help professionals keep pace with the latest developments and innovations in their fields. Courses are offered in

- defense technology
- engineering
- architecture
- science
- management
- economic development,
- logistics
- research and
- information technology

DLPE offers 26 certificate programs comprised of sequences of short courses in these subject areas.

For information, visit www.dlpe.gatech.edu, call 404.385.3500, fax to 404.894.7398, or write to:

Distance Learning and Professional Education
Georgia Institute of Technology
Global Learning Center
84 Fifth Street N.W.
Atlanta, Georgia 30308-1031

## GEORGIA TECH LORRAINE

Located in France in the Metz Technopôle, a technology park in the Lorraine region, Georgia Tech Lorraine (GT-Lorraine) serves as the Georgia Institute of Technology campus in Europe. GT-Lorraine conducts education in engineering and computer science, and has ongoing programs of basic and applied research in theses areas.

At GT-Lorraine, students can pursue regular academic programs of Georgia Tech toward their Georgia Tech degree while immersed in the rich culture of Europe. Almost all scholarship and fellowships (e.g., Hope scholarship) transfer when studying at GT-Lorraine. Tuition and fees are very attractive, especially for non-resident students. Instructional programs leading to master's degrees and Ph.D.s in electrical and computer engineering, mechanical engineering, and computer science are available to graduate students throughout the year. In addition, double-degree programs that lead to both a Georgia Tech degree and a diploma from a European university have been developed. Undergraduate summer programs in engineering, humanities, management, and social sciences are offered to any qualified student.

Starting in the fall of 2006, undergraduate students in electrical and computer engineering, mechanical engineering, and computer science who are in their third year of study in 2006-2007 will have the opportunity to take undergraduate classes at GT-Lorraine and possibly to participate in the International Plan (IP). Courses specifically designed to fulfill the student's major and IP requirements will be offered on the Lorraine campus.

All instruction at GT-Lorraine is in English. French language courses are also available to enhance students' experience as well as to enable students to participate in a double-degree program. Classes taken at the partner institutions, within the dual-degree program, are usually taught in French.

GT-Lorraine operates in a 50,000-square-foot building that houses classrooms, academic and research laboratories, student lounges, conference rooms, and a library, along with faculty and staff offices. Student housing is available for all GT-Lorraine students. Many student-oriented facilities are available close to the GT-Lorraine campus, along with the diverse cultural and entertainment resources of the city of Metz.

For more information, contact GT-L at 404.894.0076 or +33 387 20 3939. You may also e-mail GT-L below.

## GEORGIA TECH HONORS PROGRAM

The Georgia Tech Honors Program combines the challenging academic standards of one of the finest technological universities in the world with the closer connections between students and faculty one might expect to find at a small, selective college. The goal is to create a lively learning environment in which students and faculty members learn from each other through a common commitment to intellectual inquiry, careful analysis, and the energetic exchange of ideas. To promote and sustain this sort of close engagement between students and faculty, the Honors Program offers several features for students in the first two years of their studies at Georgia Tech, including the following:

- an Honors Program residence
- small sections of standard introductory courses
- a selection of small, topically oriented seminars
- a system of careful advising

## INTERDISCIPLINARY PROGRAMS

The Office of the Senior Vice Provost for Research and Innovation oversees interdisciplinary research centers at Georgia Tech. Currently, there are more than twenty-five centers overseen either solely by the office or jointly between the office and a college. Each center is listed alphabetically below, along with the director's name and telephone number. For more information on each center, please contact either the number provided or the Office of the Senior Vice Provost for Research and Innovation at 404.894.8884.

**AIR RESOURCES AND ENGINEERING CENTER (AREC)**

Director: Armistead (Ted) G. Russell, 404.894.3079

**BIOMEDICAL INTERACTIVE TECHNOLOGY CENTER (BITC)**

Director: Mark A. Clements, 404.894.4584

**CENTER FOR BIOLOGICALLY INSPIRED DESIGN (CPID)**

Director: Jeannette Yen, 404.385.1596

**CENTER FOR COMPUTATIONAL MATERIALS SCIENCE (CCMS)**

Director: Uzi Landman, 404.894.3368

**CENTER FOR EXPERIMENTAL RESEARCH IN COMPUTER SCIENCE (CERCS)**

Director: Karsten Schwan, 404.894.2589

**CENTER FOR HUMAN MOVEMENT STUDIES (CHMS)**

Director: Robert J. Gregor, 404.894.1028

**CENTER FOR NANOSTRUCTURE CHARACTERIZATION & FABRICATION (CNNC) (CNCF)**

Director: Zhong Lin (Z. L.) Wang, 404.894.8008

**CENTER FOR NONLINEAR SCIENCE (CNS)**

Director: Predrag Cvitanovic, 404.385.2502

**CENTER FOR PAPER BUSINESS AND INDUSTRY STUDIES (CPBIS)**

Executive Director: Jacquelyn McNutt, 404.894.5733; Director: Patrick S. McCarthy, 404.894.4914

**CENTER FOR THE STUDY OF WOMEN, SCIENCE, AND TECHNOLOGY (WST)**

Co-directors: Mary Frank Fox, 404.894.1818; Carol A. Colatrella, 404.894.1241; Mary Lynn Realff, 404.894.2496

**GEORGIA CENTER FOR ADVANCED TELECOMMUNICATIONS TECHNOLOGY (GCATT)**

Director: Nikil S. Jayant, 404.894.7285

**GEORGIA ELECTRONIC DESIGN CENTER (GEDC)**

Director: Joy Laskar, 404.894.5268

**GEORGIA TECH INFORMATION SECURITY CENTER (GTISC)**

Director: Mustaque Ahamad, 404.894.2593

**GEORGIA TRANSPORTATION INSTITUTE (GTI)**

Director: Michael D. Meyer, 404.385.2246

**GEORGIA WATER RESOURCES INSTITUTE (GWRI)**

Director: Aris P. Georgakakos, 404.894.2240

**INSTITUTE FOR LEADERSHIP AND ENTREPRENEURSHIP (ILE)**

Director: Terry Blum, 404.894.4924

**INSTITUTE OF PAPER SCIENCE AND TECHNOLOGY (IPST)**

Director: W. J. (Jim) Frederick Jr., 404.894.2082

**INSTITUTE FOR SUSTAINABLE TECHNOLOGY AND DEVELOPMENT (ISTD)**

Director: Charles L. Liotta, 404.894.9608

**INTERACTIVE MEDIA TECHNOLOGY CENTER (IMTC)**

Director: Mark A. Clements, 404.894.4584; Research Director: W. E. (Ed) Price, 404.894.3547

**MANUFACTURING RESEARCH CENTER (MARC)**

Director: Steven Danyluk, 404.894.9687

**MICROELECTRONICS RESEARCH CENTER (MIRC)**

Director: James D. Meindl, 404.894.5101

**NANOTECHNOLOGY RESEARCH CENTER (NRC)**

Director: James Meindl, 404.894.5101

**PARKER H. PETIT INSTITUTE FOR BIOENGINEERING AND BIOSCIENCE (IBB)**

Director: Robert M. Nerem, 404.894.2768

**PHYSIOLOGICAL RESEARCH LABORATORY (PRL)**

Director: Laura O'Farrell, 404.385.6233

**POLICY RESEARCH INITIATIVE (PRI)**

Director: Susan E. Cozzens, 404.385.0397

**SPECIALTY SEPARATIONS CENTER (SSC)**

Director: Charles A. Eckert, 404.894.7070

**STRATEGIC ENERGY INITIATIVE (SEI)**

Interim Director: Roger P. Webb, 404.385.4954

**THE TENNENBAUM INSTITUTE (TI)**

Director: William B. Rouse, 404.894. 2331

The College of Engineering participates in multidisciplinary programs.
The College of Management participates in multidisciplinary programs.
The College of Sciences participates in multidisciplinary programs.

## THE INTERNATIONAL PLAN

The International Plan is a challenging and coherent academic program for undergraduates that is designed to develop global competence within the context of a student's major. It is a degree-long program that integrates international studies and experiences into any participating major at Georgia Tech. It helps to prepare Georgia Tech graduates professionally and personally for successful lives in the twenty-first century.

The International Plan is not intended to replace current international programs; it supplements them. Existing study abroad opportunities continue to be offered. It is also not intended to be an add-on to the current degree programs. It is intended to be another curriculum path to earn a degree in which international competence is integrated into the program of study. The plan can be completed within the normal time frame of four years of undergraduate study.

In order to earn the International Plan designation in a participating major, students must complete the following four components:

- International Coursework: three courses, to include one from each of the following categories:
    1. International relations
    2. Global economics
    3. A course about a specific country or region
- International Experience: Two terms abroad (not less than twenty-six weeks) engaged in any combination of study abroad, research, or internship
- Second language proficiency: All students in the program are expected to reach at least the proficiency level equivalent to two years of college-level language study. Students who use the language to study, conduct research, or participate in an internship during their international experience are expected to attain a higher level of proficiency. Language proficiency is determined by testing (not course credits).
- Culminating Course: A capstone course in the major designed to tie the international studies and experiences together with the student's major

Completion of the International Plan is recognized by a designation on the student's diploma indicating completion of the degree with global competence, e.g., "B.S. in Electrical Engineering: International Plan."

For additional information about the International Plan visit www.internationalplan.gatech.edu.

### INTERNATIONAL RELATIONS-INTERNATIONAL PLAN ELECTIVES

| Course | Course Title | HUM | SS | ETHICS |
|---|---|---|---|---|
| GRMN 4012 | German Identity | x | | |
| GRMN 4065 | European Union | x | | |
| HTS 1031 | Europe Since Renaissance | | x | |
| HTS 2036 | Revolutionary Europe | | x | |
| HTS 2037 | 20th Century Europe | | x | |
| HTS 2061 | Traditional Asia | | x | |
| HTS 2062 | Asia in the Modern World | | x | |
| HTS 3012 | Urban Sociology | | x | |
| HTS 3032 | Europe Intellectual Hist | | x | x |
| HTS 3038 | French Revolution | | x | |
| HTS 3045 | Nazi Germany-Holocaust | | x | |
| HTS 3064 | Sociology of Development | | x | |
| HTS 3066 | Soc-Politics & Society | | x | |
| HTS 3067 | Revolutionary Movement | | x | |
| INTA 1110 | Intro to Int'l Relations | | x | |
| INTA 2030 | Ethics in Int'l Affairs | | x | x |
| INTA 2040 | Sci,Tech & Int'l Affairs | | x | |
| INTA 2100 | Great Power Relations | | x | |
| INTA 2210 | Pol Phil & Ideologies | | x | |
| INTA 3031 | Human Rights | | x | |
| INTA 3102 | Problem of Proliferation | | x | |

| | | | | |
|---|---|---|---|---|
| INTA 3103 | Challenge of Terrorism | | x | |
| INTA 4050 | Int'l Affair&Tech Policy | | x | |
| INTA 4060 | International Law | | x | |
| INTA 4241 | Democracy-Third World | | x | |
| INTA 4743 | Japan Society & Politics | x | | |
| JAPN 4123 | Tech&Bus Jpn Translation | x | | |
| JAPN 4743 | Japan Society & Politics | x | | |
| PUBP 3600 | Sustain,Tech & Policy | | x | x |

### COUNTRY OR REGIONAL-INTERNATIONAL PLAN ELECTIVES

| Course | Course Title | HUM | SS | ETHICS |
|---|---|---|---|---|
| ARCH 4113 | Renaissance&Manner Arch | x | | |
| ARCH 4123 | European Modernism | | | |
| ARCH 4125 | French Arch | | | |
| ARCH 4126 | Paris Urban History | | x | |
| ARCH 4128 | Barcelona Architecture | x | | |
| COA 3115 | Art & Arch in Italy I | x | | |
| COA 3116 | Art & Arch in Italy II | x | | |
| FREN 3001 | French Lit 1800-1900 | x | | |
| FREN 3002 | French Lit 1900-Present | x | | |
| FREN 3004 | Drama Workshop | x | | |
| FREN 3007 | Survey of French Lit I | x | | |
| FREN 3008 | Survey of French Lit II | x | | |
| FREN 3011 | France Today I | x | | |
| FREN 3012 | France Today II | x | | |
| FREN 3061 | Adv Business French I | x | | |
| FREN 3062 | Adv Business French II | x | | |
| FREN 3691 | French LBAT I | x | | |
| FREN 3692 | French LBAT II | x | | |
| FREN 3693 | French LBAT III | x | | |
| FREN 3694 | LBAT French Sem Abroad | x | | |
| FREN 4061 | Fren Science & Tech I | x | | |
| FREN 4062 | Fren Science & Tech II | x | | |
| FREN 4101 | Francophone Lit I | x | | |
| FREN 4102 | Francophone Lit II | x | | |
| GRMN 3034 | German Novella | x | | |
| GRMN 3035 | Dramatic & Lyrical Lit | x | | |
| GRMN 3036 | German Novel | x | | |
| GRMN 3071 | Intro-Business German I | x | | |
| GRMN 3072 | Intro-Business German II | x | | |
| GRMN 3695 | Structure,Commun&Corr | x | | |
| GRMN 3696 | Current Issues | x | | |
| GRMN 3697 | Communication & Culture | x | | |
| GRMN 4023 | Select Readings-Ger Lit | x | | |
| GRMN 4024 | Ger Film and Literature | x | | |
| GRMN 4061 | Adv Business German I | x | | |
| GRMN 4062 | Adv Business German II | x | | |
| HTS 3031 | European Labor History | | x | |
| HTS 3033 | Medieval England | | x | |
| HTS 3035 | Britain 1815-1914 | | x | |
| HTS 3036 | Britain Since 1914 | | x | |
| HTS 3039 | Modern France | | x | |
| HTS 3041 | Modern Spain | | x | |

| | | | | |
|---|---|---|---|---|
| HTS 3043 | Modern Germany | | x | |
| HTS 3061 | Modern China | | x | |
| HTS 3062 | Modern Japan | | x | |
| HTS 3063 | British Colonization | | x | |
| ID 4203 | French Society & Culture | | | |
| ID 4205 | French Design & Culture | | | |
| INTA 1200 | American Government | | x | |
| INTA 2220 | Govt& Pol-Western Europe | | x | |
| INTA 2230 | Govt & Politics of Asia | | x | |
| INTA 3120 | European Security Issues | | x | |
| INTA 3121 | Russia and Eurasia | | x | |
| INTA 3130 | Foreign Policy of China | | x | |
| INTA 3131 | Pacific Security Issues | | x | |
| INTA 3203 | Comparative Politics | | x | |
| INTA 3220 | Gov't & Politics-Germany | | x | |
| INTA 3221 | Post-Soviet Politics | | x | |
| INTA 3230 | Gov't & Politics-China | | x | |
| INTA 3231 | Gov't & Politics-Japan | | x | |
| INTA 3240 | Gov't & Politics-Africa | | x | |
| INTA 3241 | Latin American Politics | | x | |
| INTA 3321 | Pol Econ-Europe Integrat | | x | |
| INTA 3330 | Political Economy-China | | x | |
| INTA 3331 | Political Economy-Japan | | x | |
| INTA 4121 | Sem Europe-Euro Security | | x | |
| INTA 4230 | Sem in Europe-Euro Union | | x | |
| INTA 4240 | Argentine Politics | | x | |
| INTA 4330 | Chinese Economic Reform | | x | |
| INTA 4331 | Chinese Politics | | x | |
| INTA 4332 | Chinese Institutions | | x | |
| INTA 4333 | Korean Security Policy | | x | |
| INTA 4340 | Latin American Economics | | x | |
| JAPN 3061 | Technical Japanese I | x | | |
| JAPN 3062 | Technical Japanese II | x | | |
| JAPN 3691 | Tech & Scientific Japn | x | | |
| JAPN 3692 | Business Japanese | x | | |
| JAPN 3693 | Japan Today | x | | |
| LCC 2102 | The Classical Tradition | x | | |
| LCC 2104 | Age-Scientific Discovery | x | | |
| LCC 2106 | Age of Sci Revolution | x | | |
| LCC 2218 | Lit/Cult Postmodernism | x | | |
| LCC 3212 | Women, Lit & Culture | x | | |
| LCC 3302 | Science, Tech & Ideology | x | | |
| LCC 3316 | Postcolonialism | x | | |
| SPAN 3061 | Business Spanish I | x | | |
| SPAN 3062 | Business Spanish II | x | | |
| SPAN 3122 | Cultural Hist-Spain II | x | | |
| SPAN 3235 | Latin America Today | x | | |
| SPAN 3241 | Indiv&Family in Hisp Lit | x | | |
| SPAN 3242 | Society in Hispanic Lit | x | | |
| SPAN 3691 | Bus Comm& Correspondence | x | | |
| SPAN 3692 | Business And Culture | x | | |
| SPAN 3693 | Science And Technology | x | | |
| SPAN 3694 | Seminar Abroad | x | | |
| SPAN 4061 | Science & Technology I | x | | |

| | | | | |
|---|---|---|---|---|
| SPAN 4062 | Science & Technology II | x | | |
| SPAN 4170 | Span Applied Linguistics | x | | |
| SPAN 4255 | Hispanic Drama Workshop | x | | |

### GLOBAL ECONOMICS-INTERNATIONAL PLAN ELECTIVES

| Course # | Course Title | HUM | SS | ETHICS |
|---|---|---|---|---|
| ECON 2101 | The Global Economy | | x | |
| ECON 4311 | Strategic Economics for Global Enterprise | | x | |
| ECON 4350 | International Economics | | x | |
| INTA 3301 | International Political Economy | | x | |
| INTA 3303 | Political Economy of Development | | x | |
| INTA 3304 | International Trade and Production | | x | |
| MGT 3660 | International Business | | | |

## JOINT ENROLLMENT PROGRAM FOR HIGH SCHOOL STUDENTS

High school students who have completed tenth or eleventh grade and have academic credentials comparable to those of scholastically superior first-year students at Tech may take courses at Georgia Tech. Courses taken at Georgia Tech will normally be at a level beyond those available in the student's high school. Courses completed at Georgia Tech can be used to satisfy high school requirements and will also carry college credit. Interested students should consult their high school counselor for specific program requirements. Applications for the program are available from the Office of Undergraduate Admission or www.admiss.gatech.edu/jointenrollment.

## LEARNING SUPPORT POLICIES

The Office of the Senior Vice Provost for Academic Affairs administers the Learning Support Program. The College of Sciences offers college preparatory courses in mathematics, and the Ivan Allen College of Liberal Arts offers courses in reading comprehension and English composition for students who need further preparation before taking credit courses in English, mathematics, and related skills' courses.

Students who are required by the Institute to take courses in the Learning Support Program will be notified in writing. They must then either test out of the program or register for the required course(s) before they can register for any credit courses that require Learning Support (LS) courses as prerequisites. Until Learning Support requirements have been satisfied, students will not be permitted to take credit core courses that require the content or skills of the prerequisite courses. The Chair of the School teaching the credit core course must certify that the course being taken by the student does not contain the content or skills of the Learning Support course.

Students can test out of taking LS courses by passing the appropriate Georgia Collegiate Placement Exams (GCPEs) administered before the beginning of each semester through the Office of the Senior Vice Provost. Students who do not pass the appropriate examinations prior to their first semester in residence must register for the required LS courses. These students must pass all required LS courses and the appropriate GCPEs within their first three semesters in residence or be suspended for three years, and re-apply for admission. No more than twenty hours of degree credit work may be earned prior to exiting Learning Support.

Students who are mandated to take a Learning Support class must enroll in the course, pass it, and then pass an exit test (GCPE) provided to the LS instructor by the Office of the Senior Vice Provost. If the student fails the test, the student must re-take the course before re-taking the exit exam unless the student fails the test by one or two points. In which case, a re-take of the test may be given prior to the next semester (during the break prior to the first day of class).

In addition to those students who are required by the Institute to take LS courses, any student who desires further preparation may register for one or more courses. LS courses are not prerequisites to credit courses when taken on this elective basis.

LS courses are offered on a pass/fail basis and may not be counted as hours toward graduation.

## MULTIDISCIPLINARY AND CERTIFICATE PROGRAMS

Multidisciplinary Programs in the College of Engineering and Certificate Programs in the College of Sciences, the Ivan Allen College of Liberal Arts, and the College of Management offer students in good standing an opportunity to broaden their areas of expertise or acquire skills or information beyond their major degree requirements. Students interested in pursuing these programs should consult with their major school advisors.

## PREPROFESSIONAL PROGRAMS

Georgia Tech degree programs offer a well-balanced basic education in addition to outstanding training in the chosen field. As such, they provide an excellent basis for subsequent study of medicine, dentistry, veterinary medicine, or law. These professional programs typically require a limited number of courses in specific areas, which, if not required as a part of the student's Georgia Tech degree program, may be included as electives. There are Pre-Health, Pre-Law and Pre-Teaching (K-12) for the campus. Students can look these advisors up on the advising Web page.

Georgia Tech has elected not to have majors designated as premedicine, predentistry, or prelaw. This approach to preprofessional education has two major advantages. First, students who elect not to enter professional school upon graduation are prepared for alternative careers immediately. Second, students who do continue to professional school have backgrounds that often provide them with unique opportunities within their selected professions. Examples include medical research, development of medical devices and apparatus, patent law, or the legal aspects of design and construction.

Professional schools typically admit students with strong academic credentials, a well-balanced education, good communication skills, and a broad range of experiences. With the appropriate selection of elective courses, most majors at Georgia Tech provide suitable preparation for professional school in any area. No specific major offers an obvious competitive advantage in assuring admission to professional schools. The best choice of major is usually the one in which the student has the greatest inherent interest.

## PRESIDENT'S SCHOLARSHIP PROGRAM

The President's Scholarship is Georgia Tech's premier merit-based scholarship. Recipients are selected from the top applicants for admission to Georgia Tech, based on demonstrated excellence in academic and leadership performance. From the applicant pool, students selected as semifinalists submit teacher recommendations and are interviewed. The top semifinalists will be named finalists and invited with their parents to campus for an interview and information weekend in March. Current Georgia Tech students, transfer students, and international students are not eligible.

Each year, approximately sixty incoming freshmen receive President's Scholarships, which are renewable for up to four academic years, contingent upon honors-level performance and continued leadership development as evidenced by involvement in campus or community activities. Awards are worth up to a full ride, including tuition, room and board, books, fees, and personal expenses. See the Web site below for more information on stipends.

To be considered, a student must be a U.S. citizen or permanent resident, apply as an incoming freshman, and submit the Georgia Tech Application for Freshman Admission, along with the application fee, with a postmark no later than October 31 of their senior year.

For more information, contact the President's Scholarship Program at 404.894.1615, via the Contact Us button below, or via the Web at www.psp.gatech.edu.

## UNDERGRADUATE RESEARCH OPPORTUNITIES PROGRAM

Undergraduate research offers students a unique opportunity to apply knowledge in a meaningful, real-world context to solve problems and explore issues no one has ever addressed before. Students doing undergraduate research also have the chance to develop deeper relationships with faculty and graduate students and to add a résumé item that will make them stand out to both graduate schools and potential employers.

The Undergraduate Research Opportunities Program (UROP) facilitates research experiences for undergraduates across all disciplines. UROP creates initiatives to encourage students to participate in knowledge creation and research enterprise with Georgia Tech's world-class faculty. Students may participate in laboratory, scientific, or computing research, or they may be involved in new discoveries in literature, social sciences, architecture, or business. Undergraduate students can participate in part-time or full-time research for course credit or pay. Opportunities are available Institute-wide, within specific colleges and schools, or in interdisciplinary settings. Additional opportunities include the President's Undergraduate Research Awards (PURA), Research Option, spring symposia, and research best practices workshops and training sessions.

For information on how to participate, visit www.undergradresearch.gatech.edu.

### THE RESEARCH OPTION

The Research Option offers students the opportunity for an in-depth, longer-term research experience that culminates in a final paper or thesis. While the exact requirements for a research option vary by academic unit, students typically take the following steps:

1. Complete at least nine units of undergraduate research.
    - Over at least two, preferably three, terms.
    - Research may be for either pay or credit (specific option plans differ by department).
        - For research for pay to count towards the Research Option, you must register for an audit-only class (2698 or 4698 in most but not all academic units).
2. Take the class LCC 4700 "Writing an Undergraduate Thesis" or an equivalent course during the thesis-writing semester.
3. Write an undergraduate thesis/report of research on their findings.

For more information on specific plans and a list of participating schools, visit http://undergradresearch.gatech.edu/research_option.

## ROTC

Georgia Tech offers three voluntary ROTC programs: Army, Navy, and Air Force.

Depending on the student's major, Basic and Advanced ROTC classes count as a portion of elective credit. (Students may apply a maximum of four hours in Basic ROTC courses and six hours in Advanced ROTC courses toward meeting the free elective requirements for any degree.) Consult specific colleges to determine the amount of hours that will count toward a degree. After earning a baccalaureate degree and completing the Advanced ROTC courses for any of the three services, a student may receive a commission as an officer in either the reserve or active forces.

Students accepted into the program earn more than just money for a college degree. Cadets and midshipmen receive training and experience in the one quality which is always in great demand: Leadership.

## SUMMER LANGUAGE PROGRAM

The School of Modern Languages offers special summer immersion programs in China, France, Germany, Japan, Mexico, and Spain. These intensive programs in Languages for Business and Technology (LBAT) consist of six to eight weeks of study abroad in which classroom lessons in business, culture, and technology are combined with fieldwork, cultural events, excursions, and visits to area businesses, all conducted in the target language. The professional visits provide students with firsthand experience of business life, the protocols and strategies of business transactions, and a heightened awareness of the current issues facing the economy of the host country. The LBAT experience offers a unique opportunity for rapid growth in proficiency, for building a deeper appreciation for the cultures and lifestyle patterns of other peoples, and for making lifelong social and professional contacts.

Students will earn six to fifteen semester hours at the 3000-level (depending on the particular program). These credits count toward a certificate, a minor, or the joint majors offered by the School of Modern Languages Program costs vary according to the country visited and the length of the program. The HOPE scholarship applies. See http://www.modlangs.gatech.edu/lbat for more information.

## DUAL DEGREE PROGRAM

Under the Dual Degree Program, students attend the participating Dual Degree school for three years and then come to Georgia Tech for approximately two years. Students participating in the Dual Degree Program may seek a degree from any undergraduate degree-granting program in the College of Engineering. Upon completion of the program, the student receives a bachelor's degree from the first school and a bachelor's degree in one of the engineering disciplines at Georgia Tech.

Participating in the Dual Degree Program are many of the schools in the University System of Georgia, including Morehouse College, Spelman College, Clark Atlanta University, and other historically black colleges and universities (HBCU) and predominantly women's colleges in the southeast. For additional information on either of these programs, contact the College of Engineering at Georgia Tech or the Regents' Engineering Transfer Program (RETP) or Dual Degree coordinator at a participating RETP or Dual Degree institution.

## REGENTS' ENGINEERING TRANSFER PROGRAM

The Regents' Engineering Transfer Program (RETP) is a cooperative program between Georgia Tech and fourteen colleges in the University System of Georgia:
Albany State University
Armstrong Atlantic State University
Columbus State University
Dalton State College
Gainesville College
Georgia Perimeter College
Georgia Southern University
Macon State College
Middle Georgia College
North Georgia College and State University
Savannah State University
Southern Polytechnic State University
State University of West Georgia
Valdosta State University

For the first two years, students in this program attend one of the participating institutions, where they take all of the mathematics and science and many of the engineering courses required in the first two years of the Georgia Tech engineering curricula. Upon successful completion of the RETP requirements at the RETP institution, students are admitted to Georgia Tech to work toward completion of a Bachelor of Science in Engineering degree.

By enrolling in RETP, students may attend a college close to home, thereby decreasing the cost of their education and easing the adjustment to college life. At the same time, RETP students enjoy many of the advantages of Tech students: they have equal access to engineering majors at Tech, they can participate in the co-op program, and they are invited to the Tech campus once a year for campus tours, information sessions, and meetings with advisors in their engineering majors.

## ADVANCED TECHNOLOGY DEVELOPMENT CENTER

The Advanced Technology Development Center (ATDC) is the oldest and most experienced university-affiliated technology incubator in the country. It was formed in 1980 by the governor and General Assembly to increase the technology business base in Georgia. ATDC fulfills this mission by assisting in the formation and growth of advanced technology start-up companies, supporting technology commercialization, and attracting technology companies to the state. In 2004, ATDC received the "Excellence in Technology-led Economic Development" award from the United States Department of Commerce.

ATDC is headquartered in Technology Square, and also operates the ATDC Biosciences Center in the Ford Environmental Science and Technology Building. ATDC also has facilities in Columbus Georgia, Savannah Georgia, and Warner Robins Georgia. At these locations, early-stage companies enjoy a strong entrepreneurial working environment, access to professional business consulting, contact with university research faculty, and modern office and laboratory facilities. The ATDC also provides companies with access to facilities, personnel, and students in the University System. (www.atdc.org.)

Beyond ATDC, the Georgia Tech VentureLab program helps faculty members and students who wish to commercialize technology developed as part of Georgia Tech's research programs. Venture-Lab helps evaluate the commercial potential of innovations and matches faculty with experienced entrepreneurs who can help form new ventures. In mid-2004, four companies formed in Venture-Lab received a total of more than $6 million in venture capital investment (see www.venturelab.gatech.edu for more information).

ATDC is involved in commercializing technology developed as part of Georgia's new Innovation Centers program. The first such center, the Maritime Logistics Innovation Center, is located in Savannah as a collaboration of the Georgia Department of Economic Development, the Georgia Ports Authority, and the University System of Georgia. For more information, visit www.atdc.org.

## GEORGIA TECH RESEARCH CORPORATION

Founded in 1937, the Georgia Tech Research Corporation (GTRC) is a state-chartered, not-for-profit corporation serving Georgia Tech as a University System of Georgia-approved cooperative organization. By charter, GTRC "...shall be operated exclusively for scientific, literary, and educational purposes...conduct laboratories, engage in scientific research, and distribute and disseminate information resulting from research..." GTRC is an IRS section 501(c)(3) not-for-profit organization and serves as the contracting agency for all of the sponsored research activities at Georgia Tech. It also licenses all intellectual property (patents, software, trade secrets, etc.) created at Georgia Tech. Additionally, GTRC assists Georgia Tech in obtaining quality research space, enters into long-term leases for specialized research equipment, and conducts other research support programs as requested by the Institute. All funds collected by GTRC are used to support various Georgia Tech research programs requested by the Institute and as approved by the twelve-member board of trustees. GTRC is located on campus at 505 Tenth Street.

## GEORGIA TECH RESEARCH INSTITUTE

The Georgia Tech Research Institute is a leading nonprofit applied research center. GTRI’s world-class engineers and scientists solve some of the toughest problems facing government and industry across the nation and around the globe. For nearly 75 years GTRI has been uniquely positioned within the Georgia Institute of Technology, one of America's top research universities.

GTRI is nearly 1,200 people strong, including some of the world's top scientists and engineers who conduct more than $130 million in sponsored research each year. Many of GTRI's experts are recognized worldwide as leaders in the core technical areas of systems engineering, sensor, and information and communication systems. While providing innovative technical solutions for the defense and security markets, GTRI also has creatively transitioned many of the innovations to other markets. This has had a significant impact in the fields of health and human systems, manufacturing technologies, energy/environment, and information and communication technologies.

Chartered by the Georgia legislature in 1919 and activated in 1934, the GTRI mission is to serve the university, the state, the nation and the world by maturing selected technologies and developing innovative engineering solutions to important and challenging problems of society.

GTRI’s employees work in seven research laboratories and support units, which are housed on campus, at the Cobb County Research Facility; and in Huntsville, Alabama. GTRI also has field offices located at Eglin Air Force Base, Florida; Warner Robins, Georgia; Quantico, Virginia; Albuquerque, New Mexico; Dayton, Ohio; Arlington, Virginia; Huntsville, Alabama; Orlando, Florida; Jacksonville, Florida; San Diego, California; and Tucson, Arizona.

In 2006, GTRI proudly opened its first international research institute – Georgia Tech Ireland (GTI). Located in Athlone, Ireland, its focus is on applied research in partnership with an entire country.  GTI bridges the gap between research and its industrial adoption, while facilitating and conducting research in the areas of digital media, radio frequency identification (RFID), health care technologies, and sustainable energy.

One of GTRI's primary goals is to support economic and technological development in Georgia. GTRI promotes economic growth in the state and the southeast through mutual programs with the Georgia Tech Enterprise Innovation Institute. GTRI operates strong technology transfer programs and GTRI researchers teach more than half of all courses offered through Georgia Tech’s Distance Learning and Professional Education program. It is also home to the state's Agricultural Research Technology Program, which conducts research and technology transfer for the poultry industry, one of Georgia's leading industries and employers.

For additional information, contact the Office of the Vice President and Director, GTRI, Centennial Research Building, Atlanta, Georgia 30332-0801, or call 404.407.7400.
GTRI www.gtri.gatech.edu

## INTERDISCIPLINARY PROGRAMS

The Office of the Senior Vice Provost for Research and Innovation oversees interdisciplinary research centers at Georgia Tech. Currently, there are more than twenty-five centers overseen either solely by the office or jointly between the office and a college. Each center is listed alphabetically below, along with the director's name and telephone number. For more information on each center, please contact either the number provided or the Office of the Senior Vice Provost for Research and Innovation at 404.894.8884.

### AIR RESOURCES AND ENGINEERING CENTER (AREC)

Director: Armistead (Ted) G. Russell, 404.894.3079

### BIOMEDICAL INTERACTIVE TECHNOLOGY CENTER (BITC)

Director: Mark A. Clements, 404.894.4584

### CENTER FOR BIOLOGICALLY INSPIRED DESIGN (CPID)

Director: Jeannette Yen, 404.385.1596

### CENTER FOR COMPUTATIONAL MATERIALS SCIENCE (CCMS)

Director: Uzi Landman, 404.894.3368

### CENTER FOR EXPERIMENTAL RESEARCH IN COMPUTER SCIENCE (CERCS)

Director: Karsten Schwan, 404.894.2589

### CENTER FOR HUMAN MOVEMENT STUDIES (CHMS)

Director: Robert J. Gregor, 404.894.1028

### CENTER FOR NANOSTRUCTURE CHARACTERIZATION & FABRICATION (CNNC) (CNCF)

Director: Zhong Lin (Z. L.) Wang, 404.894.8008

### CENTER FOR NONLINEAR SCIENCE (CNS)

Director: Predrag Cvitanovic, 404.385.2502

### CENTER FOR PAPER BUSINESS AND INDUSTRY STUDIES (CPBIS)

Executive Director: Jacquelyn McNutt, 404.894.5733; Director: Patrick S. McCarthy, 404.894.4914

### CENTER FOR THE STUDY OF WOMEN, SCIENCE, AND TECHNOLOGY (WST)

Co-directors: Mary Frank Fox, 404.894.1818; Carol A. Colatrella, 404.894.1241; Mary Lynn Realff, 404.894.2496

### GEORGIA CENTER FOR ADVANCED TELECOMMUNICATIONS TECHNOLOGY (GCATT)

Director: Nikil S. Jayant, 404.894.7285

### GEORGIA ELECTRONIC DESIGN CENTER (GEDC)

Director: Joy Laskar, 404.894.5268

### GEORGIA TECH INFORMATION SECURITY CENTER (GTISC)

Director: Mustaque Ahamad, 404.894.2593

### GEORGIA TRANSPORTATION INSTITUTE (GTI)

Director: Michael D. Meyer, 404.385.2246

### GEORGIA WATER RESOURCES INSTITUTE (GWRI)

Director: Aris P. Georgakakos, 404.894.2240

### INSTITUTE FOR LEADERSHIP AND ENTREPRENEURSHIP (ILE)

Director: Terry Blum, 404.894.4924

### INSTITUTE OF PAPER SCIENCE AND TECHNOLOGY (IPST)

Director: W. J. (Jim) Frederick Jr., 404.894.2082

**INSTITUTE FOR SUSTAINABLE TECHNOLOGY AND DEVELOPMENT (ISTD)**

Director: Charles L. Liotta, 404.894.9608

**INTERACTIVE MEDIA TECHNOLOGY CENTER (IMTC)**

Director: Mark A. Clements, 404.894.4584; Research Director: W. E. (Ed) Price, 404.894.3547

**MANUFACTURING RESEARCH CENTER (MARC)**

Director: Steven Danyluk, 404.894.9687

**MICROELECTRONICS RESEARCH CENTER (MIRC)**

Director: James D. Meindl, 404.894.5101

**NANOTECHNOLOGY RESEARCH CENTER (NRC)**

Director: James Meindl, 404.894.5101

**PARKER H. PETIT INSTITUTE FOR BIOENGINEERING AND BIOSCIENCE (IBB)**

Director: Robert M. Nerem, 404.894.2768

**PHYSIOLOGICAL RESEARCH LABORATORY (PRL)**

Director: Laura O'Farrell, 404.385.6233

**POLICY RESEARCH INITIATIVE (PRI)**

Director: Susan E. Cozzens, 404.385.0397

**SPECIALTY SEPARATIONS CENTER (SSC)**

Director: Charles A. Eckert, 404.894.7070

**STRATEGIC ENERGY INITIATIVE (SEI)**

Interim Director: Roger P. Webb, 404.385.4954

**THE TENNENBAUM INSTITUTE (TI)**

Director: William B. Rouse, 404.894. 2331

The College of Engineering participates in multidisciplinary programs.
The College of Management participates in multidisciplinary programs.
The College of Sciences participates in multidisciplinary programs.

## JOINT CNRS RESEARCH LABORATORY

As the result of a strategic alliance between the Georgia Institute of Technology and the French Centre National de la Recherche Scientifique (CNRS), a joint GIT/CNRS research laboratory, GT-CNRS UMI 2958 was established at GT Lorraine in March of 2006. The laboratory, conducts a unique transatlantic collaborative program of research in secure networks and smart materials. Research faculty and graduate students from Georgia Tech, French universities, and other CNRS laboratories work on joint research projects sponsored by industry and by local and national governments. The founding associate partners in this unique laboratory are the University of Metz, the University of Franche-Comté, the Ecole Nationale Supérieure d'Arts et Métiers (ENSAM), and L'École Supérieure d'Électricité (Supélec). Initial research programs center on optoelectronic techniques for signal encryption and secure transmission for optical and wireless systems, nonlinear optics, new materials and nanostructures for photonics and electronics, functional materials, and ultrasonic characterization of materials. For more information, contact ECE Professor Abdallah Ougazzaden, GT-CNRS, at +33 387 20 3939, send e-mail below, or visit the Web site: http://www.georgiatech-metz.fr/.

## OAK RIDGE ASSOCIATED UNIVERSITIES

Since 1946, students and faculty of the Georgia Institute of Technology have benefited from its membership in Oak Ridge Associated Universities (ORAU). ORAU is a consortium of ninety-one colleges and universities and a contractor for the United States Department of Energy (DOE) located in Oak Ridge, Tennessee. ORAU works with its member institutions to help their students and faculty gain access to federal research facilities throughout the country; to keep its members informed about opportunities for fellowship, scholarship, and research appointments; and to organize research alliances among its members.

Through the Oak Ridge Institute for Science and Education (ORISE), the DOE facility that ORAU operates, undergraduates, graduates, postgraduates, and faculty enjoy access to a multitude of opportunities for study and research. Students can participate in programs covering a wide variety of disciplines, including business, earth sciences, epidemiology, engineering, physics, geological sciences, pharmacology, ocean sciences, biomedical sciences, nuclear chemistry, and mathematics. Appointment and program length range from one month to four years. Many of these programs are especially designed to increase the numbers of underrepresented minority students pursuing degrees in science- and engineering-related disciplines. A comprehensive listing of these programs and other opportunities, their disciplines, and details on locations and benefits can be found in the ORISE Catalog of Education and Training Programs, which is available at www.orau.gov/orise/educ.htm, or by calling either of the contacts below.

ORAU's Office of Partnership Development seeks opportunities for partnerships and alliances among ORAU's members, private industry, and major federal facilities. Activities include faculty development programs, such as the Ralph E. Powe Junior Faculty Enhancement Awards, the Visiting Industrial Scholars Program, consortium research funding initiatives, faculty research and support programs, as well as services to chief research officers. For more information about ORAU and its programs, contact:

Charles L. Liotta
Vice Provost for Research and Dean of Graduate Studies
ORAU Councilor for Georgia Institute of Technology

Monnie E. Champion
ORAU Corporate Secretary
865.576.3306

You may also visit the ORAU Web site at: www.orau.org

## SKIDAWAY INSTITUTE OF OCEANOGRAPHY

Located on Skidaway Island near Savannah, Georgia, the Skidaway Institute of Oceanography (SkIO) provides a complex of coastal- and ocean-related educational and research opportunities. School of Biology faculty have laboratory facilities at the Institute. Many SkIO faculty hold adjunct appointments with Tech schools, including Civil and Environmental Engineering, Earth and Atmospheric Sciences, and Biology, and actively participate in graduate research and education. SkIO maintains small boats for local studies and the 92-foot R/V Savannah for conducting ocean research. Other unique coastal research facilities include the Bioremediation and Environmental Research Mesocosms (BERM) facility, the Saltmarsh Ecosystem Research Facility (SERF), a large recirculating flume, and the SkIO library, which is the largest in the state devoted almost exclusively to marine sciences. Areas of faculty expertise at SkIO include chemical, physical, and biological oceanography, marine ecology, and marine geology. Visitor and graduate student housing is available on site, providing convenient access to these facilities.

## BILLING INFORMATION

The Bursar's Office does not mail invoices to students. A complete Student Invoice Statement is available to students via the Web Student Access System. Any changes that adjust tuition and fees (e.g., adding credit hours or a meal plan, making a payment, or canceling a parking permit) will be updated immediately to show the most current information on the account. The Web invoice also facilitates online payment options for WebCheck payments.

For more information, refer to http://www.bursar.gatech.edu/pay.php. It is the student's responsibility to make sure that all requirements of his or her account are satisfied by the deadlines. All questions concerning fees and refunds should be directed only to the Bursar's Office. Verbal misinformation is not grounds for a waiver of a regulation. All tuition and other charges are subject to change without notice.

To access a Student Invoice Statement, go to the Web Student Access System. The menu selections are: Secured Access Login (enter student's ID and PIN), Student Services and Financial Aid, Registration, and Student Invoice Statement and Web Payment Options. All notices concerning billing are sent to the student's Georgia Tech e-mail account, which is considered the student's official point of contact.

## FEE PAYMENT

All fees are payable by the deadline published on the Official School Calendar (www.registrar.gatech.edu) and on the Bursar's Office Web page (http://www.bursar.gatech.edu/office/calendar.pdf) for each academic term. Registration is not complete until all fees have been paid. The Institute reserves the right at any time during the semester to drop any student from classes for failure to pay fees. In no case will a regulation be waived or an exception be granted because a student pleads ignorance of the regulation or asserts that he or she was not informed of it by an advisor or other authority. Students who owe the Institute money and have been placed on "Hold" because of failure to pay may have their accounts placed for collection by a professional collection agency, with the student incurring the full costs of collection. Payment may be made with cash (U.S. dollars); a check payable in U.S. currency and drawn on a financial institution located in the United States (checks must be made payable to Georgia Tech and have the checking account number encoded); or cashier's check. Georgia Tech will not accept credit card payments directly for payment of tuition, fees, and room and board that appear on the student's account summary. Credit card payments can only be made via the Web Student Access System (https://oscar.gatech.edu) and will be processed by Georgia Tech's vendor. You will be charged a service fee of 2.75 percent by the vendor for this service. (No fee will be charged for WebCheck transactions.) MasterCard, American Express and Discover (credit and debit), and WebChecks will be accepted when payments are made through OSCAR. VISA credit, debit, or check cards will not be accepted. Credit card payments cannot be made by mail, phone, fax, or in person.

## LATE REGISTRATION FEES

Students who do not meet fee payment deadlines may incur penalty fees. If a student does not pay all required fees by the published fee deadlines (http://www.bursar.gatech.edu/office/calendar.pdf), his or her registration may be cancelled. The late payment fee is $75.

## MANDATORY STUDENT FEES

The student fees listed are subject to change and should be considered estimates for use in planning future payments. See www.bursar.gatech.edu/tuiandfee.php for current information. All students registered for four or more semester hours are charged the mandatory student fees, which are due at the same time as tuition charges. These mandatory student fees are considered part of the registration process and must be paid in full for the student to be considered enrolled in school. The student activity, athletics, recreation, technology, transportation, and health fees are the mandatory student fees that are used to provide cultural, social, and athletic programs for the entire student body. In addition, these fees provide financial support for student facilities at the Institute, guest speakers and lecturers, student publications, and many special events that are available exclusively for the students of Georgia Tech. These fees also assist in defraying shuttle costs for transporting students around campus. The technology fee supports the infrastructure necessary to provide students with the latest technology in regards to online computing services. Students registering for fewer than four semester hours are required to pay the technology and transportation fees.

## TUITION AND FEE RATES

The most current information on tuition and fees will be available at http://www.bursar.gatech.edu/tuiandfee.php. The tuition and fees listed are estimated and subject to change. These amounts should be used only as a planning guide for future payments. See www.bursar.gatech.edu for the latest information on tuition and fees. Tuition charges can vary based on state residency status and degree program. Residency status will be determined by the Admissions Office at the time of acceptance. Students will either be classified as a resident or non-resident of Georgia for tuition purposes in accordance with the regulations of the Board of Regents of the University System of Georgia. Students registering for fewer than twelve semester hours will be charged tuition by the hour. When students register for twelve hours, they have reached the tuition charge plateau and will not be charged tuition for any additional hours for which they register. The tuition charges are what a student can anticipate based on residency status and degree program of study.

## CHOOSING A PAYMENT OPTION

### CHECK PAYMENTS ON THE WEB:

The Bursar's Office accepts check payments over the Web. To make a payment to an account, go to https://oscar.gatech.edu. The menu selections are: Secured Access Login (enter student ID and PIN), Student Services and Financial Aid, Registration, and Student Invoice Statement and Web Payment Options. The check payment link is at the bottom of the page.

### MAIL IN:

Make all checks or money orders payable to the Georgia Institute of Technology. The student's ID number must be clearly printed on all checks or money orders. Payments must be received (not postmarked) by 4:00 p.m. on the fee deadline date. Mail to the following address: Georgia Institute of Technology, Bursar's Office, Lyman Hall, 225 North Avenue, Atlanta, Georgia 30332-0255.

### ON CAMPUS:

Students who pay in person should bring their cash or check to the Bursar's Office Cashier Window; First Floor, Lyman Hall. Payment by check or money order can be deposited in the drop box (entry vestibule to Lyman Hall) at any hour of the day before the fee deadline. Do not put cash in the drop box.

### PREPAYMENTS:

Prepayment of fees will be accepted; however, prepayment does not guarantee the student will successfully register for any or all classes needed. It is the student's responsibility to properly register for classes by the registration deadline.

### FEE PAYMENT USING FINANCIAL AID:

All tuition waivers, financial aid, scholarships, and fellowships awarded will be disbursed to the student's account and applied to any outstanding balances. Financial aid is initially estimated and has not actually been disbursed. The "Balance Due" for a student is reduced by this estimated amount. Actual disbursements begin approximately one week prior to the fee deadline. It is the student's responsibility to ensure that all funds are properly credited by the fee deadline date by reviewing his or her student Web invoice. If funds are not/will not be disbursed or credited by the fee deadline, the student may be eligible to request a deferment from Student Financial Planning and Services. Deferments must be requested and will be granted only for the lesser of the amount of the financial aid award or the amount due to the Institute.

### DISBURSEMENT OF FINANCIAL AID CHECKS:

Financial aid processed by the Office of Student Financial Planning and Services will be applied directly to the student's account in the Bursar's Office. If a credit balance exists after all charges have been posted, the Bursar's Office will forward a check to the student's campus post office box, or it will be deposited into the student's bank account. Many financial aid programs (including the HOPE scholarship, Federal Pell Grant, and Stafford Loan) do not require that the student be enrolled full time in order for disbursement to occur. However, because some scholarships and grants do require full-time study, and some aid programs require registration for at least six hours of courses for disbursement, students who are planning to enroll for fewer than twelve hours and who are unsure of the requirements are advised to seek clarification from the Office of Student Financial Planning and Services.

## RETURNED CHECKS

If a check is returned from the bank (insufficient funds, stop payment, etc.), the student will be required to redeem the returned check with cash or a cashier's check in the Bursar's Office. A returned check fee will be added to the amount of the check. Returned checks remaining unredeemed after a reasonable period of time may be forwarded to a collection agency with the student bearing the additional collections costs. Students who have three checks returned against their Georgia Tech accounts will be denied future check-writing privileges.

Checks returned against a student's fees might subject the student's classes to cancellation. If the student intends to withdraw from Georgia Tech, it remains the student's responsibility to formally withdraw via the Web Student Access System (see "Procedures for Withdrawal").

## REFUNDS FOR STUDENTS WITH FINANCIAL AID

A calculation will be made on all financial aid recipients to determine whether a student who completely withdraws during a term has "earned" the monies disbursed. Students "earn" their aid based on the period of time they remain enrolled. During the first 60 percent of the term, a student earns financial aid funds in direct proportion to the length of time the student remains enrolled. Beyond the 60 percent point, all aid is considered earned. The responsibility to repay "unearned" aid is shared by the Institute and the student in proportion to the aid each is assumed to possess. The most current refund schedule (actual dates) can be found at www.bursar.gatech.edu/ref.php.

## REFUND POLICY

The refund amount for students withdrawing from the Institute shall be based on a pro rata percentage determined by dividing the number of calendar days in the semester that the student completed by the total number of calendar days in the semester. The total number of calendar days in a semester is calculated by using the first day of class through the last day of final exams for the Institute and excludes scheduled breaks of five or more consecutive days. Institutional charges will be refunded up to the point in time that the percentage equals 60 percent. Students who withdraw from the Institute when the calculated percentage of completion is greater than 60 percent are not entitled to a refund of any portion of institutional charges. A full refund (100 percent) will be available to students who fully withdraw from the Institute or to students who drop individual courses by the end of late registration, if they cease to be enrolled at least full time (twelve hours). No further refunds will be given for individual classes dropped after the end of late registration.

## CANCELLATION OF REGISTRATION

Students who register for classes and do not attend must cancel classes online. Failure to do so will result in awarded financial aid being applied to the student's account. Non-attendance then results in the student receiving a grade of *F* in each course.

## CLASSIFICATION OF STUDENTS FOR TUITION PURPOSES

Under the Constitution and laws of Georgia, the Board of Regents of the University System of Georgia was created to govern, control, and manage a system of public institutions providing quality higher education for the benefit of Georgia citizens. The state, in turn, receives substantial benefit from individuals who attend or have attended these institutions through their significant contributions to the civic, political, economic, and social advancement of the citizens of Georgia.

Because the overwhelming proportion of financial support for the operation of the public institutions of higher education in Georgia comes from the citizens through the payment of taxes, the determination of whether a student is classified as a resident or a nonresident of the state for tuition purposes becomes a significant matter. The tuition paid by in-state students covers only about one-fourth of the total cost of their education in the University System. Therefore, Georgia taxpayers are contributing three-fourths of the necessary funds to provide quality education for the citizens of the state.

The practice followed by state colleges and universities of assessing out-of-state students a higher tuition rate is a rational attempt by states to achieve a partial cost equalization between those who have and those who have not recently contributed to the state's economy, even though no precise way exists to determine the degree to which higher tuition charges equalize the cost of educating in-state and out-of-state students.

Courts that have been faced with challenges to residency classification procedures have consistently recognized the right of public institutions of higher education to charge higher rates to out-of-state students and to adopt reasonable criteria for determining the establishment of in-state status.

For the purpose of these regulations, the question to be answered is not primarily whether a student is a resident or nonresident of Georgia, but whether the student should pay University System fees on an in-state basis. The term "resident" is confusing because it may have several definitions as it relates to voter registration, driver's licenses, automobile registration, deeds, contracts, wills, income taxes, and other matters. A student may be a resident of Georgia for some purposes, but not entitled to in-state status for tuition purposes.

The Board of Regents has adopted certain policies governing the classification of students as residents and nonresidents for tuition purposes in keeping with its responsibilities to the citizens of Georgia for an appropriate assessment of fees and reasonable share of the cost of their education. The taxpayers of Georgia are thereby assured that they are not assuming the financial burden of educating persons whose presence in the state is not intended to be permanent.

With these considerations in mind, the Board of Regents has adopted the following policies governing the classification of students for fee payment purposes:

www.usg.edu/student_affairs/faq/residency

A. United States Citizens

1.

   a. An independent student who has established and maintained a domicile in the State of Georgia for a period of at least 12 consecutive months immediately preceding the first day of classes for the term shall be classified as "in-state" for tuition purposes.

      It is presumed that no student shall have gained or acquired in-state classification while attending any postsecondary educational institution in this state without clear evidence of having established domicile in Georgia for purposes other than attending a postsecondary educational institution in this state.

   b. A dependent student shall be classified as "in-state" for tuition purposes if either i) the dependent student's parent has established and maintained domicile in the State of Georgia for at least 12 consecutive months immediately preceding the first day of classes for the term and the student has graduated from a Georgia high school or ii) the dependent student's parent has established and maintained domicile in the State of Georgia for at least 12 consecutive months immediately preceding the first day of classes for the term and the parent claimed the student as a dependent on the parent's most recent federal income tax return.

   c. A dependent student shall be classified as "in-state" for tuition purposes if a U.S. court-appointed legal guardian has established and maintained domicile in the State of Georgia for at least 12 consecutive months immediately preceding the first day of classes for the term, provided that appointment was not made to avoid payment of out-of-state tuition and the U.S. court-appointed legal guardian can provide clear evidence of having established and maintained domicile in the State of Georgia for a period of at least 12 consecutive months immediately preceding the first day of classes for the term.

2.

   a. If an independent student classified as "in-state" relocates temporarily but returns to the State of Georgia within 12 months, the student shall be entitled to retain in-state tuition classification.

   b. If the parent or U.S. court-appointed legal guardian of a dependent student currently classified as "in-state" for tuition purposes establishes domicile outside of Georgia after having established and maintained domicile in the State of Georgia, the student may retain in-state tuition classification as long as the student remains continuously enrolled in a public postsecondary educational institution in the state, regardless of the domicile of the parent or U.S. court-appointed legal guardian.

B. Noncitizens

Noncitizens initially shall not be classified as "in-state" for tuition purposes unless there is evidence to warrant consideration of in-state classification. Lawful permanent residents, refugees, asylees, or other eligible noncitizens as defined by federal Title IV regulations may be extended the same consideration as citizens of the United States in determining whether they qualify for in-state classification. International students who reside in the United States under nonimmigrant status conditioned at least in part upon intent not to abandon a foreign domicile are not eligible for in-state classification.

## OUT-OF-STATE TUITION WAIVERS

An institution may award out-of-state tuition differential waivers and assess in-state tuition for certain nonresidents of Georgia for the following reasons (under the following conditions):

A. **Academic Common Market**. Students selected to participate in a program offered through the Academic Common Market;

B. **International Students**. International students selected by the institutional president or an authorized representative, provided the number of such waivers does not exceed 2 percent of the equivalent full-time students enrolled at the institution in the fall term immediately preceding the term for which the out-of-state waiver is to be waived; Non-immigrant Out-of-State Tuition Waiver for Undergraduate Students

C. **University System Employees and Dependents**. Full-time employees of the University System, their spouses, and their dependent children;
Download Application

D. **Full-time School Employees**. Full-time employees in the public schools of Georgia or of the Department of Technical and Adult Education, their spouses, and their dependent children. Teachers employed full-time on military bases in Georgia shall also qualify for this waiver (BR Minutes, 1988-89, p.43);
Download Application

E. **Career Consular Officials**. Career consular officers, their spouses, and their dependent children who are citizens of the foreign nation that their Consulate office represents and who are stationed and living in Georgia under orders of their respective governments;
Download Application

F. **Military Personnel**. Military personnel, their spouses, and their dependent children stationed in or assigned to Georgia and on active duty are eligible to receive a military waiver of non-resident fees;

G. **Nonresident Graduate Students** who hold teaching or research assistantships requiring at least one-third time service at the institution; Contact your major school

H. **National Guard Members**. Full-time members of the Georgia National Guard, their spouses, and their dependent children (BR Minutes, April 1998, pp. 16-17); Military personnel

I. **Direct Exchange Program Students**. Any international student who enrolls in a University System institution as a participant in a direct exchange program that provides reciprocal benefits to University System students; and www.oie.gatech.edu

J. **Academically Outstanding Graduate Students**. School chairs may recommend a limited number of academically outstanding nonresident, full-time graduate students for a waiver of nonresident tuition. www.finaid.gatech.edu

K. **Economic Advantage.** As of the first day of classes for the term, an economic advantage waiver may be granted to a dependent or independent student who can provide clear evidence that the student or the student's parent, spouse, or U.S. court-appointed guardian has relocated to the State of Georgia to accept full-time, self-sustaining employment and has established domicile in the State of Georgia. Relocation to the state must be for reasons other than enrolling in an institution of higher education. This waiver will expire 12 months from the date the waiver was granted.

   As of the first day of classes for the term, an economic advantage waiver may be granted to a student possessing a valid employment-related visa status who can provide clear evidence of having relocated to the State of Georgia to accept full-time, self-sustaining employment. Relocation to the state must be for reasons other than enrolling in an institution of higher education. These individuals would be required to show clear evidence of having taken all legally permissible steps toward establishing legal permanent residence in the United States and the establishment of legal domicile in the State of Georgia. Students currently receiving a waiver who are dependents of a parent or spouse possessing a valid employment-sponsored visa may continue to receive the waiver as long as they can demonstrate continued efforts to pursue an adjustment of status to U.S. legal permanent resident (BR Minutes, June 2006).
   Download Application

L. **Recently Separated Military Service Personnel.** Members of a uniformed military service of the United States who, within 12 months of separation from such service, enroll in an academic program and demonstrate an intent to become a permanent resident of Georgia. This waiver may be granted for not more than one year (BR Minutes, June 2004).

M. **Nonresident Student.** As of the first day of classes for the term, a nonresident student whose parent, spouse, or U.S. court-appointed legal guardian has maintained domicile in Georgia for at least 12 consecutive months so long as the student can provide clear evidence showing the relationship to the parent, spouse, or U.S. court-appointed legal guardian has existed for at least 12 consecutive months immediately preceding the first day of classes for the term. If the parent, spouse, or U.S. court-appointed legal guardian of a continuously enrolled nonresident student establishes domicile in another state after having maintained domicile in the State of Georgia for the required period, the nonresident student may continue to receive this waiver as long as the student remains continuously enrolled in a public postsecondary educational institution in the state, regardless of the domicile of the parent or U.S. court-appointed legal guardian (BR Minutes, June 2006).
Download Application

Students who come to Georgia Tech from another state and work for companies in Georgia remain ineligible for in-state tuition in the absence of compelling evidence of intent to remain in Georgia permanently. Having Georgia voter registration, having employment in any position normally filled by a student (such as co-op, graduate research assistant, or graduate teaching assistant), having a lease of living quarters, having a Georgia automobile registration, and having Georgia driver's license do not constitute sufficient evidence of domicile to affect classification as an in-state student under the Board of Regents' policy.

For further information concerning residency, students should contact the Residency Office in Room 103 of the Tech Tower, write to the Registrar's Office, Residency, Georgia Tech, Atlanta, Ga 30332-0315, or call 404-894-6388. The Residency Office must receive an application for classification as a legal resident for fee payment purposes no later than one month prior to the academic registration date for the term in which the student seeks to pay fees as a resident of Georgia. Requests for tuition waivers must be received by the Registrar's Office no later than the first day of classes for the term for which the out-of-state tuition is to be waived. See the official school calendar for dates.

# APPLICATION FOR WAIVER OF NON-RESIDENT FEES

Georgia Institute of Technology - Office of the Registrar - Atlanta, GA 30332-0315

## NONRESIDENT REQUESTING CONSIDERATION FOR AN OUT-OF-STATE TUITION DIFFERENTIAL WAIVER (SELECT ONE)

☐ 1. Career Consular
- a. A statement on letterhead from the office verifying the consular officer is stationed and living in Georgia under orders of their respective government.

☐ 2. Economic Advantage  Dependent students and spouses are required to submit the following information for their parent or spouse:
- a. Employment information on company letterhead verifying fulltime employment and start date;
- b. Copy of Georgia Driver's License;
- c. Copy of lease or warranty deed;
- d. Permanent Resident Card (if applicable); and
- e. U.S. court appointed guardianship paperwork (if applicable).

Independent students are required to submit items a, b, c, and d from the list above.

☐ 3. Full-time School Employees
- a. Employment information on school letterhead verifying full time employment and start date
- b. Copy of contract from the school board

☐ 4. Nonresident Student
- a. Certified copy of most recent Georgia state income taxes for parent or spouse or U.S. court appointed guardian;
- b. Copy of Georgia driver's license for parent or spouse or U.S. court appointed guardian; and
- c. Copy of birth certificate for dependent student or marriage certificate for spouse.

☐ 5. University System Employees and Dependents
- a. Employment information on university or institution letterhead verifying full time employment and start date

## PERSONAL INFORMATION FOR GEORGIA TECH STUDENT

Applicant Name ______________________________
First  Middle  Last

Present Address ______________________________
Street address and, if applicable, apartment number  City  State  Zip Code

Email Address ______________________________

GTID Number ______________ Phone ______________

Semester Applying For ______________________________
Fall / Spring / Summer  Year

## PARENT OR SPOUSE OR U.S. COURT APPOINTED GUARDIAN INFORMATION FOR DEPENDENT APPLICANTS ONLY

Name ______________________________
First  Middle  Last

Address ______________________________
Street address and, if applicable, apartment number  City  State  Zip Code

Email Address ______________ Phone ______________

## OATH AND AFFIRMATION FOR GEORGIA TECH STUDENT

I, the undersigned, hereby swear or affirm to the authenticity of the information provided on all pages of this affidavit. I understand that any false or misleading information on this affidavit or provided to support this affidavit may result in denial of admission or expulsion from the Institute. I understand that it may also cause me to be billed for the nonresident fees. I also authorize Georgia Institute of Technology to review or examine any and all documents and records, including my confidential loan forms and related data, which may assist in clarifying my residence status.

Signature Of Person Making Affidavit - GT Student ______________________________

Subscribed And Sworn To Before Me This ______ Day of ______ 20 ______

☐ Personally Known  ☐ Produced Identification  Type ______ ID Number ______

Notary Public, State of Georgia ______________ Commission Expires ______

## *** REGISTRAR'S OFFICE USE ONLY ***

Waiver entered for: ______________ Signature: ______________ Date: ______

## TUITION AND FEE RATES

The most current information on tuition and fees will be available at http://www.bursar.gatech.edu/tuiandfee.php. The tuition and fees listed are estimated and subject to change. These amounts should be used only as a planning guide for future payments. See www.bursar.gatech.edu
for the latest information on tuition and fees. Tuition charges can vary based on state residency status and degree program. Residency status will be determined by the Admissions Office at the time of acceptance. Students will either be classified as a resident or non-resident of Georgia for tuition purposes in accordance with the regulations of the Board of Regents of the University System of Georgia. Students registering for fewer than twelve semester hours will be charged tuition by the hour. When students register for twelve hours, they have reached the tuition charge plateau and will not be charged tuition for any additional hours for which they register. The tuition charges are what a student can anticipate based on residency status and degree program of study.

## TUITION INFORMATION

Tuition and fees are estimated and subject to change. These amounts should be used only as a planning guide for future payments. See www.bursar.gatech.edu/tuiandfee.php for the latest information on tuition and fees. Tuition charges can vary based on state residency status and degree program. Residency status will be determined by the Admissions Office at the time of acceptance. Students will either be classified as a resident or non-resident of Georgia for tuition purposes in accordance with the regulations of the Board of Regents of the University System of Georgia.

Students registering for fewer than twelve semester hours will be charged tuition by the hour. When students register for twelve hours, they have reached the tuition charge plateau and will not be charged tuition for any additional hours for which they register. A student can anticipate tuition charges based on residency status and degree program of study. See www.bursar.gatech.edu/tuiandfee.php for the latest information on tuition and fees.

## UNDERGRADUATE FINANCIAL ASSISTANCE

The Office of Student Financial Planning and Services (OSFP&S) is dedicated to helping students and parents obtain the financial aid necessary to pay for a college education at Georgia Tech. The OSFP&S accomplishes this by awarding federal, state, and Institute funds to students and by directing students to other sources of aid. Additionally, the OSFP&S serves as the disbursement and delivery agent for all sources of assistance for students, including awards for Georgia Tech students from outside agencies.

All undergraduate students, including transfer students, who are interested in scholarships, grants, loans, and/or work opportunities for any semester of the academic year beginning in the fall semester must submit the "Georgia Tech Application for Scholarships and Financial Aid" and the "Free Application for Federal Student Aid" (FAFSA). The priority application deadline for entering freshmen is March 1. The deadline for returning undergraduate and transfer students is May 1.

For additional information, visit www.finaid.gatech.edu or contact the Office of Student Financial Planning and Services, Georgia Institute of Technology, Atlanta, Georgia 30332-0460.

## OUT-OF-STATE TUITION WAIVERS

An institution may award out-of-state tuition differential waivers and assess in-state tuition for certain nonresidents of Georgia for the following reasons (under the following conditions):

A. **Academic Common Market**. Students selected to participate in a program offered through the Academic Common Market;

B. **International Students**. International students selected by the institutional president or an authorized representative, provided the number of such waivers does not exceed 2 percent of the equivalent full-time students enrolled at the institution in the fall term immediately preceding the term for which the out-of-state waiver is to be waived; Non-immigrant Out-of-State Tuition Waiver for Undergraduate Students

C. **University System Employees and Dependents**. Full-time employees of the University System, their spouses, and their dependent children;
Download Application

D. **Full-time School Employees**. Full-time employees in the public schools of Georgia or of the Department of Technical and Adult Education, their spouses, and their dependent children. Teachers employed full-time on military bases in Georgia shall also qualify for this waiver (BR Minutes, 1988-89, p.43);
Download Application

E. **Career Consular Officials**. Career consular officers, their spouses, and their dependent children who are citizens of the foreign nation that their Consulate office represents and who are stationed and living in Georgia under orders of their respective governments;
Download Application

F. **Military Personnel**. Military personnel, their spouses, and their dependent children stationed in or assigned to Georgia and on active duty are eligible to receive a military waiver of non-resident fees;

G. **Nonresident Graduate Students** who hold teaching or research assistantships requiring at least one-third time service at the institution; Contact your major school

H. **National Guard Members**. Full-time members of the Georgia National Guard, their spouses, and their dependent children (BR Minutes, April 1998, pp. 16-17); Military personnel

I. **Direct Exchange Program Students**. Any international student who enrolls in a University System institution as a participant in a direct exchange program that provides reciprocal benefits to University System students; and www.oie.gatech.edu

J. **Academically Outstanding Graduate Students**. School chairs may recommend a limited number of academically outstanding nonresident, full-time graduate students for a waiver of nonresident tuition. www.finaid.gatech.edu

K. **Economic Advantage.** As of the first day of classes for the term, an economic advantage waiver may be granted to a dependent or independent student who can provide clear evidence that the student or the student's parent, spouse, or U.S. court-appointed guardian has relocated to the State of Georgia to accept full-time, self-sustaining employment and has established domicile in the State of Georgia. Relocation to the state must be for reasons other than enrolling in an institution of higher education. This waiver will expire 12 months from the date the waiver was granted.

   As of the first day of classes for the term, an economic advantage waiver may be granted to a student possessing a valid employment-related visa status who can provide clear evidence of having relocated to the State of Georgia to accept full-time, self-sustaining employment. Relocation to the state must be for reasons other than enrolling in an institution of higher education. These individuals would be required to show clear evidence of having taken all legally permissible steps toward establishing legal permanent residence in the United States and the establishment of legal domicile in the State of Georgia. Students currently receiving a waiver who are dependents of a parent or spouse possessing a valid employment-sponsored visa may continue to receive the waiver as long as they can demonstrate continued efforts to pursue an adjustment of status to U.S. legal permanent resident (BR Minutes, June 2006).
   Download Application

L. **Recently Separated Military Service Personnel.** Members of a uniformed military service of the United States who, within 12 months of separation from such service, enroll in an academic program and demonstrate an intent to become a permanent resident of Georgia. This waiver may be granted for not more than one year (BR Minutes, June 2004).

M. **Nonresident Student.** As of the first day of classes for the term, a nonresident student whose parent, spouse, or U.S. court-appointed legal guardian has maintained domicile in Georgia for at least 12 consecutive months so long as the student can provide clear evidence showing the relationship to the parent, spouse, or U.S. court-appointed legal guardian has existed for at least 12 consecutive months immediately preceding the first day of classes for the term. If the parent, spouse, or U.S. court-appointed legal guardian of a continuously enrolled nonresident student establishes domicile in another state after having maintained domicile in the State of Georgia for the required period, the nonresident student may continue to receive this waiver as long as the student remains continuously enrolled in a public postsecondary educational institution in the state, regardless of the domicile of the parent or U.S. court-appointed legal guardian (BR Minutes, June 2006).
Download Application

Students who come to Georgia Tech from another state and work for companies in Georgia remain ineligible for in-state tuition in the absence of compelling evidence of intent to remain in Georgia permanently. Having Georgia voter registration, having employment in any position normally filled by a student (such as co-op, graduate research assistant, or graduate teaching assistant), having a lease of living quarters, having a Georgia automobile registration, and having Georgia driver's license do not constitute sufficient evidence of domicile to affect classification as an in-state student under the Board of Regents' policy.

For further information concerning residency, students should contact the Residency Office in Room 103 of the Tech Tower, write to the Registrar's Office, Residency, Georgia Tech, Atlanta, Ga 30332-0315, or call 404-894-6388. The Residency Office must receive an application for classification as a legal resident for fee payment purposes no later than one month prior to the academic registration date for the term in which the student seeks to pay fees as a resident of Georgia. Requests for tuition waivers must be received by the Registrar's Office no later than the first day of classes for the term for which the out-of-state tuition is to be waived. See the official school calendar for dates.

# APPLICATION FOR WAIVER OF NON-RESIDENT FEES

Georgia Institute of Technology - Office of the Registrar - Atlanta, GA 30332-0315

## NONRESIDENT REQUESTING CONSIDERATION FOR AN OUT-OF-STATE TUITION DIFFERENTIAL WAIVER (SELECT ONE)

☐ 1. Career Consular
   a. A statement on letterhead from the office verifying the consular officer is stationed and living in Georgia under orders of their respective government.

☐ 2. Economic Advantage Dependent students and spouses are required to submit the following information for their parent or spouse:
   a. Employment information on company letterhead verifying fulltime employment and start date;
   b. Copy of Georgia Driver's License;
   c. Copy of lease or warranty deed;
   d. Permanent Resident Card (if applicable); and
   e. U.S. court appointed guardianship paperwork (if applicable).
   Independent students are required to submit items a, b, c, and d from the list above.

☐ 3. Full-time School Employees
   a. Employment information on school letterhead verifying full time employment and start date
   b. Copy of contract from the school board

☐ 4. Nonresident Student
   a. Certified copy of most recent Georgia state income taxes for parent or spouse or U.S. court appointed guardian;
   b. Copy of Georgia driver's license for parent or spouse or U.S. court appointed guardian; and
   c. Copy of birth certificate for dependent student or marriage certificate for spouse.

☐ 5. University System Employees and Dependents
   a. Employment information on university or institution letterhead verifying full time employment and start date

## PERSONAL INFORMATION FOR GEORGIA TECH STUDENT

Applicant Name ______________________________
First | Middle | Last

Present Address ______________________________
Street address and, if applicable, apartment number | City | State | Zip Code

Email Address ______________________________

GTID Number ______________ Phone ______________

Semester Applying For ______________________________
Fall / Spring / Summer | Year

## PARENT OR SPOUSE OR U.S. COURT APPOINTED GUARDIAN INFORMATION FOR DEPENDENT APPLICANTS ONLY

Name ______________________________
First | Middle | Last

Address ______________________________
Street address and, if applicable, apartment number | City | State | Zip Code

Email Address ______________ Phone ______________

## OATH AND AFFIRMATION FOR GEORGIA TECH STUDENT

I, the undersigned, hereby swear or affirm to the authenticity of the information provided on all pages of this affidavit. I understand that any false or misleading information on this affidavit or provided to support this affidavit may result in denial of admission or expulsion from the Institute. I understand that it may also cause me to be billed for the nonresident fees. I also authorize Georgia Institute of Technology to review or examine any and all documents and records, including my confidential loan forms and related data, which may assist in clarifying my residence status.

Signature Of Person Making Affidavit - GT Student ______________________________

Subscribed And Sworn To Before Me This ______________ Day of ______________ 20______

☐ Personally Known ☐ Produced Identification Type ______________ ID Number ______________

Notary Public, State of Georgia ______________ Commission Expires ______________

## *** REGISTRAR'S OFFICE USE ONLY ***

Waiver entered for: ______________ Signature: ______________ Date: ______________

## OUTSIDE SPONSORSHIPS

A student whose tuition and fees are to be paid by a corporation or government sponsor must notify the Bursar's Office of the entity's billing address and the amount to be billed at least sixty days prior to the first fee payment deadline (Phase 1) of each semester. As a courtesy to students, the Bursar's Office will send a billing statement. Please refer to http://www.bursar.gatech.edu/thirdpartybilling.pdf.

## PRESIDENT'S SCHOLARSHIP PROGRAM

The President's Scholarship is Georgia Tech's premier merit-based scholarship. Recipients are selected from the top applicants for admission to Georgia Tech, based on demonstrated excellence in academic and leadership performance. From the applicant pool, students selected as semifinalists submit teacher recommendations and are interviewed. The top semifinalists will be named finalists and invited with their parents to campus for an interview and information weekend in March. Current Georgia Tech students, transfer students, and international students are not eligible.

Each year, approximately sixty incoming freshmen receive President's Scholarships, which are renewable for up to four academic years, contingent upon honors-level performance and continued leadership development as evidenced by involvement in campus or community activities. Awards are worth up to a full ride, including tuition, room and board, books, fees, and personal expenses. See the Web site below for more information on stipends.

To be considered, a student must be a U.S. citizen or permanent resident, apply as an incoming freshman, and submit the Georgia Tech Application for Freshman Admission, along with the application fee, with a postmark no later than October 31 of their senior year.

For more information, contact the President's Scholarship Program at 404.894.1615, via the Contact Us button below, or via the Web at www.psp.gatech.edu.

## MEDALS AND PRIZES

Fraternities, academic schools and departments, professional groups, and community organizations award medals and prizes, such as the Phi Kappa Phi Award, and present them at the annual Student Honors Day exercises.

## VETERANS SERVICES

Because the Department of Veterans Affairs (VA) must receive certification of enrollment before issuing benefit payments, any student planning to enroll under any of the VA programs should initiate the certification procedure through the Georgia Tech Registrar's Office as early as possible. For further information about the certification procedure, contact the Office of the Registrar, or the Department of Veterans Affairs Atlanta Regional Office, 1700 Clairmont Road, Decatur, Georgia 30033-4032. Veterans information is also available at www.registrar.gatech.edu.

Veterans must apply to Georgia Tech through the usual admissions procedure. Eligibility for VA benefits does not guarantee acceptance to the Institute, nor does acceptance to Tech signify eligibility. The Institute serves only as a source of certification and information to the VA; the student must carry out all financial transactions with the Veterans Administration directly.

## GRADUATE FINANCIAL ASSISTANCE

The Institute offers financial aid from a variety of sources to assist students with the pursuit and completion of their degrees as rapidly as circumstances permit.

Students should address inquiries for financial assistance to the graduate coordinator of the school in which they plan to study. Graduate school applicants should also investigate national fellowships offered by various foundations, professional organizations, and government agencies. Educational loans are available for qualified applicants through the Office of Student Financial Planning and Services. More information about Federal Loan programs and various alternative loan programs may be found at www.finaid.gatech.edu/graduate.

## GRADUATE RESEARCH ASSISTANTSHIPS

Students receiving these assistantships must be registered for at least 12 total graduate credits with at least 9 hours attempted for a letter grade or pass/fail, and employed at least 1/3 time by the Institute. These students also will be eligible for a tuition waiver. For more information, refer to New Graduate Tuition Waiver Policy at www.bursar.gatech.edu.

## GRADUATE TEACHING ASSISTANTSHIPS

Students receiving these assistantships must be registered for at least 12 total graduate credits with at least 9 hours attempted for a letter grade or pass/fail, and employed at least 1/3 time by the Institute. These students also will be eligible for a tuition waiver. For more information, refer to New Graduate Tuition Waiver Policy at www.bursar.gatech.edu.

## PRESIDENT'S FELLOWSHIPS

Each year, the Institute awards fellowships to supplement other awards to full-time doctoral matriculants with outstanding academic records and high research potential. The fellowship supplement consists of an annual $5,500 stipend (three semesters). These fellowships are renewable for up to a maximum of twelve semesters, based on the major school's evaluation and recommendation.

## FEDERAL FELLOWSHIPS AND TRAINEESHIPS

The Institute participates in a number of fellowship and traineeship programs sponsored by agencies of the federal government. In addition, the following traineeships associated with specific training programs are available: water resources planning and management through the Environmental Resources Center, radiation health specialist training program through the School of Mechanical Engineering's Nuclear and Radiological Engineering Program, air quality control through the School of Chemical and Biomolecular Engineering, and minerals and mining through the School of Materials Science and Engineering.

## SPONSORED FELLOWSHIPS

The Institute awards a number of fellowships sponsored by various industrial organizations, foundations, and trust funds for the support of outstanding graduate students. These fellowships assist students in pursuing their studies and research full time. Most of these fellowships are restricted to specific areas of study, and interested students should contact the department in which they plan to study.

## OUT-OF-STATE TUITION WAIVERS

An institution may award out-of-state tuition differential waivers and assess in-state tuition for certain nonresidents of Georgia for the following reasons (under the following conditions):

A. **Academic Common Market**. Students selected to participate in a program offered through the Academic Common Market;

B. **International Students**. International students selected by the institutional president or an authorized representative, provided the number of such waivers does not exceed 2 percent of the equivalent full-time students enrolled at the institution in the fall term immediately preceding the term for which the out-of-state waiver is to be waived; Non-immigrant Out-of-State Tuition Waiver for Undergraduate Students

C. **University System Employees and Dependents**. Full-time employees of the University System, their spouses, and their dependent children;
Download Application

D. **Full-time School Employees**. Full-time employees in the public schools of Georgia or of the Department of Technical and Adult Education, their spouses, and their dependent children. Teachers employed full-time on military bases in Georgia shall also qualify for this waiver (BR Minutes, 1988-89, p.43);
Download Application

E. **Career Consular Officials**. Career consular officers, their spouses, and their dependent children who are citizens of the foreign nation that their Consulate office represents and who are stationed and living in Georgia under orders of their respective governments;
Download Application

F. **Military Personnel**. Military personnel, their spouses, and their dependent children stationed in or assigned to Georgia and on active duty are eligible to receive a military waiver of non-resident fees;

G. **Nonresident Graduate Students** who hold teaching or research assistantships requiring at least one-third time service at the institution; Contact your major school

H. **National Guard Members**. Full-time members of the Georgia National Guard, their spouses, and their dependent children (BR Minutes, April 1998, pp. 16-17); Military personnel

I. **Direct Exchange Program Students**. Any international student who enrolls in a University System institution as a participant in a direct exchange program that provides reciprocal benefits to University System students; and www.oie.gatech.edu

J. **Academically Outstanding Graduate Students**. School chairs may recommend a limited number of academically outstanding nonresident, full-time graduate students for a waiver of nonresident tuition. www.finaid.gatech.edu

K. **Economic Advantage.** As of the first day of classes for the term, an economic advantage waiver may be granted to a dependent or independent student who can provide clear evidence that the student or the student's parent, spouse, or U.S. court-appointed guardian has relocated to the State of Georgia to accept full-time, self-sustaining employment and has established domicile in the State of Georgia. Relocation to the state must be for reasons other than enrolling in an institution of higher education. This waiver will expire 12 months from the date the waiver was granted.

   As of the first day of classes for the term, an economic advantage waiver may be granted to a student possessing a valid employment-related visa status who can provide clear evidence of having relocated to the State of Georgia to accept full-time, self-sustaining employment. Relocation to the state must be for reasons other than enrolling in an institution of higher education. These individuals would be required to show clear evidence of having taken all legally permissible steps toward establishing legal permanent residence in the United States and the establishment of legal domicile in the State of Georgia. Students currently receiving a waiver who are dependents of a parent or spouse possessing a valid employment-sponsored visa may continue to receive the waiver as long as they can demonstrate continued efforts to pursue an adjustment of status to U.S. legal permanent resident (BR Minutes, June 2006).
   Download Application

L. **Recently Separated Military Service Personnel.** Members of a uniformed military service of the United States who, within 12 months of separation from such service, enroll in an academic program and demonstrate an intent to become a permanent resident of Georgia. This waiver may be granted for not more than one year (BR Minutes, June 2004).

M. **Nonresident Student.** As of the first day of classes for the term, a nonresident student whose parent, spouse, or U.S. court-appointed legal guardian has maintained domicile in Georgia for at least 12 consecutive months so long as the student can provide clear evidence showing the relationship to the parent, spouse, or U.S. court-appointed legal guardian has existed for at least 12 consecutive months immediately preceding the first day of classes for the term. If the parent, spouse, or U.S. court-appointed legal guardian of a continuously enrolled nonresident student establishes domicile in another state after having maintained domicile in the State of Georgia for the required period, the nonresident student may continue to receive this waiver as long as the student remains continuously enrolled in a public postsecondary educational institution in the state, regardless of the domicile of the parent or U.S. court-appointed legal guardian (BR Minutes, June 2006).
Download Application

Students who come to Georgia Tech from another state and work for companies in Georgia remain ineligible for in-state tuition in the absence of compelling evidence of intent to remain in Georgia permanently. Having Georgia voter registration, having employment in any position normally filled by a student (such as co-op, graduate research assistant, or graduate teaching assistant), having a lease of living quarters, having a Georgia automobile registration, and having Georgia driver's license do not constitute sufficient evidence of domicile to affect classification as an in-state student under the Board of Regents' policy.

For further information concerning residency, students should contact the Residency Office in Room 103 of the Tech Tower, write to the Registrar's Office, Residency, Georgia Tech, Atlanta, Ga 30332-0315, or call 404-894-6388. The Residency Office must receive an application for classification as a legal resident for fee payment purposes no later than one month prior to the academic registration date for the term in which the student seeks to pay fees as a resident of Georgia. Requests for tuition waivers must be received by the Registrar's Office no later than the first day of classes for the term for which the out-of-state tuition is to be waived. See the official school calendar for dates.

# APPLICATION FOR WAIVER OF NON-RESIDENT FEES

Georgia Institute of Technology - Office of the Registrar - Atlanta, GA 30332-0315

## NONRESIDENT REQUESTING CONSIDERATION FOR AN OUT-OF-STATE TUITION DIFFERENTIAL WAIVER (SELECT ONE)

☐ 1. Career Consular

a. A statement on letterhead from the office verifying the consular officer is stationed and living in Georgia under orders of their respective government.

☐ 2. Economic Advantage Dependent students and spouses are required to submit the following information for their parent or spouse:

a. Employment information on company letterhead verifying fulltime employment and start date;
b. Copy of Georgia Driver's License;
c. Copy of lease or warranty deed;
d. Permanent Resident Card (if applicable); and
e. U.S. court appointed guardianship paperwork (if applicable).

Independent students are required to submit items a, b, c, and d from the list above.

☐ 3. Full-time School Employees

a. Employment information on school letterhead verifying full time employment and start date
b. Copy of contract from the school board

☐ 4. Nonresident Student

a. Certified copy of most recent Georgia state income taxes for parent or spouse or U.S. court appointed guardian;
b. Copy of Georgia driver's license for parent or spouse or U.S. court appointed guardian; and
c. Copy of birth certificate for dependent student or marriage certificate for spouse.

☐ 5. University System Employees and Dependents

a. Employment information on university or institution letterhead verifying full time employment and start date

## PERSONAL INFORMATION FOR GEORGIA TECH STUDENT

Applicant Name ______________________________
First Middle Last

Present Address ______________________________
Street address and, if applicable, apartment number City State Zip Code

Email Address ______________________________

GTID Number ______________ Phone ______________

Semester Applying For ______________________________
Fall / Spring / Summer Year

## PARENT OR SPOUSE OR U.S. COURT APPOINTED GUARDIAN INFORMATION FOR DEPENDENT APPLICANTS ONLY

Name ______________________________
First Middle Last

Address ______________________________
Street address and, if applicable, apartment number City State Zip Code

Email Address ______________ Phone ______________

## OATH AND AFFIRMATION FOR GEORGIA TECH STUDENT

I, the undersigned, hereby swear or affirm to the authenticity of the information provided on all pages of this affidavit. I understand that any false or misleading information on this affidavit or provided to support this affidavit may result in denial of admission or expulsion from the Institute. I understand that it may also cause me to be billed for the nonresident fees. I also authorize Georgia Institute of Technology to review or examine any and all documents and records, including my confidential loan forms and related data, which may assist in clarifying my residence status.

Signature Of Person Making Affidavit - GT Student ______________________________

Subscribed And Sworn To Before Me This ______________ Day of ______________ 20 ______

☐ Personally Known ☐ Produced Identification Type ______________ ID Number ______________

Notary Public, State of Georgia ______________ Commission Expires ______________

## *** REGISTRAR'S OFFICE USE ONLY ***

Waiver entered for: ______________ Signature: ______________ Date: ______________

## OUTSIDE SPONSORSHIPS

A student whose tuition and fees are to be paid by a corporation or government sponsor must notify the Bursar's Office of the entity's billing address and the amount to be billed at least sixty days prior to the first fee payment deadline (Phase 1) of each semester. As a courtesy to students, the Bursar's Office will send a billing statement. Please refer to http://www.bursar.gatech.edu/thirdpartybilling.pdf.

## VETERANS SERVICES

Because the Department of Veterans Affairs (VA) must receive certification of enrollment before issuing benefit payments, any student planning to enroll under any of the VA programs should initiate the certification procedure through the Georgia Tech Registrar's Office as early as possible. For further information about the certification procedure, contact the Office of the Registrar, or the Department of Veterans Affairs Atlanta Regional Office, 1700 Clairmont Road, Decatur, Georgia 30033-4032. Veterans information is also available at www.registrar.gatech.edu.

Veterans must apply to Georgia Tech through the usual admissions procedure. Eligibility for VA benefits does not guarantee acceptance to the Institute, nor does acceptance to Tech signify eligibility. The Institute serves only as a source of certification and information to the VA; the student must carry out all financial transactions with the Veterans Administration directly.

## XX. STUDENT ACADEMIC GRIEVANCE PROCEDURES

The procedures set forth here are intended to provide students at the Georgia Institute of Technology a means for setting forth grievances relating to academic matters and grade disputes when the student believes that an instructor has acted unfairly or improperly in assignment of grades. It is not the intention of these procedures to provide a forum for questioning the judgment or grading policies of faculty.

### A. APPLICABILITY OF THE GRIEVANCE PROCEDURES

1. Subject Matter:
   These procedures apply to the review of grievances concerning academic matters and grade disputes. Grade appeals must be initiated by the grievant within their next enrolled term following the term of the course in question, and best efforts should be applied to resolve the appeal within that term.
2. Grievant:
   These procedures shall be the appellate procedures for students at the Georgia Institute of Technology. Students who have pursued a formal grievance procedure or who have pursued informally the resolution of a grievance in their own school, college, or unit and have had that appeal dismissed, may submit the grievance for review under these procedures.

### B. OVERVIEW OF GRIEVANCE PROCESS

1. Informal resolution attempted at the school, department, or unit level.
2. Formal resolution sought at the school, department, or unit level.
3. Formal resolution sought at the Institute level: appeal reviewed and, if so determined, heard by the Student Grievance and Appeal Committee.

### C. STEPS IN THE GRIEVANCE PROCESS (TO BE FOLLOWED IN THE ORDER PRESENTED)

1. The student shall attempt to resolve the grievance with the individual faculty member, the department, or the unit involved.
2. If the grievance is not resolved in step C.1. and the student elects to continue the grievance process, the student may request a formal hearing setting forth in writing the complaint and the remedy sought at the school, college, or unit level. Upon receipt of such appeal, the unit director will acknowledge the appeal in writing within seven calendar days and will expeditiously proceed to constitute an ad hoc appeal committee. The unit director will serve as a nonvoting member of the committee. In addition, the following four committee members will be selected:
   - One tenured faculty member from within the unit, selected by the unit director.
   - One member of the academic faculty, selected by the student. The student may elect not to select a faculty member; in that case, the committee will consist of three members.
   - One member from outside the unit, selected by the Student Grievance and Appeal Committee in consultation with the unit director.
   - One member of the academic faculty selected by the faculty member whose action is in question.

   The committee will proceed with due haste to examine the merits of the complaint and to render a decision within thirty days. During the proceedings, the student may present any and all evidence that the student deems necessary to support the complaint, except that the committee must agree that the evidence is in some way relevant. Such evidence may consist of documentation and/or testimony, within reason. Both complainant and respondent may be accompanied by advisors; the role of advisor must, however, be restricted to advice. Complainant and respondent must make their own cases before the committee.

   Following a hearing and a written decision at the school, college, or unit level, the grievance is presumed to be resolved unless the grievant appeals.
3. The grievant may appeal the decision that has been rendered by the school, college, or unit to the Student Grievance and Appeal Committee.

a. If the Committee, or subset thereof appointed by the chairperson, rules that the procedures are not applicable or that based on the facts stated by the grievant viewed in the light most favorable to the grievant, there is no basis for relief, then the appeal is denied.
b. If the Committee rules that the Institute procedural rules are applicable and that a hearing of the appeal is warranted, the Committee shall initiate a hearing process.
c. If a student wishes to have a grievance outcome reviewed by the Student Grievance and Appeal Committee with a view to a formal hearing, the student shall observe the following requirements:

   1. The appeal must be in writing. It must state the basis for the grievance and the facts that support it, including a summary of the steps that have already been taken to resolve the grievance, reasons why the student finds the resolutions unfair or unsatisfactory, and a statement of the desired remedy.

   2. The written appeal must be presented to the chairperson of the Student Grievance and Appeal Committee within thirty days after the student has received notice of a decision from a school, college, or unit.

   3. The decision as to whether a formal hearing is warranted shall be made available, in writing, to the parties concerned within thirty days after the Committee has received notice of the appeal.

   4. The Committee may alter a deadline specified in these procedures on written petition of either party showing a meritorious reason for delay; if the Committee itself needs to extend a deadline, it may do so on its own authority for periods up to fourteen calendar days; for longer delays, the Committee must request an extension from the Executive Board of the Institute.

   5. The determination of the Committee as to whether a hearing is warranted is final.

   6. The Committee shall develop and, with the approval of the Academic Senate, establish and publish its own rules of procedures for the conduct of formal hearings.

   7. After receiving testimony and the relevant documents, the Committee shall make a decision within thirty days on the basis of the received material.

   8. The Committee's decision shall contain finding of fact, the decision arrived at, reasons for the decision, and the criteria or policy applied in reaching the decision.

## D. REMEDIES

1. **General**
   If the Committee finds, after a formal hearing, that a faculty member, a departmental committee, or an administrator of a unit has not acted fairly or properly, it will recommend a remedy. It will seek to find a remedy that can be implemented by those whose cooperation is needed. In the matter of a grade dispute, this must include the faculty member involved in the dispute.

2. **Enforcement**
   a. If any party does not comply with the decision of the Committee, the Committee shall, upon request of any party, seek full compliance through the administrative offices of the Institute through the chief academic officer (CAO).
   b. The merits of the dispute shall not be subject to review in the process of enforcement. There shall be strong presumption in favor of the remedy selected by the Committee.

3. **Report of a Final Decision**
   After a final decision has been made in a case, the Committee shall prepare a report setting forth its findings and recommendations for action and present the report to the CAO. A copy of the report shall be presented to the parties concerned and to those persons involved in implementing the Committee's recommendations. All such communications shall be effected in person or by certified mail with a return receipt requested; such receipt will become part of the Institute records of the case.

   **Grade Changes:**
   In decisions that would result in the changing of a posted grade, the CAO will instruct the unit director to ask the involved faculty member to effect the prescribed grade change or, if cooperation is not forthcoming, to effect the grade change directly by action of the unit director.

Such action shall not be construed as restrictive of the recourses of the faculty member through the usual appeal procedure of the Institute.

Care will be given that no incomplete or inaccurate information pertaining to the grievance is placed in any file; and that all evidence obtained at any stage of the process and all deliberations and proceedings be kept confidential. At the conclusion of each case, the Student Grievance and Appeal Committee shall transmit original or true copies of the documents related to the case to the appropriate Office of the Vice President of Student Affairs, who shall keep such records securely as Institute records for a period of time specified by Institute statutes.

4. **Final Appeal**
   Appeal of the decision of the Committee to the CAO shall be permitted only for the purposes of procedural review. Such appeals shall be submitted in writing, with copies to the Committee. The CAO will review the findings of the Committee and, upon judgment that the Committee has failed to follow these procedures or has failed to follow the procedures approved by the Academic Senate for the operation of the Student Grievance and Appeal Committee (XX1.C.3.c.c6), return the case to the Committee for reconsideration, along with description of the received error in procedure and a recommendation for its correction.

## ACADEMIC HONOR CODE

A student initiative, the Academic Honor Code became official Institute policy in 1996. Students are required to sign an honor agreement acknowledging their awareness of the Code. All students are strongly encouraged to understand each instructor's Academic Honor expectations. The objective of the Honor Code is to level the academic playing field for all students while strengthening the level of academic integrity and trust within the Georgia Tech community.

## STUDENT ALCOHOL POLICY

Georgia Tech complies with all federal, state, and local laws and policies, including the policies of the Board of Regents of the University System of Georgia, on the abuse of alcohol and other drugs by its students. The legal drinking age in Georgia is twenty-one. Each member of the Tech community should be involved in the implementation of the Student Alcohol Policy. This policy is distributed via e-mail annually.

In accordance with federal and state laws and because of the potential detriment to the health, well-being, and success of students, all students are prohibited from engaging in the unlawful use or abuse, possession, manufacture, distribution, dispensation, and sale of alcoholic beverages, controlled substances (including marijuana), and other drugs.

## PARENTAL NOTIFICATION POLICY

Parents of students under the age of twenty-one will be notified when a student is found responsible for violating the "Georgia Tech Student Policy on Alcohol and Other Drugs" when the following occurs:

- When the student endangers himself or herself or others while under the influence of alcohol or other substances. Specific instances include DUI, fighting, alcohol poisoning, and hospitalization.
- When a hearing officer determines that any future violation of the Institute's policy will most likely result in suspension from Georgia Tech.
- When a hearing officer determines that any future violation of the Institute's policy will most likely result in removal from housing.

## REQUIRED STUDENT COMPUTER OWNERSHIP

In an effort to foster equal access to computers and to make the most of the teaching and learning technology available at Georgia Tech, all undergraduate students entering Georgia Tech under this or subsequent catalogs are required to own or lease a computer. The minimum hardware and software requirements (as well as purchasing and financing options) are sent each spring to students accepted for the summer and fall semesters, and in the fall to students accepted for spring semester.

Because computer ownership is mandatory, an average cost for the minimum hardware and software required can be included in computing a new student's cost of education for the purpose of determining their eligibility for all forms of student financial aid. Students should contact the Office of Student Financial Planning and Services for more information.

# FAMILY EDUCATIONAL RIGHTS AND PRIVACY ACT (FERPA)

## NOTIFICATION OF STUDENT RIGHTS UNDER FERPA AND DIRECTORY INFORMATION

The Family Educational Rights and Privacy Act (FERPA) affords students certain rights with respect to their education records. They are:

- The right to inspect and review the student's education records within forty-five days of the day that the Institute receives the request for access.

  Students should submit to the registrar written requests that identify the record(s) they wish to inspect. The registrar will make arrangements for access and notify the student of the time and place where the records may be inspected.

- The right to request the amendment of the student's education records that the student believes are inaccurate or misleading.

  Students may ask the Institute to amend a record that they believe is inaccurate or misleading. They should write the registrar, clearly identifying the part of the record they want changed, and specify why it is inaccurate or misleading.

  If the Institute decides not to amend the record as requested by the student, the Institute will notify the student of the decision and advise the student of his or her right to a hearing regarding the request for amendment. Additional information regarding the hearing procedures will be provided to the student when notified of the right to a hearing.

- The right to consent to disclosures of personally identifiable information contained in the student's education records, except to the extent that FERPA authorizes disclosure without consent.

  One exception which permits disclosure without consent is disclosure to school officials with legitimate educational interests. A school official is a person employed by the Institute in an administrative, supervisory, academic or research, or support staff position (including law enforcement unit personnel and health staff); a person or company with whom the Institute has contracted (such as an attorney, auditor, or collection agent); a person serving on the Board of Trustees; or a student serving on an official committee, such as a disciplinary or grievance committee, or assisting another school official in performing his or her tasks.

  A school official has a legitimate educational interest if the official needs to review an education record in order to fulfill his or her professional responsibility.

- The right to file a complaint with the United States Department of Education concerning alleged failures by the Georgia Institute of Technology to comply with the requirements of FERPA. The name and address of the Office that administers FERPA is:

  Family Policy Compliance Office
  U.S. Department of Education
  400 Maryland Avenue, SW
  Washington, DC 20202-4605

## ANNUAL NOTICE OF DIRECTORY INFORMATION CONTENTS

"Directory Information" is information not generally considered harmful or an invasion of privacy if disclosed. Effective November 1, 2007 the Georgia Institute of Technology considers the following information to be directory information:

- Name, address (including GT email address), and telephone listing
- Level (graduate or undergraduate)
- Field of study
- Enrollment status (full-time, part-time, less than part-time)
- Dates of attendance
- Degrees with associated honors and designations, and date(s) awarded

Directory information cannot include student identification numbers or social security numbers.

Students who wish to prohibit the release of Directory Information can view information on the registrar's confidentiality Web page.

## DIRECTORY INFORMATION

“Directory Information” is information not generally considered harmful or an invasion of privacy if disclosed. Effective November 1, 2007, the Georgia Institute of Technology considers the following information to be directory information:

- Name, address (including GT email address), and telephone listing
- Level (graduate or undergraduate)
- Field of study
- Enrollment status (full-time, part-time, less than part-time)
- Dates of attendance
- Degrees with associated honors and designations, and date(s) awarded

Directory information cannot include student identification numbers or social security numbers.

## C. GRADE SUBSTITUTION

**Effective with the entering Fall 2005 first-time freshman class.**

1. First-time freshman students who receive a grade of *D* or *F* in a course within their first two terms in residence (first three terms for those who begin in the Freshman Summer Session) are eligible to repeat the course and have the original grade excluded from the computation of the academic average. Grade substitution may be used only once per course, with a maximum of two courses total.
2. The course must be repeated at Georgia Tech within the student's first four terms in residence (first five terms for those who begin in the Freshman Summer Session). The application for grade substitution must be filed with the Registrar's Office no later than the deadline for withdrawing from a course during the student's next term in residence after the course is repeated.
3. The original course and grade will continue to appear on the student's transcript, with a notation that the course was repeated and that the original grade is not included in computation of the academic average. Credit for the course will be counted only once.
4. If the revised academic average results in a change in academic standing for any term, then the revised standing will be reflected on the student's transcript. If standing is changed from "Dismissal" to a higher standing, it will be recorded as "standing from Dismissal" and the dismissal will continue to be counted with respect to regulations and policies related to Withdrawal and Readmission.
5. A course is not eligible for grade substitution if the student was found responsible for any academic misconduct in that course.

DOWNLOAD FORM

# GRADING SYSTEM - RULES AND REGULATIONS SECTION V

## A. GRADES

1. The letter grades for completed courses used in the calculation of scholastic average are the following:

   ***A***-excellent (four quality points)

   ***B***-good (three quality points)

   ***C***-satisfactory (two quality points)

   ***D***-passing (one quality point)

   ***F***-failure, must be repeated if in a required course (no quality points)

2. The following grades will be used in the cases indicated and will not be included in the calculation of scholastic average:

   ***S***-passing of a course taken under pass/fail or completion of a course in which no letter grade may be assigned

   ***U***-unsatisfactory in a course taken under pass/fail or unsatisfactory performance in a course for which no letter grade may be assigned

   ***V***-assigned when the course has been audited; no credit given; and implies no academic achievement on the part of the student

3. The following grades will be used in the cases indicated and will not be included in the calculation of scholastic average:

   ***I***-incomplete. Assigned when a student was doing satisfactory work, but for nonacademic reasons beyond his/her control and deemed acceptable by the instructor, was unable to meet the full requirements of the course. If the student's performance was so poor as to preclude his/her passing, the instructor shall assign the grade of *F* . Refer to section VII. B for regulations regarding removal of the *I* grade.

   ***W***- withdrawal without penalty. Withdrawals from individual courses without penalty will not be permitted after 50 percent of the term has been completed, as specified by the official calendar, except in cases of hardship as determined by the Institute Undergraduate Curriculum Committee or Graduate Committee, as appropriate. Withdrawal from school will not be permitted after 60 percent of the term except in cases of hardship as determined by the Institute Undergraduate Curriculum Committee or Graduate Committee, as appropriate. With the exception of part-time graduate students, students who withdraw from school and receive all grades of *W*
   will not ordinarily be permitted to re-enroll the next succeeding term. Refer to section VIII .B for regulations regarding readmission.

   ***NR***- not reported. Assigned when an instructor fails to submit grades by the published deadline, through no fault of the student.

4. Final grades are reported to the registrar at the end of each term.
5. Progress report grades will be submitted to the Registrar on all classes numbered 1000 and 2000 each term. These grades will be used for the advisement of students, not for the calculation of any GPA at Georgia Tech. Progress report grades will be *S* or *U* (a grade of *U* indicates that based on work completed to that point the student's standing is in the D or lower range). They will be submitted after 40 percent of the term has been completed, as specified by the official calendar, and be available to students no later than the following Monday.
6. If a final course grade is believed to be in error, the student should contact the professor as soon as possible. In general, no change of grade will be made after the end of the student's next term in residence.

## B. ACADEMIC AVERAGE

The academic average (or grade point average) is calculated as the ratio of the total number of quality points earned to the total number of credit hours in which a final letter grade has been assigned. Grade point averages are truncated after two decimal places.

## AUDITING

Officially enrolled students who have obtained approval of their advisors and the department of instruction concerned may audit courses at Tech; however, the student will not receive credit for courses scheduled on an auditing basis. If the student wishes to change to or from auditing status, he or she must follow the procedure for schedule changes during the time allotted for schedule modification in the official calendar. In order for a successful audit to show on the student's permanent record, the student must comply with all requirements listed by the instructor. If the instructor deems that the student did not successfully audit the course, the grade of *W* will be assigned. All students registered as auditors must pay tuition at the regular rate. Members of the faculty or staff of the Georgia Institute of Technology may sit in on a course with the permission of the school/college concerned.

## EXAMINATION AND TERM GRADES

The Institute schedules final examinations during the last week of each term, and term grades are posted on the Student Access System.

## INSTITUTE RULES FOR THE PASS/FAIL SYSTEM

At the discretion of the major school, a student may receive up to a maximum of nine hours credit toward a bachelor's degree or three hours credit toward a graduate degree for courses taken under the pass/fail system with a grade of satisfactory. Such courses apply toward the degree requirements only if the major school has approved the course, either for all majors or for the individual student. The department or school offering a course determines the criteria for a passing grade and may restrict the pass/fail enrollment in any course it offers. The rules for withdrawal from graded courses apply to pass/fail courses as well.

Faculty will record only a grade of satisfactory or unsatisfactory for any student so designated on the official class roll; students may not change their designation from credit to pass/fail or from pass/fail to credit after the last day to make schedule changes. Neither the professor nor the registrar may change a pass/fail grade to a letter grade, nor may the registrar include courses taken pass/ fail in the calculation of grade point averages.

Under certain circumstances, a change in degree requirements may affect a department's position on a course previously approved for degree credit under the pass/fail system. In such cases, the student's major school will decide if a course completed with a grade of pass before the change will fulfill the amended requirements.

Only students who complete ninety-one or more hours toward a degree at Georgia Tech may use the entire maximum of nine hours credit taken on pass/fail toward a bachelor's degree. For transfer students, second undergraduate degree students, and dual-degree students, the number of hours completed at Georgia Tech determines the maximum number of pass/fail hours allowed, according to the following schedule:

| Hours included in program of study | Hours allowed on pass/fail basis |
|---|---|
| 45 to 70 credit hours | 3 credit hours |
| 71 to 90 credit hours | 6 credit hours |
| 91 or more credit hours | 9 credit hours |

## SCHOLASTIC AVERAGE

A student who passes a course receives both the designated number of credit hours and a number of quality points, calculated by multiplying the course credit hours and the numerical equivalent of the letter grade received (*A* = 4, *B* = 3, *C* = 2, *D* = 1). Thus, a student taking a three-hour credit course and earning a *C* receives six quality points. To determine the undergraduate scholastic average, the total number of quality points earned by the student for all courses scheduled as an undergraduate is divided by the total number of credit hours scheduled; for the graduate scholastic average, only those courses scheduled by the student while enrolled in the graduate division are considered. If a student takes the same course more than once, the later grade does not replace the earlier one; rather, the scholastic average includes both grades unless grade substitution has been approved. Courses taken pass/fail are not included in the calculation of the student's grade point average. Grade point averages are truncated after two decimal places.

## INTELLECTUAL PROPERTY POLICY

The Institute's Intellectual Property Policy, concerning inventions, copyright, and computer software, applies to students as well as to faculty and staff. Adherence thereto is a condition of continued enrollment at the Institute. The Intellectual Property Policy can be found in section 50 of the Faculty Handbook.

## LEARNING SUPPORT POLICIES

The Office of the Senior Vice Provost for Academic Affairs administers the Learning Support Program. The College of Sciences offers college preparatory courses in mathematics, and the Ivan Allen College of Liberal Arts offers courses in reading comprehension and English composition for students who need further preparation before taking credit courses in English, mathematics, and related skills' courses.

Students who are required by the Institute to take courses in the Learning Support Program will be notified in writing. They must then either test out of the program or register for the required course(s) before they can register for any credit courses that require Learning Support (LS) courses as prerequisites. Until Learning Support requirements have been satisfied, students will not be permitted to take credit core courses that require the content or skills of the prerequisite courses. The Chair of the School teaching the credit core course must certify that the course being taken by the student does not contain the content or skills of the Learning Support course.

Students can test out of taking LS courses by passing the appropriate Georgia Collegiate Placement Exams (GCPEs) administered before the beginning of each semester through the Office of the Senior Vice Provost. Students who do not pass the appropriate examinations prior to their first semester in residence must register for the required LS courses. These students must pass all required LS courses and the appropriate GCPEs within their first three semesters in residence or be suspended for three years, and re-apply for admission. No more than twenty hours of degree credit work may be earned prior to exiting Learning Support.

Students who are mandated to take a Learning Support class must enroll in the course, pass it, and then pass an exit test (GCPE) provided to the LS instructor by the Office of the Senior Vice Provost. If the student fails the test, the student must re-take the course before re-taking the exit exam unless the student fails the test by one or two points. In which case, a re-take of the test may be given prior to the next semester (during the break prior to the first day of class).

In addition to those students who are required by the Institute to take LS courses, any student who desires further preparation may register for one or more courses. LS courses are not prerequisites to credit courses when taken on this elective basis.

LS courses are offered on a pass/fail basis and may not be counted as hours toward graduation.

## POLICY ON SEXUAL HARASSMENT

Sexual harassment of employees or students in the University System is prohibited and shall subject the offender to dismissal or other sanctions after compliance with procedural due process requirements. Unwelcome sexual advances, requests for sexual favors, and other conduct of a sexual nature can constitute sexual harassment. For more information, contact the Dean of Students Office at 404.894.6367 or the director of the Office of Equal Opportunity and Diversity Programs at 404.385.0035.

## I. PURPOSE

These regulations are intended to set forth the requirements of the faculty to the end that a large student body may live and work together harmoniously with a minimum of friction and misunderstanding. Each student is expected to be a law-abiding citizen and to obey the laws of the city of Atlanta, Fulton County, the state of Georgia, and the United States.

# II. ACADEMIC CALENDAR

## A. STANDARD CALENDAR

The standard academic calendar of the Georgia Institute of Technology consists of fall and spring semesters and an accelerated summer session. Each semester normally includes approximately fifteen weeks of instruction plus one week of final examinations; the normal summer session includes approximately eleven weeks of instruction plus one week of final examinations. An "academic year" consists of the fall and spring semesters. "Term" may refer to either a semester or a summer session. The Office of the Registrar publishes the official calendar for each academic term.

# II. ACADEMIC CALENDAR

## B. OTHER ACADEMIC TERMS

In addition to the standard academic calendar, certain programs may be offered on other schedules. All such offerings are subject to the approval of the Institute Undergraduate Curriculum Committee, Institute Graduate Committee, and/or the registrar, as appropriate. With approval, such programs may operate under different academic rules, such as credit-hour limits or withdrawal dates, than those specified for standard academic terms.

## II. ACADEMIC CALENDAR

### C. CURRICULUM YEAR

1. Requirements for degrees and minors shall be specified for each curriculum year, which is comprised of a summer term plus the immediately following fall and spring semesters. This designation shall be independent of any schedule for publication of such requirements in printed or electronic form.
2. All changes in degree and minor requirements shall become effective at the beginning of the next curriculum year following final approval by the Institute Undergraduate Curriculum Committee, Institute Graduate Committee, Academic Senate, and/or University System, as appropriate.
3. The Registrar's Office shall maintain an archival record of all degree and minor requirements associated with each curriculum year.

## III. RESPONSIBILITY FOR NOTICES AND CHANGE OF ADDRESS

### A. NOTICES

All students will have an e-mail account through the Georgia Institute of Technology that will be their official point of contact, and they are expected to check this account each school day. Students are also expected to be aware of notices that appear on the Student Access System as well as general notices that appear in the Technique. It is the student's responsibility to check the Student Access System during the drop/add period of registration and during the term to verify the accuracy of his/her schedule and for notices. Schedules should be verified at least once during the first five weeks of the term and once after mid-term.

## III. RESPONSIBILITY FOR NOTICES AND CHANGE OF ADDRESS

### B. CHANGE OF ADDRESS

Students are responsible for reporting all changes within one week on the Student Access System.

## III. RESPONSIBILITY FOR NOTICES AND CHANGE OF ADDRESS

### C. UNCLAIMED MAIL

Students are responsible for returning to the front window of the Post Office all mail in their Post Office boxes that is unclaimed after three days.

## IV. ATTENDANCE

### A. GENERAL

1. Each term, a course listing is published showing the time period for each class.
2. If an instructor should be late in meeting the class, the students shall wait twenty minutes after the published starting time. If the instructor has not arrived by that time, the students may leave unless specifically notified to await the instructor's arrival.

# IV. ATTENDANCE

## B. CLASS ATTENDANCE

1. There are no formal institutional regulations regarding class attendance at the Georgia Institute of Technology. The resources of the Institute are provided for the intellectual growth and development of the students who attend. A schedule of courses is provided for the students and faculty to facilitate an orderly arrangement of the program of instruction. The fact that classes are scheduled is evidence that attendance is important; students should, therefore, maintain regular attendance if they are to attain maximum success in the pursuit of their studies.
2. All students are responsible for obtaining an understanding of each instructor's policy regarding absences; all students are expected to attend announced quizzes, laboratory periods, and final examinations. Although it is recognized that occasionally it may be necessary for students to be absent from scheduled classes or laboratories for personal reasons, including major religious observances, students are responsible for all material covered in their absences, and they are responsible for the academic consequences of their absences. Students should discuss planned absences with their instructors as soon as possible after the beginning of an academic term. Work missed may be made up at the discretion of the instructors.
3. Students who are absent because of participation in approved Institute activities (such as field trips and athletic events) will be permitted to make up the work missed during their absences. Approval of such activities will be granted by the Student Academic and Financial Affairs Committee of the Academic Senate, and statements of the approved absence may be obtained from the Office of the Registrar.

## V. GRADES AND SCHOLASTIC AVERAGE

### A. GRADES

1. The letter grades for completed courses used in the calculation of scholastic average are the following:

   ***A***-excellent (four quality points)

   ***B***-good (three quality points)

   ***C***-satisfactory (two quality points)

   ***D***-passing (one quality point)

   ***F***-failure, must be repeated if in a required course (no quality points)

2. The following grades will be used in the cases indicated and will not be included in the calculation of scholastic average:

   ***S***-passing of a course taken under pass/fail or completion of a course in which no letter grade may be assigned

   ***U***-unsatisfactory in a course taken under pass/fail or unsatisfactory performance in a course for which no letter grade may be assigned

   ***V***-assigned when the course has been audited; no credit given; and implies no academic achievement on the part of the student

3. The following grades will be used in the cases indicated and will not be included in the calculation of scholastic average:

   ***I***-incomplete. Assigned when a student was doing satisfactory work, but for nonacademic reasons beyond his/her control and deemed acceptable by the instructor, was unable to meet the full requirements of the course. If the student's performance was so poor as to preclude his/her passing, the instructor shall assign the grade of *F* . Refer to section VII. B for regulations regarding removal of the *I* grade.

   ***W***- withdrawal without penalty. Withdrawals from individual courses without penalty will not be permitted after 50 percent of the term has been completed, as specified by the official calendar, except in cases of hardship as determined by the Institute Undergraduate Curriculum Committee or Graduate Committee, as appropriate. Withdrawal from school will not be permitted after 60 percent of the term except in cases of hardship as determined by the Institute Undergraduate Curriculum Committee or Graduate Committee, as appropriate. With the exception of part-time graduate students, students who withdraw from school and receive all grades of *W*
   will not ordinarily be permitted to re-enroll the next succeeding term. Refer to section VIII .B for regulations regarding readmission.

   ***NR***- not reported. Assigned when an instructor fails to submit grades by the published deadline, through no fault of the student.

4. Final grades are reported to the registrar at the end of each term.
5. Progress report grades will be submitted to the Registrar on all classes numbered 1000 and 2000 each term. These grades will be used for the advisement of students, not for the calculation of any GPA at Georgia Tech. Progress report grades will be *S* or *U* (a grade of *U* indicates that based on work completed to that point the student's standing is in the D or lower range). They will be submitted after 40 percent of the term has been completed, as specified by the official calendar, and be available to students no later than the following Monday.
6. If a final course grade is believed to be in error, the student should contact the professor as soon as possible. In general, no change of grade will be made after the end of the student's next term in residence.

### B. ACADEMIC AVERAGE

The academic average (or grade point average) is calculated as the ratio of the total number of quality points earned to the total number of credit hours in which a final letter grade has been assigned. Grade point averages are truncated after two decimal places.

### C. GRADE SUBSTITUTION

**Effective with the entering Fall 2005 first-time freshman class.**

1. First-time freshman students who receive a grade of *D* or *F* in a course within their first two terms in residence (first three terms for those who begin in the Freshman Summer Session) are eligible to repeat the course and have the original grade excluded from the computation of the academic average. Grade substitution may be used only once per course, with a maximum of two courses total.
2. The course must be repeated at Georgia Tech within the student's first four terms in residence (first five terms for those who begin in the Freshman Summer Session). The application for grade substitution must be filed with the Registrar's Office no later than the deadline for withdrawing from a course during the student's next term in residence after the course is repeated.
3. The original course and grade will continue to appear on the student's transcript, with a notation that the course was repeated and that the original grade is not included in computation of the academic average. Credit for the course will be counted only once.
4. If the revised academic average results in a change in academic standing for any term, then the revised standing will be reflected on the student's transcript. If standing is changed from "Dismissal" to a higher standing, it will be recorded as "standing from Dismissal" and the dismissal will continue to be counted with respect to regulations and policies related to Withdrawal and Readmission.
5. A course is not eligible for grade substitution if the student was found responsible for any academic misconduct in that course.

# VI. SCHOLASTIC REGULATIONS

## A. CLASSIFICATION OF STUDENTS

1. Undergraduate students, with the exception of non-degree-seeking students, shall be classified at the end of each term by the Office of the Registrar on the basis of the total number of semester credit hours for which they have credit in accordance with the following schedule:

   Freshman 0-29 credit hours
   Sophomore 30-59 credit hours
   Junior 60-89 credit hours
   Senior 90 + credit hours

2. Graduate and special students who have completed all requirements for a particular classification as defined by their major department may request reclassification through their major department.
3. Students scheduled for at least twelve credit hours in a semester are classified as full-time students; those scheduled for six-eleven hours are classified as part-time students; and those scheduled for one-five hours are classified as less-than-part-time students.

### B. ELIGIBILITY FOR CLASS RINGS

A student may purchase a class ring any time after receiving credit for seventy semester credit hours.

## C. ACADEMIC STANDING

1. The assignment of academic standing is based on both the student's most recent term and overall grade point average.
2. The minimum satisfactory academic average is 1.70 for freshmen and joint-enrolled high school students; 1.80 for sophomores; 1.95 for juniors; 2.00 for seniors and special undergraduates; 2.70 for master's and special graduate students; and 3.00 for doctoral students.
3. Students not on academic probation are in good academic standing.
4. Academic warning
   a. Academic warning is a subcategory of good academic standing, differing only in the maximum allowable schedule load.
   b. A student who has an overall academic average below the minimum satisfactory scholarship requirement, or whose academic average for work taken during any term is below this requirement, shall be placed on academic warning.
5. Academic probation
   a. A student on academic warning whose academic average is below the minimum satisfactory scholarship requirement for any term shall be placed on academic probation.
   b. An undergraduate student in good academic standing whose academic average for any term is below 1.00, based on at least six credit hours, shall be placed on academic probation.
   c. A student also may be placed on academic probation through other actions, as described in the following section.
6. Dismissal for unsatisfactory scholarship
   a. The Institute may drop from the rolls at any time a student whose record in scholarship is unsatisfactory.
   b. A graduate student whose academic average for any term is 2.00 or below may be placed on academic probation or dropped, regardless of the student's previous record.
   c. A student on academic probation whose scholastic average for the term of probation is below the minimum satisfactory scholarship requirement and whose overall academic average is below the minimum satisfactory scholarship requirement shall be dropped from the rolls for unsatisfactory scholarship.
   d. An undergraduate student on academic warning whose academic average for any term is below 1.00, based on at least six credit hours, shall be dropped from the rolls for unsatisfactory scholarship.
   e. The record of a student on academic probation whose term average is unsatisfactory, but whose overall academic record is satisfactory, may be reviewed by the Undergraduate Curriculum Committee or the Graduate Committee, as appropriate. The student may be dropped or may be continued on academic probation.
7. Academic review
   A student who normally would be dropped from the rolls for academic deficiencies, but appears from the record not to have completed the term, may be placed on academic review. This is a temporary standing that makes the student ineligible for registration. If no acceptable explanation is given within a reasonable time, the standing is changed to drop.
8. The academic standing regulations given previously for graduate students do not preclude a school from having more rigorous requirements.

Top

## D. MAXIMUM SCHEDULE LOAD

1. The maximum number of credit hours for which an undergraduate student may register in fall or spring semester, based on his or her academic standing, is as follows:

   Good 21 semester hours
   Warning 16 semester hours
   Probation 14 semester hours

2. The maximum number of credit hours for which an undergraduate student may register in a normal summer term, based on his or her academic standing, is as follows:

   Good 16 semester hours
   Warning 14 semester hours
   Probation 12 semester hours

3. A graduate student may register for a maximum of twenty-one semester hours in fall or spring semester and a maximum of sixteen semester hours during the normal summer term.
4. Requests for schedule overloads must be recommended by the student's major school and approved by the Institute Undergraduate Curriculum Committee or Graduate Committee, as appropriate.

## E. ACADEMIC HONORS

The Institute encourages excellence in scholarship and gives official recognition to undergraduate students whose work is superior in any given term.

1. Dean's List-includes all degree-seeking undergraduates who, during the preceding term, made an academic average of 3.00 or higher, completed a schedule of at least twelve hours of coursework on a letter-grade basis, and are not on academic warning or probation or subject to any disciplinary action. (All grades must be reported.)
2. Faculty honors-includes all degree-seeking undergraduates who during the preceding term made an academic average of 4.00, completed a schedule of at least twelve hours of coursework on a letter-grade basis with no *W* grades, and are not on academic warning or probation or subject to any disciplinary action. (All grades must be reported.)

## F. CHANGE OF MAJOR

1. Undergraduate students, by filing the required form, will be permitted one unrestricted transfer between majors (including undecided) until they have accumulated credit for sixty hours. After sixty hours or upon subsequent request for transfer, the transfer will be permitted at the discretion of the school that the student is seeking to enter. Students who transfer from another institution to pursue a degree at Georgia Tech will be permitted to change their major only at the discretion of the school that the student is seeking to enter. Transfer students are not eligible for the one unrestricted change of major. (Note: Certain majors, because of high enrollment, have been granted a waiver of the one unrestricted transfer regulation. Students should consult with the individual school concerning its current transfer policy.)
2. Graduate students, by filing the required form, may transfer with the concurrence of the schools involved and the graduate dean.

### G. EXCEPTIONS

Exceptions to these scholastic regulations may be made by the Undergraduate Curriculum Committee or the Graduate Committee, as appropriate, whenever a consideration of the student's complete record indicates that the application of a specific regulation will result in injustice.

# VII. DEFICIENCIES

## A. GENERAL

1. A student who has received a grade of *I* , *F*, or *U* in a course has a deficiency in the course.
2. A student whose final grade is *F* or *U* has a failure in that course. The student must repeat and pass the course in class before credit will be allowed. (See section B.4 below.)

## VII. DEFICIENCIES

### B. REMOVAL OF DEFICIENCIES

1. If a grade of *I*
   (incomplete) is assigned in a course, the incomplete must be removed and the grade change reported by the end of the student's next term in residence or, if the student has not been enrolled, by the end of the term one calendar year from the date the incomplete was assigned. Failing to remove the I in the allotted time will result in the I being changed to the grade of *F* . To remove the incomplete, the student should consult with the instructor as soon as possible after the term is over and complete whatever remaining work is outlined by the instructor. Repeating the course for credit does not remove the grade of *I* .
2. A student who has a failure in a required course must schedule that course the next time it is offered while the student is in residence. When a course in which a “D” grade was earned is repeated and a grade of “F” is earned, the student must file a Petition to the Faculty to be allowed to use the “D” grade to meet graduation requirements.
3. A degree candidate who has a single course deficiency from the final term of enrollment will be permitted a re-examination, except in laboratory or studio courses, courses in which a significant portion of the grade is based upon projects, or when the deficiency is in any way a result of academic dishonesty. The re-examination will be given after commencement, and thereafter once per annum after commencement, upon receipt of the reactivated degree petition for the next term, and authorization of the exam, by the Registrar. A student should schedule the re-examination prior to the last day of Phase II registration to allow time to register for the course during the next semester if the student does not pass the re-examination and chooses to retake the course. The examination will be graded *S* or *U* and the grade so recorded. The previously assigned grade will remain a part of the record and a notation will be made on the student's transcript that the course requirement was satisfied by a re-examination. The student who successfully completes the re-examination will then be eligible to graduate the following term and may obtain a letter of completion from the registrar.
4. A degree candidate who has otherwise completed all requirements for graduation and who has an incomplete in laboratory work taken during his or her final term in residence may remove the incomplete at the convenience of the department of instruction concerned.

## VIII. WITHDRAWAL FROM SCHOOL AND READMISSION

### A. WITHDRAWAL

1. Withdrawal from school will not be permitted after 60 percent of the term except in cases of hardship as determined by the Institute Undergraduate Curriculum Committee or Graduate Committee, as appropriate. With the exception of part-time graduate students, students who withdraw from school and receive all grades of *W* will not ordinarily be permitted to re-enroll the next succeeding term. A student may withdraw from school via the Student Access System by the posted deadline in the Official School Calendar published in the OSCAR. All holds on the student's record must be cleared prior to withdrawal.
2. Students who cease attendance without withdrawing via the Student Access System will receive grades of F, U, or I for the courses in which they were registered that term.
3. Permission and/or formal resignation are not required when a student has completed an official school term and does not register for the succeeding term.
4. See section V.A.3 for further information on withdrawal.

## VIII. WITHDRAWAL FROM SCHOOL AND READMISSION

### B. READMISSION

1. Any student who is not enrolled for two or more consecutive terms must apply for readmission. This application, with all the pertinent supporting information (except possibly another college transcript: see 2 below), must be submitted to the registrar before the deadline for the term for which readmission is requested, as listed below:

   Fall-July 1
   Spring-December 1
   Summer-April 1
   Applications received after these deadlines will not be accepted.
2. Students who have attended other colleges should plan their readmission so as to allow ample time for official transcripts from those colleges to be sent to Georgia Tech. If official transcripts have not been received prior to the last day of registration, the student seeking readmission will not be allowed to complete registration.
3. Any student in good standing who is not enrolled for a single term will be allowed to re-enroll without applying for readmission to the Institute. There will be no distinction between the terms of the regular academic year and the summer term.
4. A student who is on academic warning or academic probation who is not enrolled for a single term will have an automatic hold placed on registration that must be cleared by the student's major school. For example, a student is placed on academic probation at the close of fall term and fails to enroll by the close of registration for the spring term. An automatic registration hold will be set, which must be cleared by the major school before the student can register for any future term.
5. A student who has been dropped once for unsatisfactory scholarship will ordinarily not be readmitted. A student who seeks an exception to this rule must have been out of the Institute for at least one term and have had a conference with the major school concerning the readmission. The readmission application deadline for a student who has been dropped is two months prior to the published readmission deadline for the term.
6. A student who is dropped a second time for unsatisfactory scholarship will not be readmitted to the Institute.
7. Any student, except a part-time graduate student, who withdraws during a term and wishes to return the following term must complete a Petition to the Faculty for consideration. This petition must be submitted to the registrar before the deadline for the term for which readmission is requested.
8. Students may be eligible for academic renewal. See below for more information.

   a. University System of Georgia undergraduate students who have been readmitted or reinstated after a period of absence of five (5) calendar years or longer are eligible for academic renewal. Academic renewal for the student signals the initiation of a new grade point average to be used for determining academic standing. This provision allows University System of Georgia degree-seeking students who earlier experienced academic difficulty to make a fresh start and have one final opportunity to earn an associate or bachelor's degree (BR Minutes, June, 1995, p. 7). The complete policy is available online at: www.usg.edu/academics/handbook/section3/3.16.phtml

   b. The application for academic renewal shall be considered as a petition to the undergraduate curriculum committee.

### C. TRANSFER CREDIT

1. Coursework pursued at another institution after dismissal from Georgia Tech for unsatisfactory scholarship may be considered as evidence for readmission.
2. If readmitted, a student will not necessarily be given transfer credit for work taken at another institution after dismissal from Georgia Tech.
3. With the exception of courses from which a student withdrew and received a grade of *W* or *V*, in no case will transfer credit be allowed for courses completed at another institution that have previously been taken at Georgia Tech.

## D. STUDY ABROAD

Any student in good standing choosing to participate in an approved study abroad program for two or more terms must complete a student Information Update form with the study abroad coordinator prior to departure. This form will enable the student to re-enroll for the term of "planned re-entry" without submitting a formal readmission application. It will be the student's responsibility to inform the study abroad coordinator of any change in the planned re-entry date.

# IX. SCHEDULING

## A. GENERAL

1. All previously scheduled coursework takes precedence over newly scheduled material. Therefore, all work that is incomplete from a previous term should be completed, or arrangements to complete it should be made prior to placing emphasis on new coursework.
2. Students must follow the approved curriculum of the academic school in which they are registered. Students who do not follow the approved curriculum may be denied registration privileges.
3. Each student is strongly advised each term to schedule all prerequisite courses. Students who do not have the stated prerequisites for a course but believe they have the required knowledge to fulfill prerequisite requirements should contact the department of instruction.
4. The completion of incomplete work from a previous term and the scheduling of out-of-sequence courses are the responsibility of the student, and they will be consequently held accountable. The number of scheduled hours allowed for a term may be adjusted to take into consideration the amount of incomplete work remaining regardless of the student's academic standing.
5. Students may not repeat courses on a letter-grade basis in which the grade of *B* or higher has been earned previously.
6. Subject to approval by a faculty advisor, a course may be taken more than once for academic credit. All grades will count in determining the scholastic average, but the course will be counted only once for credit toward a degree.
7. See section X for Institute rules for courses taken on a pass/fail basis.

### B. ACADEMIC LOAD

1. Maximum credit hour loads are given in section VI. D. Any hours above these limits must have prior approval of the Undergraduate Curriculum Committee or the Graduate Committee, as appropriate.
2. Graduate students must maintain a minimum of three credit hours each term of enrollment. Exceptions to this regulation may be made during the student's graduation term.

### C. AUDITING OF COURSES

1. Auditing of courses will be permitted to regularly enrolled students who have obtained the approval of their advisor and the departments concerned. Such courses count at full value in computing the student's load.
2. The grade for auditing is *V* (visitor), and this grade will have no effect on the student's grade point average.
3. No academic credit is granted for audit participation in a course.
4. Students are not permitted to change to or from an auditing status except through the regular procedures for schedule change or withdrawal. Any student who does not meet the instructor's requirements for a successful audit will be withdrawn with a grade of *W* assigned at the end of the term.

# IX. SCHEDULING

## D. ATTENDING CLASSES

1. Students may attend only those particular classes for which they are registered and paid.

## E. UNDERGRADUATE STUDENTS TAKING GRADUATE COURSES

Seniors with a grade point average of at least 2.7 may schedule graduate courses. In order to do so, the student must obtain permission from the school or department offering the course.

A. Credit toward the master's degree for up to twelve hours of courses taken as an undergraduate may be received under the following conditions.
   1. The student was in residence at Georgia Tech for at least two semesters before registering for the course(s).
   2. The student did not apply credit for the course toward the baccalaureate degree. (See Graduate Course Option for special exceptions in certain schools.)

### F. GRADUATE STUDENTS TAKING UNDERGRADUATE COURSES

Graduate students who wish to take a 1000 or 2000 level course must obtain a permit from the department teaching the course. The student must have the department of instruction enter a permit on their account, and then come to the Registrar's Office in room 104 of the Tech Tower to have the course added to their schedule. Institute policy allows graduate students to take a 1000 or 2000 level course on a pass/fail or audit basis only.

# X. PASS/FAIL SYSTEM

## A. GENERAL

1. At the option of the student's major school, credit toward a bachelor's degree may be allowed for courses taken under the pass/fail system and completed with a grade of pass.
2. The major school must approve all pass/fail courses included in the final program of study, and students should become aware of school requirements.
3. In graduate programs, thesis research hours will be evaluated on a pass/fail basis.
4. Pass/fail enrollment in any course may be restricted by the school or department offering the course.
5. Students who are permitted to register under the pass/fail system will be so designated on the official class rolls; the grades recorded will be S for satisfactory or *U* for unsatisfactory. These grades will not be included in the calculation of the grade point average and cannot be changed to a grade that will count in the average.
6. Withdrawals from courses taken on a pass/fail basis will follow the same rules that govern withdrawals from courses included in the scholastic average.

# X. PASS/FAIL SYSTEM

## B. CREDIT HOURS PERMITTED

1. The maximum number of pass/fail hours permitted in an undergraduate program of study depends upon the number of semester credit hours that will be completed at Georgia Tech, as follows:

   Hours included in program of study Hours allowed on pass/fail basis

   45 to 70 credit hours 3 credit hours
   71 to 90 credit hours 6 credit hours
   91 or more credit hours 9 credit hours

2. For a second undergraduate degree, these limitations apply to the credit hours included in the program of study for that second degree.
3. A master's degree program of study may include up to three semester credit hours on a pass/fail basis.

## XI. CROSS ENROLLMENT AND CONCURRENT REGISTRATION

### A. GENERAL

1. Students who are enrolled at Georgia Tech may not receive credit for courses completed at another institution during the same academic term, unless prior permission has been obtained for cross enrollment or concurrent registration, as described in this section.
2. With the approval of the student's major school, a student may schedule courses at any one of the colleges or universities comprising the Atlanta Regional Consortium for Higher Education (ARCHE), if such courses are not available in a particular term at Georgia Tech. A list of participating institutions is available from the Office of the Registrar.
3. Cross enrollment also is permitted among institutions participating in the Georgia Tech Regional Engineering Program (GTREP) and selected institutions in the Regents' Engineering Transfer Program (RETP).
4. All cross enrollment registration activities are performed at the student's home institution.
5. For institutions not participating in cross enrollment, a student must apply in advance for permission to be concurrently registered at both Georgia Tech and the other institution, except during the Summer.

# XI. CROSS ENROLLMENT AND CONCURRENT REGISTRATION

## B. ELIGIBILITY

1. Cross enrollment and concurrent registration are available only to degree-seeking juniors, seniors, and graduating students, except during the Summer term, when cross enrollment and concurrent registration are available to all degree-seeking students. Ordinarily students will not be allowed to participate during their first term at Georgia Tech, nor will students be allowed to cross enroll for more than two courses per term. Special rules apply to students participating in the GTREP and RETP programs. International Plan students may cross enroll or register concurrently for a language course(s) NOT offered at Georgia Tech as early as the second semester of their first year of enrollment. Special permission to do this will be granted to accepted IP students ONLY. Forms and procedures are available from the Registrar's Office. Any student seeking an exception to these eligibility requirements should contact the Office of the Registrar.
2. To participate in cross enrollment or concurrent registration, a student must be in good standing during the term when the application is processed.
3. During the term of cross enrollment or concurrent registration, the student must be carrying three or more credit hours at Georgia Tech and be in good standing. The total academic load carried at all institutions combined may not exceed the number of hours for which the student would be allowed to register at Georgia Tech.
4. Cross enrollment and concurrent registration courses must be completed with a *C* or better in order to receive credit for the course. Credits earned under cross enrollment will be handled as transfer credit, but will count as resident credit toward a degree. Credits earned under concurrent registration will be handled as regular transfer credit. Grades received in cross enrollment or concurrent registration courses will not be included in the calculation of the grade point average. No credit will be awarded until an official transcript from the participating institution is received by the Georgia Tech Registrar's Office.

## XII. EXAMINATIONS

### A. GENERAL

1. All re-examinations, examinations for advanced standing, and special examinations must be authorized by the registrar before being scheduled.
2. If the instructor considers it necessary during an examination, students may be required to present their student identification card to the instructor or an authorized representative.

## B. EXAMINATIONS FOR ADVANCED STANDING

1. Students who offer satisfactory evidence that they are qualified to do so may receive credit for a course by examination. Such an examination is called an examination for advanced standing.
2. Examinations for advanced standing require the recommendation of the department of instruction in which the course is offered, payment of the appropriate fee, and authorization by the registrar.
3. Examinations for advanced standing will ordinarily be offered during the week of final examinations.
4. A student will not be allowed to take an examination for advanced standing in a given course more than twice.
5. An examination for advanced standing will be reported with an S or U grade. Neither grade will be included in the calculation of the scholastic average.

## C. REGULATIONS COVERING FINAL EXAMINATIONS

1. The Office of the Registrar will publish the final examination schedule and policies each term.
2. A student reporting to a final examination room more than fifteen minutes after the scheduled starting time shall not be allowed to take the examination unless a satisfactory explanation is presented to the instructor conducting the examination.

# XIII. UNDERGRADUATE DEGREES

## A. GENERAL

1. To be considered for admission to candidacy for a degree, a student must have passed the Regents' Test and must make a formal petition for the degree during the term preceding the final term in residence. A petition for degree will not be accepted until the Regents' Test has been passed.
2. Students desiring to withdraw their name from the rolls of degree candidates must formally withdraw the petition for degree before the end of the seventh week of the semester (or fourth week of the summer term). This privilege will be extended to a degree candidate only once.
3. A degree program may include a maximum of four hours of basic ROTC and a maximum of six hours of advanced ROTC.
4. The diploma of a candidate for a degree shall bear the date of the commencement at which the degree is awarded.
5. All requirements for the degree must be completed and certified by the registrar no later than forty-eight hours after final grades for the term are due. If a candidate for a degree is not certified by the appropriate deadline, the candidate will be graduated at the next scheduled commencement. The diploma will bear the date of the commencement at which the degree is awarded. It is the responsibility of the student to reactivate the degree petition for the appropriate term.

## B. RESIDENCY RULE

No student may be considered a candidate for a degree unless the final thirty-six credit hours required for the degree are earned in residence at Georgia Tech and approved by the major school.

### C. TEN-YEAR RULE

Work that was completed more than ten years prior to commencement must be validated by special examinations before it can be counted toward a degree.

## D. REQUIREMENTS FOR A DEGREE

1. To be a candidate for a degree, undergraduate students must have passed or be enrolled in all courses required for the degree, must have a scholastic average for their entire academic program of at least 2.00, and must have done creditable work in their departmental courses so as to merit the recommendation for the degree by the chair and faculty of their school.
2. Students, with the approval of their school or specialization, may satisfy the requirements for an undergraduate degree by meeting all of the requirements associated with any one curriculum year in effect during the period of their enrollment in the Institute or during their last two years (prior to their enrollment at Georgia Tech) in the program at one of the RETP schools. A curriculum year is in effect for a student only if the student's date of matriculation is prior to the ending date of the spring term concluding that curriculum year.
3. Constitution and history examinations
    a. The Georgia law as amended March 4, 1953, requires that before graduation all students pass examinations or pass comparable courses in United States and Georgia history as well as the United States and Georgia constitutions.
    b. For courses that may satisfy the constitution and history requirements, refer to the Information for Undergraduate Students/Academic Regulations section of this catalog.
4. Regents' Testing Program. All students completing requirements for baccalaureate degrees are required by the University System of Georgia to pass an examination designed to measure proficiency in reading and English composition. This examination is known as the Regents' Test. It must be passed before a petition for graduation will be accepted. Students should obtain further information from the registrar.
5. Wellness Requirement
    a. Unless medically exempted, all students are required to satisfy the wellness requirement as specified in the Information for Undergraduate Students/Academic Regulations section of this catalog prior to graduation.
    b. The Health Information Record on file with the director of Health Services will be used to determine any medical exemptions from the wellness courses. All certificates of disability from personal physicians must be endorsed by Student Health Services before they will be accepted by the School of Applied Physiology.

## E. GRADUATION WITH ACADEMIC DISTINCTION

1. For graduation with highest honor, the minimum scholastic average shall be 3.55. For graduation with high honor, the minimum scholastic average shall be 3.35. For graduation with honor, the minimum scholastic average shall be 3.15.
2. A student must have earned at least sixty semester credit hours (excluding remedial coursework) at Georgia Tech to graduate with highest honor, with high honor, or with honor.
3. In order to qualify for graduation with honors, all grades or grade corrections affecting the honors designation must be received and certified by the registrar no later than noon on Wednesday following the commencement.

### F. SECOND UNDERGRADUATE DEGREE

1. A student enrolled for a second undergraduate degree shall be classified as an undergraduate student, except that a graduate student wishing to pursue a second undergraduate degree will remain classified as a graduate student. A graduate student, with approval of the major school, may work toward a second undergraduate degree while pursuing a graduate program.
2. To be a candidate for a second undergraduate degree, a student must have the recommendation of the chair of the school concerned and the approval of the Undergraduate Curriculum Committee.
3. To obtain a second undergraduate degree, a student must complete all major required courses for the degree and earn credit for a total of at least thirty-six credit hours in excess of the requirement for any previous degrees earned.
4. All regulations in section XIII apply to students completing second undergraduate degrees.

## G. MINORS

1. A student may complete a minor in another academic field while completing the requirements of his or her major degree program.
2. With the approval of the major school, the student should consult an advisor in the minor field, who can inform the student of the requirements for the minor.
3. When a student petitions for a degree, he or she should complete the petition for a minor and have it approved by the minor advisor. The petition for a minor must accompany the petition for the major degree when reviewed for approval by the major school.
4. The minor will be conferred at the same time the degree is conferred.
5. The minor will not be printed on the diploma, but both the degree and minor will be recorded on the student's transcript.
6. Minors may not be conferred retroactively upon students who have graduated.

## XIV. GRADUATE DEGREES

A complete description of Institute requirements for the master's and doctoral degrees is given in this catalog in the section titled "Information for Graduate Students." Students desiring to withdraw their name from the rolls of degree candidates must formally withdraw the petition for degree before the deadline specified in section XIII.A.2.

## XV. STUDENT MOTOR VEHICLES

Students desiring to operate motor vehicles on campus are subject to all rules set forth by the Georgia Tech motor vehicle regulations.

## XVI. MEDICAL REGULATIONS

A Medical Entrance Form and proof of required immunizations and tuberculosis screening must be on file with Student Health Services. Failure to provide this information may result in a health hold and delay of registration. All international students (F-1 and J-1 visas) are required to have health insurance coverage. Students may elect to purchase the health insurance made available by the health insurance provider contracted by Georgia Tech or may have their own comparable medical insurance.

## XVII. EXTRACURRICULAR ACTIVITIES

### A. PARTICIPATION

1. In order to be eligible for participation in extracurricular activities, a student must satisfy the following requirements:
   a. be enrolled in a degree program
   b. maintain a schedule with at least six credit hours on a credit basis or be a student in the Division of Professional Practice on work term
   c. all student organization officers must be enrolled in Georgia Tech classes with at least six credit hours on a credit basis or be a student in the Division of Professional Practice on work term in Atlanta
2. Changes in academic standing that affect eligibility become effective when determined by the Institute at the end of each term (normally the Tuesday following final examination week), except that a student whose academic standing changes from good to probation shall remain eligible through the day preceding the first day of instruction of the following academic term.
3. Any student placed on academic drop/dismissal, review, suspension, or expulsion is immediately ineligible for participation.
4. Changes in disciplinary standing that affect eligibility become effective immediately.
5. Participation also requires satisfaction of any additional requirements established by the Student Activities Committee of the Academic Senate.

### B. SCHEDULING OF EVENTS

1. All student organizations must make written application to, and receive permission from, the Division of Student Affairs to hold a social function.
2. In each term, the weekend before final examinations is closed to student-sponsored extracurricular events.

## C. STUDENT ORGANIZATIONS

1. All student organizations must adhere to the Conduct Code and Disciplinary Procedures for Student Organizations.
2. Every organization must renew its charter every year or when changing officers by submitting an Officer Update Form and by signing the Alcohol Policy Acknowledgement Form.
3. Requirements and standards for chartering a student organization are established by the Student Activities Committee of the Academic Senate and are available from the Division of Student Affairs.

## D. FRATERNITY AND SORORITY REGULATIONS

1. To be eligible for initiation, a student must be a full-time student not on academic or disciplinary probation.
2. The initiation of any individual must be registered with and approved by the Division of Student Affairs prior to the initiation.
3. The individual must meet all Georgia Tech Interfraternity Council (I.F.C.) or Panhellenic requirements concerning initiation.
4. All fraternities and sororities are subject to the rules established by the Georgia Tech I.F.C./Panhellenic/National Pan-Hellenic and all Georgia Tech policies, rules, and regulations.

## E. INTERCOLLEGIATE ATHLETICS REGULATIONS

1. To be eligible for intercollegiate athletic competition, a student must satisfy the following requirements:
   a. be eligible to participate in extracurricular activities, as defined in section XVII .A;
   b. be carrying a full-time workload as defined in section VI.A.3;
   c. be making satisfactory progress toward a degree; and
   d. meet any further requirements of the NCAA or other governing organization; see the athletic director for details.

2. No student may be excused from regularly scheduled classes for athletic practice.
3. No student may participate in more than two sports in intercollegiate competition in any school year, except by permission of the Division of Student Affairs. Being manager or assistant manager is counted as participation within the meaning of this rule.

# XVIII ACADEMIC HONOR CODE

## ARTICLE I: HONOR AGREEMENT

Having read the Georgia Institute of Technology Academic Honor code, I understand and accept my responsibility as a member of the Georgia Tech community to uphold the Honor Code at all times. In addition, I understand my options for reporting honor violations as detailed in the code.

## ARTICLE II: HONOR CODE

### Section 1. Statement of Purpose

The members of the Georgia Tech community believe the fundamental objective of the Institute is to provide the students with a high-quality education while developing in them a sense of ethics and social responsibility. We believe that trust is an integral part of the learning process and that self-discipline is necessary in this pursuit. We also believe that any instance of dishonesty hurts the entire community. It is with this in mind that we have set forth a student Honor Code at Georgia Tech.

### Section 2. Objectives

An Honor Code at Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. It specifically aims to accomplish the following:

- Ensure that students, faculty and administrators understand that the responsibility for upholding academic honesty at Georgia Tech lies with them.
- Prevent any students from gaining an unfair advantage over other students through academic misconduct.
- Ensure that students understand that academic dishonesty is a violation of the profound trust of the entire academic community.
- Clarify what constitutes academic misconduct among students at Georgia Tech and what is expected of them by the Institute, the faculty, and their peers.
- Cultivate an environment at Georgia Tech where academic dishonesty is not tolerated among the students.
- Secure a centralized system of education and awareness of the Honor Code.

### Section 3. Student Responsibilities

Students are expected to act according to the highest ethical standards. The immediate objective of an Honor Code is to prevent any students from gaining an unfair advantage over other students through academic misconduct. Academic misconduct is any act that does or could improperly distort student grades or other student academic records. Such acts include but need not be limited to the following:

- Possessing, using, or exchanging improperly acquired written or verbal information in the preparation of any essay, laboratory report, examination, or other assignment included in an academic course;
- Substitution for, or unauthorized collaboration with, a student in the commission of academic requirements;
- Submission of material that is wholly or substantially identical to that created or published by another person or persons, without adequate credit notations indicating authorship (plagiarism);
- False claims of performance or work that has been submitted by the claimant;
- Alteration or insertion of any academic grade or rating so as to obtain unearned academic credit;
- Deliberate falsification of a written or verbal statement of fact to a member of the faculty so as to obtain unearned academic credit;
- Forgery, alteration, or misuse of any Institute document relating to the academic status of the student.

While these acts constitute assured instances of academic misconduct, other acts of academic misconduct may be defined by the professor.

Students must sign the Honor Agreement affirming their commitment to uphold the Honor Code before becoming a part of the Georgia Tech community. The Honor Agreement may reappear on exams and other assignments to remind students of their responsibilities under the Georgia Institute of Technology Academic Honor Code.

### Section 4. Faculty Responsibilities

Faculty members are expected to create an environment where honesty flourishes. In creating this environment, faculty members are expected to do the following:

- Make known to their class as specifically as possible what constitutes appropriate academic conduct as well as what comprises academic misconduct. This includes but is not limited to the use of previously submitted work, collaborative work on homework, etc.

- Provide copies of old exams or lists of sample questions to the Georgia Tech library for students to review.
- Avoid the re-use of exams.
- Include a paragraph containing information about the Georgia Tech Academic Honor Code on the syllabus for each class they teach.
- Report instances of academic dishonesty to the Office of the Dean of Students.

In addition to the expectations listed previously, faculty have the authority to superimpose their own interpretations on some aspects of academic conduct including, but not limited to, the following:

- Old exams for use during open-book exams;
- Contents of formula sheets allowed on exams;
- Use of calculators on exams;
- Collaboration on out-of-class assignments;
- Use of previously submitted out-of-class assignments.

Top

## ARTICLE III: HONOR SYSTEM

### Section 1. Governing Bodies

The Georgia Institute of Technology Academic Honor Code recognizes the present bodies given the power to enforce the academic regulations of the Institute. The Honor Code recognizes the Office of the Dean of Students to be the principal administrator to enforce Institute disciplinary measures as presently specified in Article XIX Section B, of the Rules and Regulations section of the current Georgia Institute of Technology General Catalog.

The Honor Code also recognizes the Student Honor Committee as the body given jurisdiction to hear all cases of alleged academic misconduct as currently specified in XIX Section B.

### Section 2. Reporting Honor Code Violations

In order for an Honor Code to function, members of the Georgia Tech community must not tolerate violations of it by anyone. Community members are at their discretion to use any of three options to report suspected Honor Code violations:

1. A student may simply desire to confront the fellow student with the perceived infraction. While this option is most likely to enact widespread change in attitude and behavior among students (because violators would understand that they are violating the trust of their peers and not some abstract body of people), it is still expected that an alleged violator be taken before the Student Honor Committee if he or she persists in academic misconduct.
2. A student may choose to approach the professor of the class in which the alleged infraction occurred and seek his or her input on how to proceed. A result of a conference of this type would be the professor's awareness that the alleged violator needs closer monitoring to ascertain reasonable certainty of guilt before being brought before the Student Honor Committee.
3. A student may choose to seek the advice of an honor advisor (see Article III., Section 3). Meetings with honor advisors shall address issues of policy and procedure only. Specifics of an individual case are not to be discussed. After a consultation with an honor advisor, a student may choose to submit a formal accusation of academic misconduct to the Office of the Dean of Students.

### Section 3. Student Honor Advisory Council

Students composing the Student Honor Advisory Council are to become well versed in all aspects of the Georgia Institute of Technology Academic Honor Code and the procedures for reporting an honor violation as well as those procedures for the trying of cases of suspected academic misconduct before the Student Honor Committee. The Council is to act as an information resource to all members of the Georgia Tech community on issues related to the Honor Code.

#### Membership

1. Members are to be selected by the vice president of Student Affairs or a designated person to carry out these duties.
2. Members must be full-time students at Georgia Tech and must be in good academic standing.
3. Once a member of the council, the student shall serve until he or she graduates, unless he or she resigns or is impeached.
4. Impeachment procedures are to be specified in the rules and/or bylaws of the Student Honor Advisory Council.
5. Membership shall be composed of no less than fifteen (15) students at any given time.

#### Duties and Responsibilities

1. To serve in an advisory capacity to any student(s) wishing to report an honor violation or any student(s) being accused of committing an honor violation.
2. To continually educate and maintain awareness among the Georgia Tech community regarding the Honor Code.
3. To limit discussion with students to issues of policy and procedure.

Top

## ARTICLE IV. AMENDING THE HONOR CODE

Amendments to the Georgia Tech Academic Honor Code may be proposed by a two-thirds (2/3) vote of both the Undergraduate Student Council and the Graduate Student Senate, or by a petition of ten percent (10%) of the total population (undergraduate and graduate) directed to both the undergraduate student body president and the graduate student body president.

Amendments become part of this Honor Code upon ratification by two-thirds (2/3) of the votes cast in a special election open to the undergraduate and graduate students, provided that the proposed amendments have been published in the Technique at least one week prior to the vote by the student body and further provided that the amendments are approved by the Academic Senate.

Appendices or amendments of appendices which pertain to either the undergraduate student body or to the graduate student body may be proposed by a two-thirds (2/3) vote of the respective legislative body or a petition of at least ten percent of the respective student body directed to the respective student body president. These shall become part of this Honor Code upon ratification by two-thirds (2/3) of the votes in a special election of the respective student body, provided that the proposed appendices or amendments of appendices have been published in the Technique at least one week prior to the election, and further provided that the appendices or amendments of appendices are approved by the Academic Senate.

### Appendix A: Graduate Addendum to the Academic Honor Code

#### I. Preamble

The Honor Code recognizes that graduate students are involved in research and scholarly activities that occur outside the classroom. Integrity and academic honesty are as fundamental to research and scholarly activity as they are to classroom activity. Therefore, this Appendix to the Honor Code is adopted to pertain to the academic activities of graduate students that occur outside of the classroom.

#### II. Scholarly Misconduct

Scholarly misconduct refers to misconduct that occurs in research and scholarly activities outside the classroom. It can include plagiarism, among other things. The consequences of scholarly misconduct are governed by Institute policy. The following definitions are taken from the Institute Policy on Scholarly Misconduct:

- "Misconduct" or "scholarly misconduct" is the fabrication of data, plagiarism, or other practice that seriously deviates from those that are commonly accepted within the academic or research community for proposing, conducting, or reporting research or scholarly activity. It does not include honest error or honest differences in interpretation or judgments of data.
- "Plagiarism" is the act of appropriating the literary composition of another, or parts of passages of his or her writings, or language or ideas of the same, and passing them off as the product of one's own mind. It involves the deliberate use of any outside source without proper acknowledgment. Plagiarism is scholarly misconduct whether it occurs in any work, published or unpublished, or in any application for funding.

Allegations involving scholarly misconduct fall under the Institute's Policy on Scholarly Misconduct. This document details the procedures involved with reporting allegations and with the handling of cases. All graduate students are encouraged to become familiar with this policy, which is available from the Office of the Provost.

Top

## XIX. STUDENT CODE OF CONDUCT

The most current Student Code of Conduct can be found on the Office of Student Integrity web site as listed in the References. In the event of any conflict, the Code found on the web site will govern.

A. General
B. Prohibited Academic Conduct
C. Prohibited Non-Academic Conduct
D. Student Code of Conduct Procedures
E. Sanctions
F. Interim Suspension
G. Appeal Procedures
H. Record Keeping and Release of Information
I. References

### A. GENERAL

1. **Purpose**
   The Student Code of Conduct educates all members of the Georgia Tech Community about the Institute's expectations and Students' rights and creates a standard by which Students are expected to conduct themselves for the purpose of establishing an environment conducive to academic excellence.

2. **Definitions**
   When used in this Code:
   a. The term "*Accused*" means a Student, Group, or Organization who is alleged to be in violation of the Student Code of Conduct.
   b. The term "*Administrative Conference*" refers to the meeting between the Accused and the Student Conduct Administrator that occurs during an investigation. An Administrative Resolution may be offered during this conference.
   c. The term "*Administrative Resolution*" refers to a decision by a Student Conduct Administrator that will result in the Accused either being found responsible or not responsible.
   d. The term "*Advisor*" refers to an individual who assists the Complainant(s), Accused or Student Conduct Panel with the Student Conduct process. Attorneys at law are not allowed to serve as Advisors to Complainant(s) or Accused unless he/she is subject to criminal prosecution or the parent/legal guardian is the attorney.
   e. The term "*Appellate Officer*" means the person authorized by the Institute to consider an appeal of a disciplinary decision rendered by a Student Conduct Administrator, a Student Conduct Panel or the Dean of Students.
   f. The term "*Business Day*" means any day in which the Institute is open for its full hours of operation, in accordance with the Institute's official calendars. All campuses will follow their respective calendars. When an authorized Institute Official closes the Institute, it will not be considered an official business day.
   g. The term "*Chairperson*" means a member of a Student Conduct Panel who is identified by the Institute to oversee the proceedings during a hearing.
   h. The term "*Complainant*" means any person who submits a complaint to OSI alleging that a Student or Organization violated the Student Code of Conduct, or anyone who has been affected by the alleged misconduct.
   i. The term "*Community*" includes any Student, Faculty member, Institute Official or any other person employed by the Institute. A person's status in a particular situation shall be determined by the Dean of Students.
   j. The term "*Faculty Member*" means any person hired by the Institute to conduct classroom, teaching or research activities or who is otherwise considered by the Institute to be a member of its Faculty, except as otherwise provided in Section D.5.c.
   k. The term "*Group*" means a number of persons who are associated with each other, but who have not complied with Institute requirements for registration as an Organization.
   l. The term "*Group or Organization Activity*" means any activity on or off Institute Premises that is directly initiated for or supervised by a Group or Organization including any individual activity occurring in buildings, facilities, grounds, utilities, or resources (including computer resources) owned, leased, operated, controlled or supervised by an Institute Organization.

m. The term "*Hazing*" means an act which endangers the mental or physical health or safety of a student, or which destroys or removes public or private property, for the purpose of initiation, admission into, affiliation with, or as a condition for continued membership in a group or organization.

n. The term "*Information*" means any Witness testimony, documents, statements, or tangible material presented to a Student Conduct Administrator or Student Conduct Panel.

o. The terms "*Institute*" and "*Georgia Tech*" each refer to the Georgia Institute of Technology and all of its undergraduate, graduate, and professional schools, divisions, and programs.

p. The term "*Institute Official*" is defined as Faculty, administration, or staff personnel including Students serving as Institute employees.

q. The term "*Institute Premises*" includes all land buildings, facilities, grounds, utilities, resources and other property (including computer resources) in the possession of, or owned, operated, leased, controlled or supervised by the Institute (including adjacent streets and sidewalks).

r. The term "*may*" is used in the permissive sense.

s. The terms "*the Office of Student Integrity*" or “OSI” means the office designated by the Institute to oversee the Student Code of Conduct.

t. The term "*Organization*" means a number of persons who have complied with or are in process of complying with the requirements for chartering.

u. The term "*Policy*" or "*Policies*" means any written rule or regulation of the Institute.

v. The phrase "*found responsible by a Preponderance of the Evidence*" means it is more likely than not that the Accused is responsible for a violation of the Student Code of Conduct.

w. The terms "*Sanction*" and "*Supplementary Requirements*" means the conditions imposed upon an Accused found responsible for a violation of the Student Code of Conduct.

x. The term "*Student*" means any person who is taking or auditing classes of the Institute, either full time or part time; is participating in academic programs; or is pursuing undergraduate, graduate or professional studies. A Student is also any person who matriculates in any Institute program, has been accepted for enrollment or is eligible to reenroll without applying for readmission.

y. The term "*Student Conduct Administrator*" means an Institute Official authorized on a case-by-case basis by the Dean of Students to impose Sanctions upon any Student(s) found to have violated the Student Code of Conduct.

z. The term "*Student Conduct Panel*" means a set of persons authorized by the Institute to determine whether the Accused has violated the Student Code of Conduct. In academic cases, the Panel makes a decision to be implemented by OSI. In non-academic cases, the Panel recommends a decision and Sanctions, if applicable, to the Dean of Students.

aa. The term "*Weapon*" means any object or substance designed, intended, or used to inflict or threaten bodily injury.

ab. The terms "*will*" or "*shall*" are used in the imperative sense.

ac. The term "*Witness*" is defined as a person providing Information during the Conduct process.

3. **Authority**

a. This Code is not written with the specificity of a criminal statute and should not be confused with criminal law. Institute conduct proceedings are not restricted by the rules of evidence governing criminal and civil proceedings. Students may be held accountable both to civil authorities and the Institute for acts that constitute violations of law and the Code. Proceedings under this Code may be carried out prior to, simultaneously with, or following civil or criminal proceedings. Students who reside in Institute housing will be held accountable under housing policies and procedures in addition to this Code.

b. OSI shall develop operating procedures for the administration of the Student Code of Conduct process and for the conduct of Student Conduct Panel hearings that are not inconsistent with provisions of the Student Code of Conduct.

c. Interpretation of the Student Code of Conduct is held by the Dean of Students.

4. **Jurisdiction**

a. The Institute reserves the right to take necessary and appropriate action to protect the safety and well being of the Community. Academic misconduct relevant to any Institute activity will be addressed regardless of where it may have occurred. Non-academic misconduct will be addressed whenever such acts:

   a. occur on Institute Premises; or
   b. occur at Institute sponsored activities; or
   c. occur at Group or Organization Activities; or
   d. occur off Institute Premises when conduct adversely affects the Institute and/or the pursuit of its objectives.

b. Each Student shall be responsible for his/her conduct from the time of application for admission through the actual awarding of a degree. This includes conduct that may occur before classes begin or after classes end, as well as during the academic year and during periods between terms of actual enrollment. The Code shall apply to a Student's conduct even if the Student withdraws from school while a disciplinary matter is pending. The Code applies to Institute programs in remote and overseas locations.

c. The Institute shall retain jurisdiction over all Students irrespective of when the Student is subject to tenets of an agreement with other schools.

5. **Inappropriate Classroom Behavior**
The primary responsibility for managing the classroom environment rests with the instructor. Students who engage in any acts that result in disruption of a class may be directed by the instructor to leave the class for the remainder of the class period. Longer suspensions from a class can be administered only by the Dean of Students in accordance with this Code.

6. **Student Organizational Discipline**
Student Groups and Organizations are accountable to this Code. A Student Group or Organization and its officers may be held collectively and individually responsible when violations of this Code by those associated with the Group or Organization have received the consent or encouragement of the Group or Organization, or of the Group's or Organization's leaders or officers. Prohibited academic and non-academic misconduct is outlined in this Code. The process is governed by the "Conduct Code and Disciplinary Procedures for Student Organizations," found at the OSI website. This subsection shall expire upon the adoption of a separate Code of Conduct governing Student Organizations.

Top

## B. PROHIBITED ACADEMIC CONDUCT

Any Student, Student Organization or Group accused of committing or attempting to commit one or more of the following acts of academic misconduct is subject to conduct procedures in accordance with Section D.

1. Unauthorized Access: Possessing, using, or exchanging improperly acquired written or verbal information in the preparation of a problem set, laboratory report, essay, examination, or other academic assignment.
2. Unauthorized Collaboration: Unauthorized interaction with another Student or Students in the fulfillment of academic requirements.
3. Plagiarism: Submission of material that is wholly or substantially identical to that created or published by another person or persons, without adequate credit notations indicating the authorship.
4. False Claims of Performance: False claims for work that has been submitted by a Student.
5. Grade Alteration: Alteration of any academic grade or rating so as to obtain unearned academic credit.
6. Deliberate Falsification: Deliberate falsification of a written or verbal statement of fact to a Faculty member and/or Institute Official, so as to obtain unearned academic credit.
7. Forgery: Forgery, alteration, or misuse of any Institute document relating to the academic status of the Student.
8. Distortion: Any act that distorts or could distort grades or other academic records.

## C. PROHIBITED NON-ACADEMIC CONDUCT

Any Student, Student Organization or Group accused of committing or attempting to commit one or more of the following acts of non-academic misconduct is subject to conduct procedures in accordance with Section D.

1. Alcohol violations including, but not limited to:
    a. Underage use or possession of alcohol.
    b. Possession or consumption of alcohol in an unauthorized area.
    c. Use or possession of fake identification.
    d. Distribution of alcohol to underage person(s).
    e. Behavior, while under the influence of alcohol, that endangers any person.
    f. Disorderly conduct associated with the use of alcoholic beverages.

2. Illegal drugs and other substance violations including, but not limited to:
    a. Use or possession of illegal drugs (without valid medical or dental prescription).
    b. Behavior, while under the influence of illegal drugs, that endangers any person.
    c. Manufacturing, furnishing, selling, or distributing of any narcotic or dangerous drug controlled by law.
    d. Disorderly conduct associated with the use of illegal drugs.

3. Unjustifiably pushing, striking, or otherwise intentionally causing reasonable apprehension of such harm to any person.
4. Disorderly conduct including, but not limited to:
    a. Boisterousness, rowdiness, obscene, or indecent conduct or appearance.
    b. Obstruction or disruption of teaching, research, administration, or other Institute activities, including its public service functions or other authorized activities.
    c. Breach of the peace.

5. Behavior that endangers any person(s), including self.
6. Unauthorized use of Institute facilities or premises including:
    a. Unauthorized entry into any Institute Premises or remaining without permission in any building after normal closing hours.
    b. Possessing, using, making, or causing to be made any key or other means of access to any Institute Premises without proper authorization.

7. Furnishing false information to any Institute Official.
8. Forgery, alteration, replication, or misuse of any document, record, or identification upon which the Institute relies, regardless of the medium.
9. Any physical or mental hazing action related to membership or connected with rites or ceremonies of induction, initiation, or orientation in Institute life or into the life of any Group or Organization.
10. Safety violations, including, but not limited to:
    a. Intentionally initiating or causing to be initiated any false reporting, warning or threat of fire, explosion or other emergency.
    b. Tampering with safety devices or other emergency, safety, or fire fighting equipment.
    c. Setting or attempting to set an unauthorized fire.
    d. Unauthorized possession of fireworks, firearms, and/or ammunition.
    e. Unauthorized possession of Weapons and/or dangerous materials or chemicals.
    f. Unauthorized sale, possession, furnishing, or use of any bomb or explosive or incendiary device.

11. Theft and/or unauthorized possession or use of property or services belonging to the Institute, another person, or any other entity.
12. Malicious or unauthorized damage to or destruction of Institute property or property belonging to another.

13. Illegal gambling, including online gambling.

14. Failure to return or submit property or records of the Institute within the time prescribed by the Institute.

15. Acting with any other person to perform an unlawful act or to violate an Institute regulation or Policy.

16. Failure to comply with instructions or a directive of any properly identified Institute Official while that person is acting in the performance of his/her duties.

17. Abuse of the Student Code of Conduct Procedures including, but not limited to:
    a. Failure to cooperate with the investigation, resolution, and procedures of the Student Code of Conduct.
    b. Falsification, distortion, or misrepresentation of Information before a Student Conduct Administrator or Student Conduct Panel.
    c. Disruption or interference with the orderly conduct of an Administrative Conference and/or a Student Conduct Panel proceeding.
    d. Attempting to influence the impartiality of a Student Conduct Administrator and/or a member of a Student Conduct Panel at any point in the Student Conduct process.
    e. Failure to comply with the Sanction and/or Supplementary Requirements imposed under the Student Code of Conduct.
    f. Influencing or attempting to influence another person to commit an abuse of the Student Conduct process.

18. Violation of the Georgia Institute of Technology Computer and Network Usage and Security Policy.

19. Harassing another person including, but not limited to:
    a. Placing another person in reasonable fear of his/her personal safety through words or actions directed at that person, or substantially interfering with the working, learning, or living environment of the person.
    b. Unwelcome sexual advances, requests for sexual favors, and other written, verbal or physical conduct of a sexual nature.

20. Sexual misconduct including, but not limited to:
    a. Non-consensual sexual contact including, but not limited to, intentional and/or forcible touching.
    b. Non-consensual sexual intercourse including, but not limited to, anal, oral or vaginal penetration, however slight.
    c. Sexually related offenses including, but not limited to, obscene, indecent behavior and/or exposure.

21. Violation of any Georgia Institute of Technology policy, rule, or regulation.

22. Violation of any Board of Regents policy and/or federal, state, or local law.

## D. STUDENT CODE OF CONDUCT PROCEDURES

1. **Case Referrals**
   Any person may file a complaint against a Student for violations of the Student Code of Conduct. The complaint shall be prepared in writing and directed to OSI or, in academic cases, the instructor of record may hold a Faculty Conference (see Section D.5.c.). The procedures for filing a complaint can be found on the OSI website as listed in the References. This complaint should be submitted as soon as possible after the event takes place or when it is reasonably discovered, no later than thirty (30) Business Days following the discovery of the incident. In extraordinary circumstances, OSI may waive this timeline.

2. **Communication**
   All communication (requests for meetings, notifications, notice of hearings, etc.) will be provided via the official Institute e-mail address, as defined by the Office of Information Technology. If the Accused is not currently enrolled, the notification will be sent via US Postal Service to the last known address on file with the Registrar.

3. **Rights of the Accused**
   Throughout the Conduct process, the Accused is granted the following rights:
   a. to seek information from a Student Conduct Administrator about the Investigation and Resolution Process;
   b. to be informed of the charge(s) and alleged misconduct upon which the charge is based;
   c. to be informed of the Information upon which a charge is based and afforded an opportunity to offer a relevant response;
   d. to be accompanied by an Advisor of his/her choice;
   e. to remain silent with no inference of responsibility drawn;
   f. to call and question relevant Witnesses;
   g. to present Information in his/her behalf;
   h. to be considered not responsible until proven responsible by a Preponderance of the Evidence;
   i. to appeal the decision;
   j. to waive any of the above rights.

4. **Investigation and Resolution Process**
   The Institute's Conduct process utilizes an investigatory model, not an adversarial model, in resolving allegations of misconduct with the primary goal of uncovering the truth. The standard of proof shall be a Preponderance of the Evidence. An investigation begins when a complaint is forwarded and the case is opened by OSI. During the investigation, a Student should continue to attend class and required Institute functions unless otherwise instructed by the Dean of Students. The investigation and resolution process are as follows:
   a. After OSI receives a complaint, the Accused is formally notified and is requested to contact a Student Conduct Administrator within five (5) Business Days of the notification to schedule an Administrative Conference. Should the Accused fail to contact the Student Conduct Administrator within the required time frame, or fail to attend the Administrative Conference, the Student Conduct Administrator may determine the resolution of the case in the Student’s absence, or may refer the case to a Student Conduct Panel.
   b. At the Administrative Conference, the Accused is presented with the alleged violation of the Student Code of Conduct, supporting Information, and an explanation of his/her rights. The Student Conduct Administrator offers the Accused the opportunity to provide his/her statement regarding the alleged misconduct, supporting Information, and Witnesses. The Accused may bring an Advisor, however if the Advisor disrupts the investigation and resolution process, he/she may be asked to leave.
   c. The Student Conduct Administrator continues the investigation by meeting with the Complainant(s), and Witnesses and gathering additional Information. The investigation will be completed in an expeditious fashion.
   d. Upon the conclusion of the investigation, the Student Conduct Administrator will determine the level of the case (Low or High). If the case is determined to be Low, the Student Conduct Administrator will render a decision in accordance with Section D.5.a. If the case is determined to be High, the Student Conduct Administrator may choose to have the case heard by a Student Conduct Panel; otherwise the Accused chooses one of the two following forms of case resolution 1) Administrative (see D.5.a.) or 2) Student

Conduct Panel (see D.5.b) within forty-eight (48) hours.

e. The Accused shall submit a list of desired Witnesses to the Student Conduct Administrator at the conclusion of the investigation or no later than 48 hours prior to the scheduled hearing.

5. **Forms of Case Resolution**

a. **Administrative Resolution**

1. **Low Level Cases**
The Student Conduct Administrator renders a decision of 1) Not Responsible, which closes the case or 2) Responsible for one or more violations with an appropriate Sanction, and, as warranted, one or more from among the Supplementary Requirements. The Sanction will be either Disciplinary Warning or Disciplinary Probation. The Accused, after being notified of the Student Conduct Administrator's decision, may submit an appeal to the Dean of Students according to appeal procedures described in Section G.

2. **High Level Cases**
The Student Conduct Administrator decides High level cases only when the Accused elects this form of resolution. The Student Conduct Administrator renders a decision of 1) Not Responsible, which closes the case or 2) Responsible for one or more violations of the Student Code of Conduct with an appropriate Sanction and, as warranted, one or more from among the Supplementary Requirements. The Sanction will be Disciplinary Probation, Suspension Held in Abeyance, Suspension, or Expulsion. The Accused, after being notified of the decision, may submit an appeal, in academic cases, to the Vice Provost for Undergraduate Studies and Academic Affairs, or in non-academic cases, to the Vice President for Student Affairs, according to appeal procedures described in Section G.

b. **Student Conduct Panel**

The Student Conduct Panel is convened for High level cases only and only when either the Student Conduct Administrator or the Accused elects this form of resolution.

1. **Decisions and Sanctions for Academic Cases**
The Student Conduct Panel, after convening a hearing, renders a decision of 1) Not Responsible, which closes the case or 2) Responsible for one or more violations of the Student Code of Conduct with an appropriate Sanction and, as warranted, one or more from among the Supplementary Requirements. The Accused, after being notified of the decision, may submit an appeal to the Vice Provost for Undergraduate Studies and Academic Affairs, according to appeal procedures described in Section G.

2. **Decisions and Sanctions for Non-academic Cases**
The Student Conduct Panel, after convening a hearing, recommends a disciplinary decision to the Dean of Students. The Dean of Students, after reviewing the case, renders a decision of 1) Not Responsible, which closes the case, or 2) Responsible for one or more violations of the Student Code of Conduct with an appropriate Sanction and, as warranted, one or more from among the Supplementary Requirements. The Accused, after being notified of the decision and Sanction, may appeal to the Vice President for Student Affairs, according to appeal procedures described in Section G.

3. **Scheduling of Student Conduct Panel Hearing**
After the case is forwarded to a Student Conduct Panel, the Complainant(s) and the Accused will be notified of available dates and times for a hearing. The Accused may indicate preferences from among the available dates and times, which will be considered by OSI if received within three (3) Business Days. This official notice will be provided at least five (5) Business Days prior to the hearing and will include the time, date, and location of the hearing. In addition, the notice will specify the Complainant(s), Witnesses(s), and nature of the alleged misconduct. Accused may waive the notification timeline in order to expedite the hearing process. Upon request, the Accused may meet with a Student Conduct Administrator to review Information and hearing procedures.

4. **Hearing Participants and Attendees**
   - Student Conduct Panel hearings shall ordinarily be closed except for the Accused, the Complainant(s), Advisor(s), and Witnesses. Exceptions may be made at the discretion of the Chairperson. Witnesses are allowed at

the discretion of the Chairperson. The Chairperson may exclude any person, including the Accused, who disrupts a hearing.

- An Accused who fails to appear after proper notice will be deemed to have responded "Not Responsible" to the charges against him/her and to have exercised the right to remain silent without prejudice. At the discretion of the Chairperson the hearing may be conducted in the absence of the Accused and all the Information regarding the alleged misconduct shall be presented and considered.
- The Complainant(s) and Accused have the right to be accompanied by an Advisor. The Complainant(s) and/or Accused should select an Advisor who can attend the hearing at the scheduled date and time. Delays are not usually granted due to scheduling conflicts of an Advisor.
- Subject to the Chairperson’s control of the hearing, the Complainant(s), Accused and their Advisors, shall be allowed to attend the Student Conduct Panel hearing, but shall not be allowed to attend Panel deliberations.
- In Student Conduct Panel hearings involving more than one Accused, OSI may permit the Student Conduct Panel hearings concerning each Student to be conducted either separately or jointly.
- A maximum of two (2) character Witnesses will be allowed in a hearing.

5. **Hearing Procedures**
    - The Chairperson shall exercise control over the proceedings to achieve orderly completion of the hearing.
    - Advisors are restricted to private communications with their advisee(s). Any communication by the Advisor that is audible to the Student Conduct Panel may be viewed by the Chairperson as disrupting the hearing.
    - All questions by the Complainant(s) and Accused must be directed to the Chairperson, rather than to the Witness directly. Questions of whether potential Information will be received shall be resolved at the discretion of the Chairperson.
    - In addition to the investigatory packet provided by OSI, the Student Conduct Panel, at the discretion of the Chairperson, may accept additional pertinent Information and testimony (including impact statements). Any letters of recommendation submitted by the Accused will be admitted for consideration at the discretion of the Chairperson and, if admitted, will be viewed only during Panel deliberations.
    - All procedural questions arising during the hearing are subject to the final decision of the Chairperson.
    - The Student Conduct Panel’s standard of proof shall be a Preponderance of the Evidence.
    - The Student Conduct Panel in consultation with OSI, may reasonably accommodate concerns for the personal safety, well-being, and/or fears of confrontation of the Complainant(s), Accused, and/or Witnesses during the hearing.
    - The Student Conduct Panel shall make a recording and/or summary transcription of the proceeding, which will serve as the official record of the hearing. No other recording will be permitted. The Accused or the Complainant may request a copy of the Institute's recording upon payment of the cost to reproduce the recording, or may listen to the original recording in a location designated by OSI at no charge. The record shall be the property of the Institute.

c. **Faculty Conference (optional academic case resolution)**

A faculty conference is an optional way in which an alleged act of academic misconduct can be resolved.

1. **Initiation of Complaint**
   The Faculty Conference is initiated by the instructor of record, who requests the meeting with the Accused to discuss the alleged misconduct. Should the Accused not choose to participate in a Faculty Conference, the instructor should forward the case to OSI for investigation.
2. **Participants**

The Faculty Conference involves the instructor of record and the Accused. The Faculty Conference may also involve Witnesses and a representative from OSI if requested by either the instructor or the Accused.

3. **Process**
During the Faculty Conference, the instructor of record explains the alleged misconduct, supporting Information, and the Rights of the Accused. The Accused has the opportunity to provide 1) his/her response to alleged misconduct, 2) supporting Information, and 3) Witnesses.

4. **Conclusion**
    - If the instructor finds the Accused not responsible, the case is closed.
    - If the instructor finds the Accused responsible, but the Accused does not admit responsibility, the instructor forwards the case to OSI for investigation.
    - If the instructor finds the Accused responsible, and the Accused acknowledges responsibility, the instructor proposes a Faculty Resolution including 1) a Sanction of Disciplinary Warning, or Disciplinary Probation, 2) a grade penalty, and 3) an educational component.
    - If the Accused agrees to the Faculty Resolution, the instructor forwards the Faculty Resolution to OSI for consideration.
    - If the Accused does not agree to the Faculty Resolution, the instructor forwards the case to OSI.
    - If the Accused has prior disciplinary history the case will be forwarded to OSI for investigation, in accordance with Section D.4.

5. **Implementation**
    - The Accused is formally notified of the proposed Faculty Resolution by OSI, according to the communication guidelines in Section D.2.
    - The Faculty resolution goes into effect upon delivery unless the Accused requests within five (5) Business Days that the case be forwarded to OSI for investigation.

d. **Alternative Dispute Resolution**

At the sole discretion of the Dean of Students cases may be assigned for Alternative Dispute Resolution (ADR). If the ADR is not agreed to by both parties, the remaining forums will adjudicate the case. Results of the ADR proceedings do not result in formal disciplinary records.

Top

### E. SANCTIONS

Sanctions are imposed only when the Accused is found responsible for one or more violations of the Student Code of Conduct. Sanctions are determined by the severity of the case and the disciplinary history of the Accused. An Accused who is found responsible must be given one of the five Sanctions below, which are listed in ascending order of severity. In addition the Accused may be subject to one or more Supplementary Requirements.

1. **Sanction Descriptions**
   a. **Disciplinary Warning**
   A Disciplinary Warning means that the Student has been found responsible for violating the Institute's Code of Conduct. Any further disciplinary violation may result in disciplinary action up to and including Expulsion. Disciplinary Warning is officially recorded in the Student's disciplinary file.

   b. **Disciplinary Probation**
   Disciplinary Probation means that the student has been found responsible for violating the Institute's Code of Conduct. Disciplinary Probation is for a specified period of time. Any further disciplinary violation may result in disciplinary action up to and including Expulsion. Disciplinary Probation is officially recorded in the Student's disciplinary file.

   c. **Suspension Held in Abeyance**
   Suspension Held in Abeyance means that the Student has been found responsible for violating the Institute's Code of Conduct. Suspension Held in Abeyance is for a specified period of time. During the time of Suspension Held in Abeyance, involvement at the Institute is restricted to 1) academic activities and 2) non-academic activities specifically approved by the Office of Student Integrity. A Student who is found responsible for violating the Student Code of Conduct while under Suspension Held in Abeyance will be given immediate Suspension or Expulsion. Suspension Held in Abeyance is officially recorded in the Student's disciplinary file.

   d. **Suspension**
   Suspension means that the Student has been found responsible for violating the Institute's Code of Conduct. Suspension is exclusion for a specified period of time from the Institute Premises, and other privileges or activities as determined by the Office of Student Integrity. A suspended student shall immediately leave campus and cannot re-enter campus without prior approval from the Office of Student Integrity. The Dean of Students will determine when the Accused has met the requirements for readmission. Any further disciplinary violation may result in disciplinary action up to and including Expulsion. Suspension is officially recorded in the Student's disciplinary file.

   e. **Expulsion**
   Expulsion means that the Student has been found responsible for violating the Institute's Code of Conduct. Expulsion is permanent separation and termination of the Accused's status as a Georgia Tech student, and exclusion from Institute Premises, privileges, and activities. Expulsion is officially recorded in the Student's disciplinary file.

2. **Supplementary Requirements**
   a. Restitution
   Payment to the Institute or to an affected party for damages resulting from a violation of the Student Code of Conduct.

   b. Fine
   A monetary penalty paid to the Institute.

   c. Grade Change
   Change of grade for the course and/or coursework in which the academic misconduct occurred.

   d. Programmatic Requirements
   Required completion of designated educational programs (i.e. alcohol, Community issues, anger management, assessments, etc.).

   e. Restrictions
   Exclusion from participation in specified services and activities.

   f. Revocation of Admission and/or Degree
   Admission to or a degree awarded from the Institute may be revoked for fraud, misrepresentation, or other violation of Institute standards in obtaining the degree, or for other serious violations committed by a Student prior to graduation.

g. Withholding Degree
The Institute may withhold awarding a degree otherwise earned until the completion of the process set forth in this Student Code of Conduct, including the completion of all Sanctions and Supplementary Requirements, if any.

h. Other Requirements
Other Requirements may be imposed.

Top

## F. INTERIM SUSPENSION

In certain circumstances the Dean of Students may impose an Institute suspension prior to the investigation and resolution process.

1. The Dean of Students will determine if interim suspension is warranted. Interim suspension may be imposed only:
   a. To ensure the Student's physical or emotional safety and well-being; or
   b. To ensure the safety and well-being of members of the Institute Community or to preserve Institute property; or
   c. If the Student poses a definite threat of disruption of or interference with the normal operations of the Institute; or
   d. If the Student is charged with a felony.
2. During the interim suspension the Student may be denied access to classes, campus facilities, and all other Institute activities or privileges.
3. The Student shall be notified in writing of this action and the reasons for the Suspension, in accordance with Section F.1. The notice should include the time, date, and place of a subsequent meeting with the Dean of Students in order for the student to show cause why he/she should not be interim suspended.
4. Cases of interim suspension shall be given priority and will be expedited through the Conduct process.

## G. APPEAL PROCEDURES

1. **Reasons for Appeal**
   The appeal process is not intended to grant a new hearing at a higher level. An appeal shall be limited to a review of the record of the initial hearing, supporting documents, and the Accused's written appeal. The Accused must explicitly state why he or she believes an appeal is warranted. Appeals will only be considered for the following reasons:
   a. To determine whether the original hearing was conducted fairly and in conformity with prescribed procedures;
   b. To determine whether there was sufficient evidence to support the decision;
   c. To determine whether the Sanctions and Supplementary Requirements imposed were appropriate for the violation for which the Student was found responsible; and/or
   d. To determine whether new Information, not available at the time of the hearing, is relevant to the final decision.

2. **Process**
   The appeal must be written by the accused, addressed to the appropriate Appellate Officer and delivered to the Office of Student Integrity within five (5) Business Days of the delivery of the decision. Appeal decisions will normally be rendered within ten (10) Business Days either in person, or in accordance with the communication guidelines in Section D.2. At the discretion of the Appellate Officer, a designee may be selected to determine the outcome of the appeal. The Appellate Officers are as follows:
   a. For all low-level cases: the Dean of Students.
   b. For high-level academic cases: the Vice Provost for Undergraduate Studies and Academic Affairs in conjunction with the Office of the Dean of Students.
   c. For high-level non-academic cases: the Vice President for Student Affairs.

3. **Appeal Decisions**
   Decisions of the Appellate Officer go into effect immediately. The Appellate Officer is authorized to take one of the following actions:
   a. dismiss the appeal for failure to state valid reasons, in accordance with Section G.1.
   b. find no error and uphold the original decision;
   c. uphold the original decision, but modify Sanctions and Supplementary Requirements;
   d. remand the case to the original Student Conduct Administrator or Student Conduct Panel; or
   e. reverse the original decision.

4. **Board of Regents**
   The Board of Regents of the University System of Georgia (the "Board") is the final appellate authority for all cases. Should the Accused be dissatisfied with the decision of an Institute Appellate Officer, he/she may apply to the Board for a review of the decision. The application for review shall be submitted in writing to the executive secretary of the Board within the period specified by the Board of Regents.

## H. RECORD KEEPING AND RELEASE OF INFORMATION

1. **Maintenance of Disciplinary Files**
   Disciplinary records of Students found responsible of any charges against them will normally be retained for five (5) years from the date of the most recent notice of disciplinary action. Disciplinary records containing records of Suspension and Expulsion will be permanently retained. A case referral results in the creation of a disciplinary file in the name of the Accused. This file shall be voided if:
   a. The Student is found not responsible for the charges, or
   b. The case is determined to be an informational file only. An informational file is not included in background checks, but can be used in future sanctioning if the behavior continues.

   Voided files will be so marked, shall not be kept with the active disciplinary records, and shall not leave any Student with a disciplinary record. If the Student is not enrolled when five (5) years have passed and disciplinary action did not result in Suspension, Suspension Held in Abeyance, or Expulsion, or a Student terminates enrollment more than five (5) years after a violation, the record is destroyed.

2. **Release of Information**
   Student disciplinary records shall be governed by the Family Educational Rights of Privacy Act 20 U.S.C. § 1232g.

3. **Parental Notification**
   Parents of Students under the age of 21 may be notified when a Student is found responsible for violating the Georgia Tech Student Policy on Alcohol and other Drugs when any of the following occur:
   a. A Student endangers himself/herself or others while under the influence of alcohol or other substances. Specific instances include driving under the influence, fighting, alcohol poisoning, and hospitalization.
   b. When the Dean of Students determines that any future violation of Institute Policy will most likely result in Suspension from Georgia Tech.
   c. When a Student Conduct Administrator determines that any future violation of Institute Policy will likely result in removal from housing.

4. **Transcript Encumbrances**
   In pending cases that could result in Suspension or Expulsion, the Dean of Students will normally place a temporary encumbrance (hold) on a Student's records. The Dean of Students will also place a hold on a Student's records if the Student fails to respond to an official request to meet or if the Student fails to complete assigned Sanctions.

## XIX. STUDENT CODE OF CONDUCT

### I. REFERENCES

Academic Honor Code: www.honor.gatech.edu
Board of Regents: www.usg.edu/regents/policymanual
Computer Use and Network Policy: www.security.gatech.edu
Department of Housing: www.housing.gatech.edu
Faculty Senate: www.Facultysenate.gatech.edu
Office of the Dean of Students: www.deanofstudents.gatech.edu/
Office of Student Integrity: www.deanofstudents.gatech.edu/integrity

The following policies can be found on the OSI website:
Student Policy on Alcohol and Illegal Drugs
Student Policy on Sexual Harassment and Misconduct

## XX. STUDENT ACADEMIC GRIEVANCE PROCEDURES

The procedures set forth here are intended to provide students at the Georgia Institute of Technology a means for setting forth grievances relating to academic matters and grade disputes when the student believes that an instructor has acted unfairly or improperly in assignment of grades. It is not the intention of these procedures to provide a forum for questioning the judgment or grading policies of faculty.

### A. APPLICABILITY OF THE GRIEVANCE PROCEDURES

1. Subject Matter:
   These procedures apply to the review of grievances concerning academic matters and grade disputes. Grade appeals must be initiated by the grievant within their next enrolled term following the term of the course in question, and best efforts should be applied to resolve the appeal within that term.

2. Grievant:
   These procedures shall be the appellate procedures for students at the Georgia Institute of Technology. Students who have pursued a formal grievance procedure or who have pursued informally the resolution of a grievance in their own school, college, or unit and have had that appeal dismissed, may submit the grievance for review under these procedures.

## XX. STUDENT ACADEMIC GRIEVANCE PROCEDURES

### B. OVERVIEW OF GRIEVANCE PROCESS

1. Informal resolution attempted at the school, department, or unit level.
2. Formal resolution sought at the school, department, or unit level.
3. Formal resolution sought at the Institute level: appeal reviewed and, if so determined, heard by the Student Grievance and Appeal Committee.

## XX. STUDENT ACADEMIC GRIEVANCE PROCEDURES

### C. STEPS IN THE GRIEVANCE PROCESS (TO BE FOLLOWED IN THE ORDER PRESENTED)

1. The student shall attempt to resolve the grievance with the individual faculty member, the department, or the unit involved.
2. If the grievance is not resolved in step C.1. and the student elects to continue the grievance process, the student may request a formal hearing setting forth in writing the complaint and the remedy sought at the school, college, or unit level. Upon receipt of such appeal, the unit director will acknowledge the appeal in writing within seven calendar days and will expeditiously proceed to constitute an ad hoc appeal committee. The unit director will serve as a nonvoting member of the committee. In addition, the following four committee members will be selected:
    - One tenured faculty member from within the unit, selected by the unit director.
    - One member of the academic faculty, selected by the student. The student may elect not to select a faculty member; in that case, the committee will consist of three members.
    - One member from outside the unit, selected by the Student Grievance and Appeal Committee in consultation with the unit director.
    - One member of the academic faculty selected by the faculty member whose action is in question.

    The committee will proceed with due haste to examine the merits of the complaint and to render a decision within thirty days. During the proceedings, the student may present any and all evidence that the student deems necessary to support the complaint, except that the committee must agree that the evidence is in some way relevant. Such evidence may consist of documentation and/or testimony, within reason. Both complainant and respondent may be accompanied by advisors; the role of advisor must, however, be restricted to advice. Complainant and respondent must make their own cases before the committee.

    Following a hearing and a written decision at the school, college, or unit level, the grievance is presumed to be resolved unless the grievant appeals.
3. The grievant may appeal the decision that has been rendered by the school, college, or unit to the Student Grievance and Appeal Committee.
    a. If the Committee, or subset thereof appointed by the chairperson, rules that the procedures are not applicable or that based on the facts stated by the grievant viewed in the light most favorable to the grievant, there is no basis for relief, then the appeal is denied.
    b. If the Committee rules that the Institute procedural rules are applicable and that a hearing of the appeal is warranted, the Committee shall initiate a hearing process.
    c. If a student wishes to have a grievance outcome reviewed by the Student Grievance and Appeal Committee with a view to a formal hearing, the student shall observe the following requirements:
        1. The appeal must be in writing. It must state the basis for the grievance and the facts that support it, including a summary of the steps that have already been taken to resolve the grievance, reasons why the student finds the resolutions unfair or unsatisfactory, and a statement of the desired remedy.
        2. The written appeal must be presented to the chairperson of the Student Grievance and Appeal Committee within thirty days after the student has received notice of a decision from a school, college, or unit.
        3. The decision as to whether a formal hearing is warranted shall be made available, in writing, to the parties concerned within thirty days after the Committee has received notice of the appeal.
        4. The Committee may alter a deadline specified in these procedures on written petition of either party showing a meritorious reason for delay; if the Committee itself needs to extend a deadline, it may do so on its own authority for periods up to fourteen calendar days; for longer delays, the Committee must request an extension from the Executive Board of the Institute.
        5. The determination of the Committee as to whether a hearing is warranted is final.
        6. The Committee shall develop and, with the approval of the Academic Senate,

establish and publish its own rules of procedures for the conduct of formal hearings.

7. After receiving testimony and the relevant documents, the Committee shall make a decision within thirty days on the basis of the received material.
8. The Committee's decision shall contain finding of fact, the decision arrived at, reasons for the decision, and the criteria or policy applied in reaching the decision.

## D. REMEDIES

1. **General**
   If the Committee finds, after a formal hearing, that a faculty member, a departmental committee, or an administrator of a unit has not acted fairly or properly, it will recommend a remedy. It will seek to find a remedy that can be implemented by those whose cooperation is needed. In the matter of a grade dispute, this must include the faculty member involved in the dispute.

2. **Enforcement**
   a. If any party does not comply with the decision of the Committee, the Committee shall, upon request of any party, seek full compliance through the administrative offices of the Institute through the chief academic officer (CAO).
   b. The merits of the dispute shall not be subject to review in the process of enforcement. There shall be strong presumption in favor of the remedy selected by the Committee.

3. **Report of a Final Decision**
   After a final decision has been made in a case, the Committee shall prepare a report setting forth its findings and recommendations for action and present the report to the CAO. A copy of the report shall be presented to the parties concerned and to those persons involved in implementing the Committee's recommendations. All such communications shall be effected in person or by certified mail with a return receipt requested; such receipt will become part of the Institute records of the case.

   **Grade Changes:**
   In decisions that would result in the changing of a posted grade, the CAO will instruct the unit director to ask the involved faculty member to effect the prescribed grade change or, if cooperation is not forthcoming, to effect the grade change directly by action of the unit director. Such action shall not be construed as restrictive of the recourses of the faculty member through the usual appeal procedure of the Institute.

   Care will be given that no incomplete or inaccurate information pertaining to the grievance is placed in any file; and that all evidence obtained at any stage of the process and all deliberations and proceedings be kept confidential. At the conclusion of each case, the Student Grievance and Appeal Committee shall transmit original or true copies of the documents related to the case to the appropriate Office of the Vice President of Student Affairs, who shall keep such records securely as Institute records for a period of time specified by Institute statutes.

4. **Final Appeal**
   Appeal of the decision of the Committee to the CAO shall be permitted only for the purposes of procedural review. Such appeals shall be submitted in writing, with copies to the Committee. The CAO will review the findings of the Committee and, upon judgment that the Committee has failed to follow these procedures or has failed to follow the procedures approved by the Academic Senate for the operation of the Student Grievance and Appeal Committee (XX1.C.3.c.c6), return the case to the Committee for reconsideration, along with description of the received error in procedure and a recommendation for its correction.

## XXI. EXCEPTIONS

Where appeals are not otherwise specified, exceptions to these regulations may be made by the appropriate faculty committee upon petition by the student and recommendation of the student's school or department. Blanket exceptions that have the effect of amending these regulations shall be referred to the Academic Senate for approval.

## XXII. STUDENT BILL OF ACADEMIC RIGHTS

1. The right to attend classes at regularly scheduled times without deviation from such time and without penalty if the student cannot attend instructional, lab, or examination hours not institutionally scheduled.
2. The right to consult with an assigned and qualified advisor for a reasonable amount of time each term.
3. The right to consult with faculty outside usual classroom time such as regularly scheduled office hours by appointment.
4. The right to have reasonable access to campus facilities of which use is required to complete course assignments and/or objectives.
5. The right to receive a syllabus for each course at the first class meeting. The syllabus should include an outline of the course objectives, criteria used in determining the course grade, and any other requirements. Students should be informed of any changes made to the syllabus with reasonable time to adjust to these changes.
6. The right to have reasonable time to learn course material prior to the administration of an examination.
7. The right of each student to receive access to any of his/her records kept by the institution.
8. The right to have reasonable access to grading instruments and/or evaluation criteria and to have graded material returned in a timely fashion.
9. The right to be informed of the grade appeals process.
10. The right to have reasonable facilities in which to receive instruction and examinations.
11. The right to be informed in each course of the definition of academic misconduct.