

2009-2010

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**Georgia  
Tech**



## 2009 - 2010 GEORGIA INSTITUTE OF TECHNOLOGY CATALOG

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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 2009.

## **ACADEMIC OFFERINGS**

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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

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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 PhD 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 following undergraduate computing program is accredited by the Computing Accreditation Commission (CAC) of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, Telephone: (410) 347-7700:

- Bachelor of Science in Computer Science

The following undergraduate computing program is not accredited by the Computing Accreditation Commission (CAC) of ABET:

- Bachelor of Science in Computational Media

The College of Management and all of its degrees are fully accredited by AACSB International - 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 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**

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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 and promote the alumni and 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 engage 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](http://www.gtalumni.org).

## **GEORGIA TECH INTERCOLLEGIATE ATHLETICS**

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Intercollegiate athletics at Georgia Tech have enjoyed a long and storied history marked by tradition and success. The athletics program is administered as a nonprofit 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

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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
- Computational Science and Engineering
- Electrical and Computer Engineering
- Environmental Engineering
- Industrial Engineering
- Mechanical Engineering
- Medical Physics
- 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 ninety courses each semester, except during the summer when there are a smaller number of courses available. Visit [www.dlpe.gatech.edu/dl](http://www.dlpe.gatech.edu/dl) 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 Street N.W.  
Atlanta, GA 30308-1031



## LANGUAGE INSTITUTE

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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 in

- The Intensive English Program, which offers core courses in writing, grammar, reading, and speaking/listening at seven levels of proficiency and elective courses 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, accent reduction, public speaking, and TOEFL preparation
- Summer short course program with courses including conversation, writing, speaking, accent reduction, American studies, and business communication
- Customized courses for corporate clients
- Online courses

More than 1,000 students attend programs offered by the Language Institute each year, giving 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 UCIEP 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](http://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

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Distance Learning and Professional Education coordinates the delivery of noncredit short courses and professional development programs to the public and 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 the following:

- Architecture
- Campus Recreation Programs
- Defense Technology
- Economic Development
- Engineering
  - Aerospace | Civil | Electrical & Computer
  - Engineering Review | Mechanical
  - Systems | Textile & Fiber
- English as a Second Language
- Environmental Management
- Executive Education
- Information Technology
- Lean Manufacturing
- OSHA Training
- Quality
- Supply Chain and Logistics

DLPE offers 31 certificate programs comprised of sequences of short courses in these subject areas.

For information, visit [www.dlpe.gatech.edu](http://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.**

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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) AND APPLICANT RECORDS**

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### **A. NOTIFICATION OF STUDENT RIGHTS UNDER FERPA**

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 whether volunteering for or 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

### **B. APPLICANT RECORDS**

- Access to applicant records is strictly controlled and governed by Institute policy. These records are treated as confidential.

## **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 social security numbers.

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

### **ADDITIONAL INFORMATION**

Additional information on Georgia Tech's FERPA policies is available from the Registrar's Office.

## HUMAN RELATIONS STATEMENT

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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

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### 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

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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

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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](http://www.oit.gatech.edu).

## **COMMUNITY SERVICES**

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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**

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Georgia Tech's forty-five 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

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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-managed radio station, WREK 91.1 FM.

Other student publications include the *North Avenue Review*, an open forum magazine; *Erato*, the student literary magazine; *The Tower*, the Institute's undergraduate research journal; and *T-Book*, a handbook and an online survival guide of Georgia Tech traditions for new students.

## CAMPUS RECREATION CENTER

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The Georgia Tech Campus Recreation Center (CRC) is one of the nation's premier recreation facilities. The 300,000 plus square-foot building includes a state-of-the-art fitness center, a 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 Olympics, 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 is also home to 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, SCUBA, golf, and more, the G.I.T. FIT programs focus on fitness and promoting a healthy, balanced lifestyle.

Outdoor Recreation Georgia Tech (ORGT), found in the lower level of the CRC, exposes the urban campus of Georgia Tech to the outdoor opportunities both locally and internationally. 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 adventure sports at reasonable prices.

For more information, please call 404.385.PLAY or visit [www.crc.gatech.edu](http://www.crc.gatech.edu).

## **DRAMATECH**

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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](http://www.dramatech.org).

## **FERST CENTER FOR THE ARTS**

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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

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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. Audio/visual equipment is 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 Kaplan test prep center, 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 (accessible by BuzzCard after hours), providing students with a place to meet and study.



## **STUDENT GOVERNMENT**

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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 ORGANIZATIONS

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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**

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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](http://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](http://www.career.gatech.edu).

## COUNSELING CENTER

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The Georgia Tech Counseling Center is a unit of the Division of Student Affairs. The mission of the Counseling Center is the dedication of its services to enhance the academic experience and personal success of all students by providing a variety of counseling and psychological services to students and the campus community. The Counseling Center accomplishes its mission by offering services to students that facilitate personal development, assist in the alleviation, remediation, and prevention of distress, and educate students in ways that develop self-awareness, self-reliance, and self-confidence. The services at the Counseling Center are accredited by the International Association of Counseling Services.

The Counseling 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 Counseling Center provides outreach and consultation programming and services to the Georgia Tech community.

- **Counseling Services**

The Counseling Center provides short-term counseling (individual counseling, group counseling, couples counseling) and assessment to currently enrolled students. The counseling services that are provided to students facilitate their personal growth and development by assisting students in developing personal insight and awareness of themselves as young adults, assisting them in the education of the salient issues in their lives, and offering them ways to recognize, address, and resolve the difficulties and challenges that serve as obstacles to their academic and personal success.

- **Outreach and Consultation**

The Counseling Center provides a wide variety of programs and educational workshops annually to students and the campus community. Educational outreach programs are offered from a core set of workshops each year in addition to offering individualized programs based on requests from Institute departments, faculty, students, and staff groups. In addition, the Counseling Center's resource library provides a collection of self-help materials for student use.

- **Training Program**

The Counseling Center also has a number of trainees (pre-doctoral interns, graduate practicum students) who also provide supervised counseling services through the Counseling Center. The predoctoral internship program is a member of the Association of Psychology Postdoctoral and Internship Centers.

More information is available at [www.counseling.gatech.edu](http://www.counseling.gatech.edu).

## **OFFICE OF THE DEAN OF STUDENTS**

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The Office of the Dean of Students, a unit of the Division of Student Affairs, has a rich history and tradition of providing support advocacy for all students. The Dean's Office 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. In addition we provide educational and extra-curricular activities and experiences that encourage you to have a positive college experience for all students.

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 room 210, Student Services Building. Students may drop in or call 404.894.6367 to schedule an appointment.

## **DIVERSITY PROGRAMS**

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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](http://www.diversity.gatech.edu).

## **WOMEN'S RESOURCE CENTER**

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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. Staff also provide assistance to students who experience academic or personal challenges while at Tech. For additional information, call 404.385.0230 or visit [www.womenscenter.gatech.edu](http://www.womenscenter.gatech.edu).

## **ASSISTANCE FOR PEOPLE WITH DISABILITIES**

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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](http://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**

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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**

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### **THE PRIMARY CARE CENTER'S HOURS**

(Appointments recommended)

Monday-Friday 8:00 a.m.-5:00 p.m.

### **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](http://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, psychiatrists, radiologists, nurse practitioners, registered nurses, medical and radiological technologists, pharmacists, and health educators. Specialists in gynecology and 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.

## **STUDENT HEALTH CENTER**

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### **MEDICAL ENTRANCE FORM**

All students, graduate and undergraduate, must complete the Medical Entrance, Tuberculosis Screening and Certificate of Immunization forms, and fax them to Health Services before registration at 404-385-0329.

**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.health.gatech.edu/policies\\_procedures/docs.htm](http://www.health.gatech.edu/policies_procedures/docs.htm).

### **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](http://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**

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### **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

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### 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.

## STUDENT HEALTH CENTER

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### **COST**

A student health fee is automatically assessed on student accounts along with tuition for 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. For additional information, please visit the Patient Financial Services section of the Health Services web site at <http://www.health.gatech.edu/departments/insurance.htm>.

The health fee is not insurance and does not cover any services rendered off campus.



**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 do not have health insurance. 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 <https://www.pearceandpearce.com/PearceSite/Schools/GA/GT/Default.asp> regarding mandatory student health insurance and hard waivers. The mandatory health insurance charge is applied to student accounts by the Bursar's Office. Please contact the Bursar's Office directly regarding these charges.

## DEPARTMENT OF HOUSING

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The Department of Housing operates a total of 8,359 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. The Department of Housing has 394 family apartments in the Tenth & Home family housing facility, which includes a mix of one- and two-bedroom unfurnished 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](http://www.housing.gatech.edu).

## OFFICE OF INTERNATIONAL EDUCATION

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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 3,000 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 and year-long study abroad options. 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 1,000 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 300 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.

## INFORMATION TECHNOLOGY AND COMPUTING FACILITIES

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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](http://www.oit.gatech.edu).

## LIBRARY AND INFORMATION CENTER

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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.

## **OMED: EDUCATIONAL SERVICES**

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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**

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Parking registration is conducted online annually from April 15 through June 30 at [www.parking.gatech.edu](http://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](http://www.parking.gatech.edu).

Questions may be directed to the Georgia Tech Department of Parking and Transportation by calling 404.385.PARK or 404.385.RIDE.



## **SPECIAL ACADEMIC SERVICES**

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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:

**PRESIDENT'S OFFICE**

**Gary B. Schuster**

PhD  
Interim President

**Sue Ann Allen**

PhD  
Executive Assistant to the President

**James L. Fetig**

BS  
Associate Vice President  
Communications and Marketing

**Dene H. Sheheane**

MBA  
Director of Government Relations

**PROVOST'S OFFICE**

**Gary B. Schuster**

PhD  
Provost and Vice President for Academic Affairs

**Anderson D. Smith**

PhD  
Senior Vice Provost for Academic Affairs

**Mark G. Allen**

PhD  
Senior Vice Provost for Research and Innovation

**Steve McLaughlin**

PhD  
Vice Provost for International Initiatives

**Ray Vito**

PhD  
Vice Provost for Graduate and Undergraduate Studies

**Jack Lohmann**

PhD  
Vice Provost for Faculty and Program Development

**Gilda A. Barabino**

PhD  
Vice Provost for Academic Diversity

**Deborah Smith**

MS  
Associate Vice Provost for Enrollment Services

**ADMINISTRATION AND FINANCE**

**Steven G. Swant**

MA  
Executive Vice President  
Administration and Finance

**B. E. (Chuck) Donbaugh**

BA  
Associate Vice President

Human Resources

**Joel E. Hercik**

MBA

Associate Vice President

Financial Services

**Rosalind R. Meyers**

CPA

MBA

Associate Vice President

auxiliary Services

**John K. Mullin**

BS

Associate Vice President/Associate Vice Provost

Information Technology

**Charles G. Rhode**

MS

Associate Vice President

Facilities

**Julianne Williamson**

MSEE, MSIE

Executive Director

Organizational Development

**John Majeroni**

BS

Executive Director

Real Estate Development

**Phil Hurd**

BS

Director

Internal Auditing

**Randy A. Nordin**

JD

Chief Legal Advisor

Legal Affairs

**Teresa Crocker**

MA

Director

Security and Police

**Patrick J. McKenna**

LLM

Executive Director

Affiliated Organizations

**ADVANCED TECHNOLOGY DEVELOPMENT CENTER**

**H. Wayne Hodges**

BA

Director

**Anthony K. Antoniadis**

MBA

General Manager

**AUXILIARY SERVICES**

**Rosalind R. Meyers**

CPA

MBA

Associate Vice President

**Michael Black**

BS

Director

Housing

**James Pete**

Acting Director

Information Technology

**David Santa Ana**

Interim Director

Parking and Transportation

**Barbara A. Hanschke**

MBA

Director of Finance

**Stephen Johnson**

BS

Project Director

**Vern Johnson**

BS

Director

Dining Services

**Gerard J. Maloney**

BS

Director

Bookstore

**Melissa Moore**

BS

Communication Officer

**James A. Pete**

MBA

Director

Buzzcard Center

**Jonathan Baker**

RN, MBA

Interim Director

Health Services

**Richard Steele Jr.**

B ChE

Director

Student Center

**COLLEGE OF ARCHITECTURE**

**Alan Balfour**

M Arch

Dean

**Douglas C. Allen**

MLA

RLA

Associate Dean

**Sabir Khan**

M Arch  
Associate Dean

**Leslie N. Sharp**

PhD  
Assistant Dean

**Lucie M. André**

BA  
Director of Development

**COLLEGE OF COMPUTING**

**Ronald Arkin**

Regents' Professor and Associate Dean for Research

**Carla Bennett**

Director of Business Operations

**George Biros**

Associate Professor, Joint with Wallace H. Coulter Department of Biomedical Engineering

**Aaron Bobick**

Professor and Chair, School of Interactive Computing

**James Foley**

Professor and Interim Dean

**Richard Fujimoto**

Regents' Professor and Chair, Computational Science and Engineering Division

**Beki Grinter**

Associate Professor and Associate Dean for Graduate Affairs

**Mary Jean Harrold**

Professor and Associate Dean for Faculty Affairs

**Charles Isbell, Jr.**

Associate Professor and Associate Dean for Undergraduate Affairs

**Mary Alice Isele**

Senior Director of Development, CFRE

**Leo Mark**

Associate Professor

**W. Michael McCracken**

Assistant Dean for Academics

**Elizabeth Mynatt**

Professor and Associate Dean for Strategic Planning and Initiatives

**Thomas Pilsch**

Assistant Dean for Students

**Russ Poole**

Director, Technology Services Organization

**Pamela Ruffin**

Director of Human Resources and Administration

**Cedric Stallworth**

Assistant Dean of the Office of Outreach, Enrollment and Community

**Dawn Williamson**

Special Assistant to the Dean

**Stefany Wilson**

Director of Communications

**Ellen Zegura**

Professor and Chair, School of Computer Science

**COLLEGE OF ENGINEERING**

**Don P. Giddens**

PhD

Dean

**Jane C. Ammons**

PhD

Associate Dean

**John Leonard**

PhD

Associate Dean

**Laurence J. Jacobs**

PhD

Associate Dean

**Jane G. Weyant**

PhD

Assistant Dean

**Felicia Benton-Johnson**

Ed.D

Director

K12/Diversity

**John M. Crowley**

BA

Senior Director of Development

**Linda D. House**

BS

Director

Human Resources and Administration

**Didier Contis**

MSEE

Director

Technology Services

**Pete Dawkins**

B.BA

Director

Finance and Administration

**Gregory B. Goolsby**

Director

Facilities and Capital Planning

**Mahera (Mimi) Philobos**

PhD

Director

Women in Engineering

**COLLEGE OF LIBERAL ARTS**

(Ivan Allen College)

**Sue V. Rosser**

PhD

Dean

**Susan Cozzens**

Associate Dean for Research and Faculty Development

**John Tone**

Associate Dean for Undergraduate Affairs

**Peter Brecke**

Assistant Dean for Information Technology

**Ferdinand Hilenski**

PhD

Director of Development

**Rebecca Keane**

Communications Officer II

**Tina Lambert**

Director of Finance and Administration

**COLLEGE OF MANAGEMENT**

**Steve Salbu**

PhD

Dean and Stephen P. Zelnak Jr Chair

**Sridhar Narasimhan**

PhD

Senior Associate Dean and Robert A. Anclien Professor

**Goutam Challagalla**

PhD

Associate Dean, Executive Education and Brady Family Associate Professor.

**Vinod Singhal**

PhD

Associate Dean, MBA Programs and Alfred F. and Patricia L. Knoll Professor

**Charles Parsons**

PhD

Associate Dean, Undergraduate Programs and Professor

**Dennis H. Nagao**

PhD

Faculty Director, EMBA-MOT and Associate Professor

**Saby Mitra**

PhD

Faculty Director, GEMBA and William H. Anderson II Associate Professor

**James A. Kranzusch**

MS

Executive Director, MBA Career Services

**Nancy Gimbel**

MA

Director, Undergraduate Programs

**Ann J. Scott**

MBA

Director, Graduate Programs

**Paula Wilson**

MEd

Director, MBA Admissions

**Kurt G. Paquette**

MSM

Chief Administrative and Finance 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**

BS  
Senior Director, Development

**COLLEGE OF SCIENCES**

**Paul L. Houston**

PhD  
Dean

**E. Kent Barefield**

PhD  
Associate Dean

**Evans M. Harrell**

PhD  
Associate Dean

**Philip Bonfiglio**

MPH  
Director  
Development

**David L. Moore**

Director  
Finance

**Gerald E. O'Brien**

Director  
Facilities

**COMMUNICATIONS AND MARKETING**

**Jim Fetig**

Associate Vice President

**Amelia Gambino**

Assistant Vice President

**Andrea Ashmore**

Director, Institute Partnerships

**Pam Bonser**

Director, Business Operations

**Katherine Bows**

Director, Marketing Communications

**Lisa Grovenstein**

Director, Public Relations

**John Taylor**

Senior Director, Executive Communications

**Kathi Wallace**

Director, Research and Analysis



## **DEAN OF STUDENTS**

### **John M. Stein**

MA, MS

Dean of Students

Assistant Vice President

### **Buck Cooke**

MS

Assistant Dean of Students

Director of Greek Affairs

### **J. Denise Johnson-Marshall**

MEd

Assistant Dean of Students

Director of Disability Services

### **Danielle McDonald**

MEd

Assistant Dean of Students

Director of Student Involvement

### **Stephanie L. Ray**

MEd

Associate Dean of Students

Director, Student Diversity Programs

### **Yvette Upton**

MS

Assistant Dean of Students

Director of Women's Resource Center

### **VACANT**

Assistant Dean of Students

Director of Student Integrity

## **DEVELOPMENT**

### **Barrett H. Carson**

MA

Vice President

### **Marta H. Garcia**

BA

Assistant Vice President

### **Dorcas G. Wilkinson**

MEd

Assistant Vice President

## **DISTANCE LEARNING AND PROFESSIONAL EDUCATION**

### **Nelson C. Baker,**

PhD

Vice Provost,

Associate Professor of Civil and Environmental Engineering

### **William Holm,**

PhD Associate Vice

Provost,

Principal Research Scientist, GTRI

### **Aziza Bailey**

Assistant Director of Human Resources

**Gretchen Belgum**

Registrar

**Jeffrey Fischer**

Director of Information Systems

**Phyllis Harris**

Director of Customer Service and Operations

**Patrice Miles**

Director of Marketing and Sales

**Thomas Pruitt**

Director of Business and Finance

**Karen Tucker**

Director of the Language Institute

**Diana Turner**

Director of Special Projects

**ENROLLMENT SERVICES**

**Deborah D. Smith**

MEd

Associate Vice Provost

**Randolph W. McDow**

MS

Director

Special Scholarships

**Reta Pikowsky**

M.Ed

Registrar

**Craig Womack**

MEd

Associate Registrar

**Debbie S. Williamson**

MA

Director

Enrollment Services

**Rick Clark**

MEd

Director

Undergraduate Admission

**Valarie R. Mack**

BA

Associate Director

Undergraduate Admission

**Carol Heller**

MEd

Associate Director

Undergraduate Admission

**Gail W. Potts**

BS

Director

Graduate Studies

**Marie R. Mons**

B.BA

Director  
Office of Scholarships and Financial Aid

**Lisa Mitchem**

BA  
Senior Associate Director  
Office of Scholarships and Financial Aid

**Jennifer Mullins**

MA  
Associate Director  
Office of Scholarships and Financial Aid

**Gina Repak**

BA  
Associate Director  
Office of Scholarships and Financial Aid

**Thomas Frese**

BS  
Associate Director  
Office of Scholarships and Financial Aid

**FACILITIES**

**Charles G. Rhode**

MS  
Associate Vice President

**Warren L. Page**

M.E.  
Director  
Operations and Maintenance

**Michael H. Patterson**

BA  
Director  
Design and Construction

**David L. Goldfarb**

PhD  
Director  
Finance

**Charles A. LaFleur**

MS  
Director  
Information Technology

**GEORGIA TECH ALUMNI ASSOCIATION**

**Joseph P. Irwin**

BS  
President

**Allison Hickman**

BS  
CPA  
Vice President  
Administration and Technical Services

**Leonard Contardo Jr.**

MA  
Vice President  
Constituent Services

**James J. Shea**

BS

Vice President

Fundraising and Business Development

**GEORGIA TECH ATHLETIC ASSOCIATION**

**Dan Radakovich**

Director of Athletics

**Paul Griffin**

Senior Associate Director

**THERESA WENZEL**

Senior Associate Director

**DAVE MARMION**

Associate Athletic Director

Business Operations

**Jack Thompson**

Senior Associate Director

**Mollie Simmons-Mayfield**

Senior Associate Director

**Jim Hall**

MS

Associate Director

Development

**Phyllis Labaw**

Associate Director

Academic Services

**Eric Ciano**

Director

Player Development

**Wes Durham**

Director

Broadcasting

**Wayne Hogan**

Director

Associate Athletic Director Public Relations

**DEAN BUCHAN**

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Georgia Institute of Technology  
Georgia State University  
Medical College of Georgia  
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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

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Dalton State College  
Gainesville College  
Georgia Gwinnett College  
Macon State College

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Atlanta Metropolitan College  
Bainbridge College  
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Georgia Highlands College  
Georgia Perimeter College  
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PhD in Comparative Literature - Rutgers The State University of New Jersey  
Associate Professor, School of Literature, Communication & Culture

**Thadhani, Naresh N**

PhD in Metallurgical Engineering - New Mexico Institute of Mining  
Assoc Chair-Academic, School of Materials Science & Engineering

**Thio, Yonathan S**

PhD in Chemical Engineering - Massachusetts Institute of Technology  
Assistant Professor, School of Polymer, Textile & Fiber Engineering

**Thomas, Robin**

PhD in Applied Mathematics - Charles University  
Professor, School of Mathematics

**Thomas, Robert Nelson**

PhD in Higher Education Administratio - University of Georgia  
Professor of the Practice, College of Management

**Thomas, Valerie M**

PhD in Physics - Cornell University  
Associate Professor, School of Industrial & Systems Engineering

**Thomas-Mobley, Linda M**

PhD in Construction/Building Technolo - Georgia Institute of Technology  
Associate Professor, College of Architecture

**Thomaz, Andrea Lockerd**

PhD in Media - Massachusetts Institute of Technology  
Assistant Professor, School of Interactive Computing

**Thursby, Marie C**

PhD in Economics - University of North Carolina-Charlotte  
Professor, College of Management

**Thursby, Jerry Gilbert**

PhD in Economics - University of North Carolina-Chapel Hill  
Professor, College of Management

**Toktay-Tsiotras, Latife Beril**

PhD in Operations Management And Supe - Massachusetts Institute of Technology

Associate Professor, College of Management

**Tolbert, Laren M**

PhD in Chemistry - University of Wisconsin-Madison

Regents' Professor, School of Chemistry & Biochemistry

**Tone, John L**

PhD in History - Columbia University-NYC

Associate Dean-Academic, School of History, Technology & Society

**Tovey, Craig A**

PhD in Operations Research - Stanford University

Professor, School of Industrial & Systems Engineering

**Traynor, Patrick Gerard**

PhD in Computer Science - Pennsylvania State University

Assistant Professor, School of Computing Science & Systems

**Trebino, Rick P**

PhD in Applied Physics - Stanford University

Professor, School of Physics

**Trotter, William T**

PhD in Mathematics - University of Alabama

School Chair-Academic, School of Mathematics

**Trubiano, Franca**

MA in Architecture - McGill University

Assistant Professor, College of Architecture

**Tsai, Yi-Chang James**

PhD in Civil Engineering - Georgia Institute of Technology

Associate Professor, School of Civil & Environmental Engineering

**Tsiotras, Panagiotis**

PhD in Aerospace Engineering - Purdue University

Professor, Aerospace Engineering

**Tsui, Kwok-Leung**

PhD in Mathematical Statistics - University of Wisconsin-Madison

Professor, School of Industrial & Systems Engineering

**Tsukruk, Vladimir V**

PhD in Polymer Chemistry - National Academy of Science Ukraine

Professor, School of Materials Science & Engineering

**Tummala, Rao R**

PhD in Ceramic Sciences And Engineeri - University of Illinois-Urbana-Champaign

Professor, School of Electrical & Computer Engineering

**Turk, Gregory**

PhD in Computer & Information Science - University of North Carolina-Charlotte

Associate Professor, College of Computing

**Turner, Deborah H**

PhD in Accounting - Georgia State University  
Associate Professor, College of Management

**Ulgado, Francis M**

PhD in Business Management & Admin Se - University of Illinois-Urbana-Champaign  
Associate Professor, College of Management

**Ulrich, Jerry A**

PhD in Choral Conducting - University of Cincinnati  
Associate Professor, College of Architecture

**Ume, Ifeanyi Charles**

PhD in Mechanical Engineering - University of South Carolina  
Professor, School of Mechanical Engineering

**Usselman, Steven W**

PhD in History - University of Delaware  
Associate Professor, School of History, Technology & Society

**Uwaifo, Ruth O**

PhD in Agricultural Economics - University of California-Berkeley  
Assistant Professor, School of Economics

**Uzer, Ahmet Turgay**

PhD in Chemistry - Harvard University  
Regents' Professor, School of Physics

**Van Ittersum, Koert**

PhD in Social Sciences - Wageningen University  
Assistant Professor, College of Management

**Van Rooijen, Willem F. G.**

PhD in Nuclear Physics - Delft University of Technology  
Assistant Professor, School of Mechanical Engineering

**Vande Vate, John**

PhD in Electrical Engineering - Massachusetts Institute of Technology  
Professor, School of Industrial & Systems Engineering

**Vazirani, Vijay V**

PhD in Computer & Information Science - University of California-Berkeley  
Professor, College of Computing

**Vela, Patricio Antonio**

PhD in Engineering - California Institute of Technology  
Assistant Professor, School of Electrical & Computer Engineering

**Vempala, Santosh Srinivas**

PhD in Industrial Administration - Carnegie Mellon University  
Professor, College of Computing

**Vengazhiyil, Roshan J**

PhD in Statistics - University of Michigan-Ann Arbor  
Associate Professor, School of Industrial & Systems Engineering

**Venkateswaran, H**

PhD in Computer & Information Science - University of Washington-Seattle

Associate Professor, College of Computing

**Verhaeghen, Paul Michel Bernard**

PhD in Psychology - Catholic University Louvain

Associate Professor, School of Psychology

**Verriest, Erik I**

PhD in Electrical Engineering - Stanford University

Professor, School of Electrical & Computer Engineering

**Vidakovic, Branislav**

PhD in Statistics - Purdue University

Professor, School of Industrial & Systems Engineering

**Vigoda, Eric Joseph**

PhD in Computer & Information Science - University of California-Berkeley

Associate Professor, College of Computing

**Vito, Raymond P**

PhD in Applied Mechanics - Cornell University

VProv Grad & Undrgrd Studies, Provost & Executive VP Academic Affairs

**Voigt, Nicholas D**

MS in Management - Georgia Institute of Technology

Professor of the Practice, College of Management

**Voit, Eberhard O**

PhD in Biology - University of Koln (Cologne)

Professor, School of Biology

**Volovoi, Vitali**

PhD in Aerospace Engineering - Georgia Institute of Technology

Assistant Professor, Aerospace Engineering

**Voss, Paul L**

PhD in Electrical Engineering - Northwestern University

Assistant Professor, School of Electrical & Computer Engineering

**Vuduc, Richard Wilson**

PhD in Computer Science - University of California-Berkeley

Assistant Professor, School of Computational Science & Engineering

**Walker, Mitchell L.R.**

PhD in Aerospace Engineering - University of Michigan-Ann Arbor

Assistant Professor, Aerospace Engineering

**Walker, Bruce N**

PhD in Psychology - Rice University

Associate Professor, School of Psychology

**Walsh, John P**

PhD in Sociology - Northwestern College



Professor, School of Public Policy

**Wang, Yang**

PhD in Civil Engineering - Stanford University

Assistant Professor, School of Civil & Environmental Engineering

**Wang, Yuhang**

PhD in Earth And Planetary Sciences - Harvard University

Associate Professor, School of Earth & Atmospheric Sciences

**Wang, Dongmei**

PhD in Electrical Engineering - Georgia Institute of Technology

Assistant Professor, School of Biomedical Engineering

**Wang, Qinghai**

PhD in Finance - Ohio State University

Associate Professor, College of Management

**Wang, Qi**

PhD in Media - University of California-Los Angeles

Assistant Professor, School of Literature, Communication & Culture

**Wang, C K Chris**

PhD in Nuclear Engineering - Ohio State University

Professor, School of Mechanical Engineering

**Wang, Fei-Ling**

PhD in Political Science - University of Pennsylvania

Professor, School of International Affairs

**Wang, Youjiang**

PhD in Mechanical Engineering - Massachusetts Institute of Technology

Professor, School of Polymer, Textile & Fiber Engineering

**Wang, Zhong Lin**

PhD in Physics - Arizona State University

Regents' Professor, School of Materials Science & Engineering

**Wardi, Yorai**

PhD in Electrical Engineering - University of California-Berkeley

Professor, School of Electrical & Computer Engineering

**Wartell, Roger M**

PhD in Physics & Astronomy - University of Rochester

Professor, School of Biology

**Weber, Katja**

PhD in Political Science - University of California-Los Angeles

Associate Professor, School of International Affairs

**Weber, Rodney J**

PhD in Mechanical Engineering - University of Minnesota-Twin Cities

Professor, School of Earth & Atmospheric Sciences

**Webster, Peter J**

PhD in Atmospheric Sciences And Meteo - Massachusetts Institute of Technology  
Professor, School of Civil & Environmental Engineering

**Webster, Donald R**

PhD in Mechanical Engineering - University of California-Davis  
Assoc Chair-Academic, School of Civil & Environmental Engineering

**Weinberg, Gil**

ABD in Visual And Performing Arts, Ot - Massachusetts Institute of Technology  
Assistant Professor, College of Architecture

**Weiss, Howard**

PhD in Applied Mathematics - University of Maryland College Park  
Professor, School of Mathematics

**Weissburg, Marc J**

PhD in Ecology - State University of New York-Stony Brook  
Associate Professor, School of Biology

**Weitz, Joshua Stephen**

PhD in Physics - Massachusetts Institute of Technology  
Assistant Professor, School of Biology

**Wepfer, William J**

PhD in Mechanical Engineering - University of Wisconsin-Madison  
School Chair-Academic, School of Mechanical Engineering

**West, Benjamin H**

MS in Public Administration - University of Georgia  
Professor of the Practice, College of Architecture

**Westdickenberg, Maria G**

PhD in Applied Mathematics - New York University  
Assistant Professor, School of Mathematics

**Westdickenberg, Michael**

PhD in Applied Mathematics - University of Bonn  
Assistant Professor, School of Mathematics

**Wheaton, Lewis A**

PhD in Science - University of Maryland College Park  
Assistant Professor, School of Applied Physiology

**Whetten, Robert L**

PhD in Chemical Physics - Cornell University  
Professor, School of Chemistry & Biochemistry

**White, Chelsea C**

PhD in Computer Engineering - University of Michigan-Ann Arbor  
School Chair-Academic, School of Industrial & Systems Engineering

**White, Donald W**

PhD in Structural Engineering - Cornell University  
Professor, School of Civil & Environmental Engineering

**Wiesenfeld, Kurt A**

PhD in Physics - University of California-Berkeley

Professor, School of Physics

**Wilhite, Alan W**

PhD in Aerospace Engineering - North Carolina State University

Professor, Aerospace Engineering

**Wilkinson, Angus P**

PhD in Chemistry - University of Oxford

Professor, School of Chemistry & Biochemistry

**Will, Kenneth M**

PhD in Civil Engineering - University of Texas-Austin

Assoc Chair-Academic, School of Civil & Environmental Engineering

**Williams, Douglas B**

PhD in Electrical Engineering - Rice University

Assoc Chair-Academic, School of Electrical & Computer Engineering

**Williams, Loren D**

PhD in Physical And Theoretical Chemi - Duke University

Professor, School of Chemistry & Biochemistry

**Wills, Linda M**

PhD in Computer And Information Scien - Massachusetts Institute of Technology

Associate Professor, School of Electrical & Computer Engineering

**Wills, Donald Scott**

PhD in Electrical Engineering - Massachusetts Institute of Technology

Professor, School of Electrical & Computer Engineering

**Winders, William P**

PhD in Sociology - Emory University

Assistant Professor, School of History, Technology & Society

**Wine, Paul H**

PhD in Physical And Theoretical Chemi - Florida State University

Professor, School of Chemistry & Biochemistry

**Winegarden, Claudia Rebola**

PhD in Industrial Design - North Carolina State University

Assistant Professor, College of Architecture

**Wolf, Wayne H**

PhD in Electrical Engineering - Stanford University

Professor, School of Electrical & Computer Engineering

**Wong, C P**

PhD in Organic Chemistry - Pennsylvania State University

Regents' Professor, School of Materials Science & Engineering

**Wood, Robert E**

PhD in Comparative Literature - University of Virginia

Associate Professor, School of Literature, Communication & Culture

**Woodall, Brian E**

PhD in Political Science - University of California-Berkeley

Associate Professor, School of International Affairs

**Work, Paul A**

PhD in Ocean Engineering - University of Florida

Assoc Chair-Academic, School of Civil & Environmental Engineering

**Wu, Hongwei**

PhD in Electrical Engineering - University of Southern California

Assistant Professor, School of Electrical & Computer Engineering

**Wu, Chien-Fu Jeff**

PhD in Mathematical Statistics - University of California-Berkeley

Professor, School of Industrial & Systems Engineering

**Wu, Dongjun**

PhD in Operations Management And Supe - University of Pennsylvania

Associate Professor, College of Management

**Xu, Jun**

PhD in Computer & Information Science - Ohio State University

Associate Professor, College of Computing

**Yalamanchili, Sudhakar**

PhD in Electrical Engineering - University of Texas-Austin

Professor, School of Electrical & Computer Engineering

**Yang, Vigor**

PhD in Mechanical Engineering - California Institute of Technology

School Chair-Academic, Aerospace Engineering

**Yang, Jiawen**

PhD in Urban Affairs/Studies - Massachusetts Institute of Technology

Assistant Professor, College of Architecture

**Yang, Perry P J**

PhD in Urban And Regional Planning - National Taiwan University

Associate Professor, College of Architecture

**Yao, Donggang**

PhD in Mechanical Engineering - University of Massachusetts-Boston

Associate Professor, School of Polymer, Textile & Fiber Engineering

**Yaszek, Lisa**

PhD in English Language And Literature - University of Wisconsin-Madison

Associate Professor, School of Literature, Communication & Culture

**Yavari, Arash**

PhD in Applied Mechanics - California Institute of Technology

Assistant Professor, School of Civil & Environmental Engineering

**Yen, Jeannette**

PhD in Oceanography - University of Washington-Seattle

Professor, School of Biology

**Yeung, Pui-Kuen**

PhD in Mechanical Engineering - Cornell University

Professor, Aerospace Engineering

**Yezzi, Anthony Joseph**

PhD in Electrical Engineering - University of Minnesota-Twin Cities

Professor, School of Electrical & Computer Engineering

**Yi, Yingfei**

PhD in Applied Mathematics - University of Southern California

Professor, School of Mathematics

**Yi, Soojin**

PhD in Ecology - University of Chicago

Assistant Professor, School of Biology

**Yiacoumi, Sotira**

PhD in Civil Engineering - Syracuse University

Professor, School of Civil & Environmental Engineering

**Yoda, Minami**

PhD in Aerospace Engineering - Stanford University

Professor, School of Mechanical Engineering

**Yoder, Paul Douglas**

PhD in Electrical Engineering - University of Illinois-Urbana-Champaign

Associate Professor, Georgia Tech Savannah

**Yoganathan, Ajit**

PhD in Chemical Engineering - California Institute of Technology

Assoc Chair-Academic, School of Chemical & Biomolecular Engineering

**You, Li**

PhD in Physics - University of Colorado-Boulder

Professor, School of Physics

**Yu, Xing Xing**

PhD in Applied Mathematics - Vanderbilt University

Professor, School of Mathematics

**Yuan, Ming**

PhD in Statistics - University of Wisconsin-Madison

Assistant Professor, School of Industrial & Systems Engineering

**Yushin, Gleb**

PhD in Materials Science - North Carolina State University-Raleigh

Assistant Professor, School of Materials Science & Engineering

**Zamir, Evan A**

DSC in Bioengineering & Biomedical En - Washington University

Assistant Professor, School of Mechanical Engineering

**Zangwill, Andrew**

PhD in Physics - University of Pennsylvania

Professor, School of Physics

**Zegura, Ellen**

PhD in Computer & Information Science - Washington University

School Chair-Academic, College of Computing

**Zeng, Chongchun**

PhD in Applied Mathematics - Brigham Young University

Associate Professor, School of Mathematics

**Zha, Hongyuan**

PhD in Computer & Information Science - Stanford University

Professor, School of Computing Science & Systems

**Zhang, Z John**

PhD in Chemistry - University of Wisconsin-Madison

Professor, School of Chemistry & Biochemistry

**Zhang, Fumin**

PhD in Electrical Engineering - University of Maryland College Park

Assistant Professor, School of Electrical & Computer Engineering

**Zhang, Han**

PhD in Management Science - University of Texas-Austin

Associate Professor, College of Management

**Zhang, Zhuomin**

PhD in Mechanical Engineering - Massachusetts Institute of Technology

Professor, School of Mechanical Engineering

**Zhang, Ying**

PhD in Systems Engineering - University of California-Berkeley

Assistant Professor, Georgia Tech Savannah

**Zhou, Haomin**

PhD in Applied Mathematics - University of California-Los Angeles

Associate Professor, School of Mathematics

**Zhou, Guotong**

PhD in Electrical Engineering - University of Virginia

Professor, School of Electrical & Computer Engineering

**Zhou, Chen**

PhD in Engineering - Pennsylvania State University

Assoc Chair-Academic, School of Industrial & Systems Engineering

**Zhou, Min**

PhD in Mechanical Engineering - Brown University

Professor, School of Mechanical Engineering

**Zhu, Cheng**

PhD in Engineering Mechanics - Columbia University-NYC

Regents' Professor, School of Biomedical Engineering

**Zhu, Ting**

PhD in Engineering Mechanics - Tsinghua University

Assistant Professor, School of Mechanical Engineering

**Zhu, Ting**

PhD in Mechanical Engineering - Massachusetts Institute of Technology

Assistant Professor, School of Mechanical Engineering

**Zimring, Craig M**

PhD in Architecture - Wellesley College

Professor, College of Architecture

**Zinn, Ben T**

PhD in Aerospace Engineering - Princeton University

Regents' Professor, Aerospace Engineering

**Zureick, Abdulhamid**

PhD in Civil Engineering - University of Illinois-Urbana-Champaign

Professor, School of Civil & Environmental Engineering

## GENERAL INFORMATION FOR FRESHMAN ADMISSION

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Freshmen may only apply 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. Our application is typically made available online by August 15 each year at [www.apply.gatech.edu](http://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 received prior to November 1 to guarantee consideration for the President's Scholarship or by 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](http://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

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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)**

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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](http://www.gatech.edu/president/strategicplan.html).

## **REQUIRED STUDENT COMPUTER OWNERSHIP**

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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 Scholarships and Financial Aid for more information.

## **INTERNATIONAL STUDENTS**

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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](http://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)**

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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](http://www.faset.gatech.edu).

## REGENTS' TESTING PROGRAM

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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 10 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.

Effective Summer Term, 2003, the Board of Regents made several changes regarding the Regents' Test. Additional changes were made in Spring 2007 and Summer 2008.

- The READING portion of the test can be satisfied with:
  - Regents' Test score of at least 61
  - SAT Verbal score of 510 or higher
  - ACT Reading score of 23 or higher
- The ESSAY portion of the test can be satisfied with:
  - Regents' Test score of at least 2
  - SAT II English Writing score of 650 or higher
  - SAT Reasoning, Writing Section score of 560 (effective Spring 2007)
  - SAT Critical Reading score of at least 510 and a SAT Writing score of at least 500 (effective Summer 2008)
  - ACT score of at least 24 on the ACT combined English/Writing exam (effective Summer 2008)
  - ACT score of at least 22 on the ACT combined English/Writing for students who also earned an ACT Reading score of at least 23 (effective summer 2008)
  - AP English Language and Composition score of 3 or higher
  - AP English Literature and Composition 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.

If you are a transfer student and believe you have test scores that would fulfill Regents' Test requirements, you will need to provide a copy of your test scores from the testing agency indicating that it was a national administration. Please bring your scores to room 104 of the Administration Building (Tech Tower) between the hours of 8:00 AM and 4:30 PM Monday through Friday.

## **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.

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## GENERAL INFORMATION FOR READMISSION

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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](http://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.



## **READMISSION IMMUNIZATION REQUIREMENTS**

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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](http://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 10 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.

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- The READING portion of the test can be satisfied with:
  - Regents' Test score of at least 61
  - SAT Verbal score of 510 or higher
  - ACT Reading score of 23 or higher
- The ESSAY portion of the test can be satisfied with:
  - Regents' Test score of at least 2
  - SAT II English Writing score of 650 or higher
  - SAT Reasoning, Writing Section score of 560 (effective Spring 2007)
  - SAT Critical Reading score of at least 510 and a SAT Writing score of at least 500 (effective Summer 2008)
  - ACT score of at least 24 on the ACT combined English/Writing exam (effective Summer 2008)
  - ACT score of at least 22 on the ACT combined English/Writing for students who also earned an ACT Reading score of at least 23 (effective summer 2008)
  - AP English Language and Composition score of 3 or higher
  - AP English Literature and Composition 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.

If you are a transfer student and believe you have test scores that would fulfill Regents' Test requirements, you will need to provide a copy of your test scores from the testing agency indicating that it was a national administration. Please bring your scores to room 104 of the Administration Building (Tech Tower) between the hours of 8:00 AM and 4:30 PM Monday through Friday.

## TRANSFER CREDIT

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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 TRANSFER ADMISSION

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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. The transfer application is online at [www.apply.gatech.edu](http://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 received by February 1 to guarantee consideration for summer or fall semester admission, or 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](http://www.transfer.gatech.edu), call 404.894.4154, or write to:

Office of Undergraduate Admission  
Georgia Institute of Technology  
Atlanta, Georgia 30332-0320

## ACADEMIC ADVISING

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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 (TRANSFER APPLICANTS)**

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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](http://www.gatech.edu/president/strategicplan.html).

## **FASET ORIENTATION (NEW STUDENT ORIENTATION)**

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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](http://www.faset.gatech.edu).

## **INTERNATIONAL STUDENTS**

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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](http://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.



## **REQUIRED STUDENT COMPUTER OWNERSHIP**

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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 Scholarships and Financial Aid for more information.

## REGENTS' TESTING PROGRAM

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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 10 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.

Effective Summer Term, 2003, the Board of Regents made several changes regarding the Regents' Test. Additional changes were made in Spring 2007 and Summer 2008.

- The READING portion of the test can be satisfied with:
  - Regents' Test score of at least 61
  - SAT Verbal score of 510 or higher
  - ACT Reading score of 23 or higher
- The ESSAY portion of the test can be satisfied with:
  - Regents' Test score of at least 2
  - SAT II English Writing score of 650 or higher
  - SAT Reasoning, Writing Section score of 560 (effective Spring 2007)
  - SAT Critical Reading score of at least 510 and a SAT Writing score of at least 500 (effective Summer 2008)
  - ACT score of at least 24 on the ACT combined English/Writing exam (effective Summer 2008)
  - ACT score of at least 22 on the ACT combined English/Writing for students who also earned an ACT Reading score of at least 23 (effective summer 2008)
  - AP English Language and Composition score of 3 or higher
  - AP English Literature and Composition 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.

If you are a transfer student and believe you have test scores that would fulfill Regents' Test requirements, you will need to provide a copy of your test scores from the testing agency indicating that it was a national administration. Please bring your scores to room 104 of the Administration Building (Tech Tower) between the hours of 8:00 AM and 4:30 PM Monday through Friday.

## TRANSFER CREDIT

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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

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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](http://www.gradadmiss.gatech.edu).

Unless otherwise instructed by the major school/college under the "Degree Programs" listing at [www.gradadmiss.gatech.edu](http://www.gradadmiss.gatech.edu), the student must submit the online application and all required supporting documentation (see mailing instructions at [www.gradadmiss.gatech.edu](http://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](http://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.

## ORIENTATION - NEW STUDENTS

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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](http://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](http://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**

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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

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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](http://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.

## **GRADUATE RECORD EXAMINATIONS (GRE)**

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Official GRE general test scores are generally required by all graduate programs with the exception of the MBA, 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](http://www.gre.org).

General information on the GMAT is available from Educational Testing Service, Box 966, Princeton, New Jersey 08540, or [www.gmac.com](http://www.gmac.com). On-campus applicants may pick up GRE information from the Graduate Admissions Office and GMAT information from the College of Management.



## TOEFL FOR INTERNATIONAL STUDENTS

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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](http://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](http://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

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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 33 semester credit hours may receive up to 6 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 33 semester credit hours or more may receive up to 9 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

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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

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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](http://www.coa.gatech.edu)

### GENERAL INFORMATION

With its six academic programs and seven research centers, the College of Architecture is well-equipped to address the designed and built environment across a range of scales: from the “spoon to the city.” The academic programs – Architecture, Building Construction, Industrial Design, Music Technology, City and Regional Planning, and PhD – currently offer undergraduate degrees in the first three; all offer graduate and doctoral degrees.

The original mission of the College, at its establishment as a Department of Architecture in 1908, was to prepare students for the professional practice of architecture. Over the past hundred years, the College has grown in response to changes in the professions and in society. The College is now a multidisciplinary venue for teaching, research, and service that engages multiple dimensions of the designed and built – and lived – environment.

The current undergraduate and graduate programs -- and the degrees they offer -- are described in the following sections. The modifications proposed to the undergraduate curriculum are described below.

All work produced in the College as part of a degree program becomes the property of the College; it may 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 produced without proper coordination with the faculty.

## **COLLEGE OF ARCHITECTURE ACCREDITATION STATEMENT**

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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 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).

# COLLEGE OF ARCHITECTURE

## ARCHITECTURE PROGRAM

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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 Progra](#)

Architecture & City and Regional Planning

Doctor of Philosophy with a Major in Architecture

## BUILDING CONSTRUCTION PROGRAM

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Bachelor of Science in Building Construction

Master of Science in Building Construction and 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

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BS / 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

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Bachelor of Science in Industrial Design

[Additional Options:](#)

International Plan

Master of Industrial Design

Doctor of Philosophy with a Major in Architecture (Concentration: Industrial Design)

## DEPARTMENT OF MUSIC

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Master of Science in Music Technology

## **SUMMER STUDY IN GREECE AND ITALY (AVAILABLE TO ALL MAJORS)**

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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. 12 credit hours are offered, nine of which satisfy Institute undergraduate humanities requirements. The remaining 3 hours are taken as free electives and involve faculty-directed independent study of topics developed during the spring term.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN ARCHITECTURE

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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:

PhD Program Director  
College of Architecture  
Georgia Institute of Technology  
Atlanta, Georgia 30332-0155  
Phone: 404.894.3476  
Web site: [www.coa.gatech.edu/phd/](http://www.coa.gatech.edu/phd/)

## GENERAL INFORMATION

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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

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The Master of Architecture (M Arch) degree offered by the Architecture Program at Georgia Tech is fully accredited by the National Architectural Accrediting Board (NAAB). The current term of accreditation is for years 2008-2014.

In the United States, most state registration boards require a degree from an accredited professional program as a prerequisite for licensure. The National Architectural Accrediting Board (NAAB), which is the sole agency authorized to accredit U.S. professional degree programs in architecture, recognizes three types of degrees: the Bachelor of Architecture, the Master of Architecture, and the Doctor of Architecture. A program may be granted a six-year, three-year, or two-year term of accreditation, depending on the extent of its conformance with established educational standards.

Masters degree programs may consist of a pre-professional undergraduate degree and a professional degree that, when earned sequentially, constitute an accredited professional education. However, the pre-professional degree is not, by itself, recognized as an accredited degree.

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, the Architecture Program offers the four-year Bachelor of Science in Architecture degree plus the two-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.

## **BACHELOR OF SCIENCE IN ARCHITECTURE**

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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/](http://www.coa.gatech.edu/arch/)

**BACHELOR OF SCIENCE IN ARCHITECTURE****2009 - 2010 DEGREE REQUIREMENTS**

## ARCHITECTURE PROGRAM

## Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
ARCH 3011 DESIGN STUDIO III	5
ARCH 3241 FUNDAMENTALS OF STRUCTURES	3
COLLEGE OF ARCHITECTURE ELECTIVE	3
FREE ELECTIVE	3
SOCIAL SCIENCE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
ARCH 3012 DESIGN STUDIO IV	5
ARCH 3231 ENVIRONMENTAL SYSTEMS & DESIGN INTEGRATION I	3
HUMANITIES ELECTIVE	3
VISUAL ARTS/DESIGN-COMPUTING REQUIREMENT (ARCH 4411, ARCH 4414, ARCH 4415, ARCH 4420)	3
FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
ARCH 4011 DESIGN STUDIO V or CLUSTER ELECTIVES	5
COLLEGE OF ARCHITECTURE ELECTIVE	3
FREE ELECTIVES	9
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
ARCH 4012 DESIGN STUDIO VI or CLUSTER ELECTIVES	5

COLLEGE OF ARCHITECTURE ELECTIVE	3
FREE ELECTIVES	6
<b>TOTAL SEMESTER HOURS =</b>	<b>14</b>

**TOTAL PROGRAM HOURS = 129 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

## GRADE REQUIREMENTS

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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 9 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 (BS) and Master of Architecture (M Arch) in the College may apply up to 6 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.

## **ELECTIVES**

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### **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**

12 credit hours of humanities courses are required. The required ENGL 1101 and 1102, and any other 6 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**

12 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 6 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**

12 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 BS 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 4 hours of basic ROTC and a maximum of 6 hours of advanced ROTC. No course covering the same material as other courses may be applied for credit for the BS degree.



## BACHELOR OF SCIENCE IN ARCHITECTURE - INT'L PLAN

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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/](http://www.coa.gatech.edu/arch/international/international.php/)

## UNDERGRADUATE MINORS

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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 [www.catalog.gatech.edu/academics/minorguide.php](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 [www.catalog.gatech.edu/academics/minorguide.php](http://www.catalog.gatech.edu/academics/minorguide.php) and consult with the associate dean for Undergraduate Programs for more details.

## CERTIFICATE PROGRAMS

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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 architecture 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 12 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](http://www.coa.gatech.edu/arch) for more details.

## FOREIGN STUDY PROGRAMS

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Undergraduate students are eligible to participate in two COA-affiliated foreign study programs.

The first 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 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). This program 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)**

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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)**

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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. 12 credit hours are offered, nine of which satisfy Institute undergraduate humanities requirements. The remaining 3 hours are taken as free electives and involve faculty-directed independent study of topics developed during the spring term.

## GRADUATE STUDIES IN ARCHITECTURE

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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 (MS).

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 MS Program is a nonprofessional, research-oriented degree program that requires a minimum of 30 hours of coursework. The Master of Science is administered through the PhD 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

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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

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The College of Architecture's (COA) Master of Science (MS) Program is a non-professional program requiring a minimum of 30 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:

MS Program Advisor  
PhD Office, College of Architecture  
Georgia Institute of Technology  
Atlanta, Georgia 30332-0155

## MASTER OF ARCHITECTURE (M ARCH)

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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)

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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

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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  
PhD Office, College of Architecture  
Georgia Institute of Technology  
Atlanta, Georgia 30332-0155

## **MULTIDISCIPLINARY STUDY**

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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

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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

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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:

PhD Program Director  
College of Architecture  
Georgia Institute of Technology  
Atlanta, Georgia 30332-0155  
Phone: 404.894.3476  
Web site: [www.coa.gatech.edu/phd/](http://www.coa.gatech.edu/phd/)



## GENERAL INFORMATION

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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

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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 Facility Management is recognized by the International Facility Management Association (IFMA), and the Design Build Institute of America (DBIA).

## **BACHELOR OF SCIENCE IN BUILDING CONSTRUCTION**

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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

## 2009 - 2010 DEGREE REQUIREMENTS

### BUILDING CONSTRUCTION

#### Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>18</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>18</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
BC 3630 PROJECT MANAGEMENT I	3
BC 4640 CONSTRUCTION MARKETING	3
BC 4680 PROFESSIONAL INTERNSHIP	3
MGT 3102 MANAGING HUMAN RESOURCES ... OR	3
MGT 3660 INTERNATIONAL BUSINESS	3

BC 4670 CONSTRUCTION INDUSTRY ISSUES	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

**TOTAL PROGRAM HOURS = 129 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

## **ELECTIVES**

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### **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**

12 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 9 hours. The remaining 3 hours are selected by the student from the approved Catalog list of humanities courses.

### **SOCIAL SCIENCES ELECTIVES**

12 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 6 hours. The remaining 6 hours are selected by the student from the approved Catalog list of social sciences courses.

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 36 semester hours:

<b>Courses</b>	<b>Hours</b>
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 36 semester hours:

<b>Courses</b>	<b>Hours</b>
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](http://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

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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

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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:

PhD Program Director  
College of Architecture  
Georgia Institute of Technology  
Atlanta, Georgia 30332-0155  
Phone: 404.894.3476  
Web site: [www.coa.gatech.edu/phd/](http://www.coa.gatech.edu/phd/)

## GENERAL INFORMATION

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Founded in 1952, Georgia Tech's planning program is one of the oldest professional planning programs in the United States, with more than 1,100 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; dual degrees with civil and environmental engineering, architecture, and public policy; a five-year BS/ M CRP 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/](http://www.coa.gatech.edu/crp/)

## **ACCREDITATION**

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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**

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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**

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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**

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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. 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 without substantial previous planning work experience.

The Graduate Record Examination is required for all applicants to the Master of City and Regional Planning Program. A minimum IBT TOEFL score of 100 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 CRP program, contact:

Academic Advisor  
City and Regional Planning Program  
College of Architecture  
Georgia Institute of Technology  
Atlanta, Georgia 30332-0155.

## **BS / M CRP : DEGREE**

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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

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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 CRP/CEE (TRANSPORTATION ENGINEERING)**

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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 CRP / MASTER OF SCIENCE (PUBLIC POLICY)**

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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. The dual-degree is an efficient step towards PhD programs in either City and Regional Planning or Public Policy with an emphasis on Urban Policy. It is also strong preparation for policy analytic positions concerned with city growth and development, economic development, and environmental resources. The dual-degree student receives both degrees in less time than it would take to receive the two degrees sequentially.

## DUAL DEGREE M ARCH/M CRP (URBAN DESIGN)

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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 CRP AND GSU JURIS DOCTOR DEGREE**

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This dual Georgia Tech Master of City and Regional Planning and Georgia State University Juris Doctor degree supports the interests of students who wish to pursue study in the fields of both law and urban planning. Land management law and city and regional planning have become increasingly integrated and interdisciplinary in nature with the result that those holding both Juris Doctor and M CRP degrees are well positioned to influence governmental planning, municipal law, or private law practice.

## **DUAL DEGREE MS ENVE/M CRP (ENVIRONMENTAL ENGINEERING)**

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This dual-degree program with Environmental Engineering (MS EnvE / M CRP) 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 MS CE/M CRP (WATER RESOURCES)**

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This dual-degree program with civil engineering (MS CE/M CRP) 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

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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.

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For further details on the program, contact:

PhD Program Director  
College of Architecture  
Georgia Institute of Technology  
Atlanta, Georgia 30332-0155  
Phone: 404.894.3476  
Web site: [www.coa.gatech.edu/phd/](http://www.coa.gatech.edu/phd/)

## GENERAL INFORMATION

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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. The industrial designer's work touches all of our lives in the form of home products and furnishings, communication devices, healthcare equipment, rehabilitation technologies, 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 people. As such, the industrial designer's central responsibilities include fitting the artifact, system, or service to the person through considering appropriate aesthetics and ergonomics, technical processes, requirements for manufacture, marketing opportunities, and economic constraints. 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.

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/](http://www.coa.gatech.edu/id/)

## **ACCREDITATION**

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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).

## **BACHELOR OF SCIENCE INDUSTRIAL DESIGN**

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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 the University System of Georgia.

Industrial design is the professional practice of creating products that enhance 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 be 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 6 industrial design studios after the first 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****2009 - 2010 DEGREE REQUIREMENTS**

## INDUSTRIAL DESIGN

## Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>19</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
ID 4011 ADVANCED DESIGN I	5
SOCIAL SCIENCE ELECTIVE	3
COA HISTORY ELECTIVE	3
FREE ELECTIVES	5
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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ID 4012 ADVANCED DESIGN II	5
INDUSTRIAL DESIGN ELECTIVE	3
FREE ELECTIVES	5
<b>TOTAL SEMESTER HOURS =</b>	<b>13</b>

**TOTAL PROGRAM HOURS = 129 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

## **GRADE REQUIREMENTS**

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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 9 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**

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### **ELECTIVES**

12 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**

12 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**

12 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 9 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 6 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 9 hours of electives taken on a pass/fail basis may be applied toward fulfilling requirements for the BS ID degree. Nine industrial design elective hours are required.



## **BACHELOR OF SCIENCE INDUSTRIAL DESIGN - INTERNATIONAL PLAN**

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The International Plan offers a challenging academic program that develops global competence within the context of Industrial Design.

The International Plan is a four-year program that builds global competence by requiring students to spend two full terms at an Industrial Design program in another country, to develop a proficiency in a second language, and to take internationally oriented coursework. This experience provides students a deeper global competency than traditional international opportunities. The eight-semester sequence is structured to allow for the Fall and Spring third year semester to be completed at an industrial design program in another country. Students are responsible for locating those courses at the host institution that will serve as equivalents to the courses listed in the curriculum.

Degree requirements are not modified but are satisfied with specialized courses and appropriate choices of elective courses, which includes globally focused courses within the major area and a capstone Senior Studio: Global Awareness. Consult with the Industrial Design Program advisor for the suggested curriculum.

All International Plan participants must develop proficiency in a language other than English. Unless otherwise approved, the language chosen to fulfill this requirement will have a relationship to the country or region in which the student plans to fulfill the 26 week requirement. Any variance will require approval from the IP faculty representative and the IP Committee.

Admission Requirements:

- Applicants must be undergraduate degree-seeking Tech students in one of the participating majors.
- Students must submit an application via the International Plan Web site. Notification of acceptance will be communicated via the student's Georgia Tech e-mail address.
- There is no GPA requirement for first-semester freshmen applying to the International Plan. All other applicants must have at least a 2.5 GPA at the time of application.

## MASTER OF INDUSTRIAL DESIGN (MID)

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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. The industrial designer's work touches all of our lives in the form of home products and furnishings, communication devices, healthcare equipment, rehabilitation technologies, 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 people. As such, the industrial designer's central responsibilities include fitting the artifact, system, or service to the person through considering appropriate aesthetics and ergonomics, technical processes, requirements for manufacture, marketing opportunities, and economic constraints.

At the graduate-level, Georgia Tech's Master's of Industrial Design (MID) focuses on an inclusive design approach that is dedicated to the creation and development of products, systems, services and environments that are usable by all segments of the population. With the growing diversity of the population, inclusive design is becoming increasingly important to designers of tomorrow to ensure that design is responsive to the individual and collective needs of all people.

Capitalizing on Georgia Tech's rich traditions in technology and research, the MID program stresses a user-centered design process and evidence-based design practice that offers students unique opportunities to explore the design of new and existing technologies. Faculty members, who are practicing designers and experts in their fields, maintain active research programs in tangible products within communication technologies, enabling environments, supportive product systems, rehabilitation technologies, and healthcare systems technologies.

The Georgia Tech program offers a well-rounded course of study with early emphasis on exercising design principles and developing project-based design skills. Design projects stress realistic design situations, where students can have the opportunity to be involved in sponsored and/or funded projects. Within this model, the program encourages students to expand individual disciplinary talents and respond to changing opportunities 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.*

Students who have an undergraduate degree in industrial design from an ID program similar to Georgia Tech's can complete a two-year program consisting of 48 graduate credits.

Students who do not have an undergraduate degree in industrial design will need to successfully complete an additional 36 undergraduate industrial design credits, which at a minimum includes one year of undergraduate industrial design studios, Advanced Sketching, History of Industrial Design, Industrial Design Computing I and II, and Professional ID Practices. These classes are the minimum requirements students with a previous degree other than industrial design need before proceeding into the graduate-level studios and coursework. Students with a non-industrial design background will be admitted conditionally.

All graduate students will be reviewed each year for satisfactory progress.

The minimum requirements for the two-year MID degree for a student with a previous degree in industrial design are as follows:

Course Number	Course Name	Credit Hours
ID 6100	GRADUATE STUDIES IN ID	3
ID 6101	HUMAN-CENTERED DESIGN	3
ID 6200	GRADUATE STUDIO I	6
ID 6201	GRADUATE STUDIO II	6
GRADUATE ELECTIVES (ALL ELECTIVES MUST BE APPROVED BY THE ID PGM)		18
ID 7000 (THESIS) or ID 6400 (NON-THESIS)		12
TOTAL MINIMUM REQUIRED CREDIT HOURS		48



## DOCTOR OF PHILOSOPHY WITH A MAJOR IN ARCHITECTURE

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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:

PhD Program Director  
College of Architecture  
Georgia Institute of Technology  
Atlanta, Georgia 30332-0155  
Phone: 404.894.3476  
Web site: [www.coa.gatech.edu/phd/](http://www.coa.gatech.edu/phd/)

analyzing, and solving design problems of human interface with the physical environment.

For further details on the program, contact:

PhD Program Director

College of Architecture

Georgia Institute of Technology

Atlanta, Georgia 30332-0155

Phone: 404.894.3476

Web site: [www.coa.gatech.edu/phd/](http://www.coa.gatech.edu/phd/)

## MASTER'S CERTIFICATE PROGRAM IN DESIGN COMPUTING

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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  
PhD Office, College of Architecture  
Georgia Institute of Technology  
Atlanta, Georgia 30332-0155

## DEPARTMENT OF MUSIC

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Location: Couch Building

Telephone: 404.894.3193

Fax: 404.894.9952

Web site: [www.music.gatech.edu](http://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 6 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**

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**DONALD F. ALLEN**

Assistant Director of Bands

**PARAG CHORDIA, PHD**

Music Technology

**FRANK CLARK, PHD**

Director and Professor of Music

**JASON FREEMAN, DMA**

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, PHD**

Director of Bands and Director of Symphonic Band

**JERRY ULRICH, DMA**

Director of Choral Activities

**GIL WEINBERG, PHD**

Director of Music Technology

## MASTER OF SCIENCE IN MUSIC TECHNOLOGY

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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 48 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 production-oriented 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**

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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**

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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 9 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):**

- 3 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):**

2 hours of elective music courses with MUSI prefix.

## MUSIC DEPARTMENT HUMANITIES CREDIT INFORMATION

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### CORE AREA C:

Music: 2600, 3450, 3500, 3600, 3610, 3620, 4450

Students are permitted to earn 4 hours of humanities credit for participation in ensembles.

### HUMANITIES CREDIT FOR ENSEMBLE PARTICIPATION

Students are permitted to earn 4 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**

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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**

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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**

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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**

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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**

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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**

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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**

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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 3 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**

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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**

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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**

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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**

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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

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**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**

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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/](http://www.music.gatech.edu/).

## COLLEGE OF COMPUTING

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Established in 1990

Location: 801 Atlantic Drive

Telephone: 404.894.3152

Fax: 404.894.9846

Web site: [www.cc.gatech.edu](http://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 MS 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**

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The following undergraduate computing program is accredited by the Computing Accreditation Commission (CAC) of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, Telephone: (410) 347-7700:

- Bachelor of Science in Computer Science

The following undergraduate computing program is not accredited by the Computing Accreditation Commission (CAC) of ABET:

- Bachelor of Science in Computational Media

### **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](http://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](http://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/](http://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](http://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/>

## COLLEGE OF COMPUTING

Bachelor of Science in Computer Science

**Additional Options:**

Cooperative Plan

International Plan

Research Option

### SCHOOL OF COMPUTER SCIENCE

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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

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Bachelor of Science in Computational Media (Interdisciplinary with IAC )

**Additional Options:**

Cooperative Plan

International Plan

Research Option

BS/MS Computational Media & Digital Media - Five-year

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

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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

## **BACHELOR OF SCIENCE IN COMPUTER SCIENCE WITH THREADS**

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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 6 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 BS CS undergraduate program or the College of Computing, please visit [www.cc.gatech.edu](http://www.cc.gatech.edu)



## **THE COMPUTING AND DEVICES THREAD**

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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 BS 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**

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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 BS 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**

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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 BS 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**

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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 BS 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**

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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 BS 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**

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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 BS 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**

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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 BS 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

## THE COMPUTING AND THEORY THREAD

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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 BS 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



**BACHELOR OF SCIENCE IN COMPUTER SCIENCE**  
**THREAD: DEVICES & INFORMATION INTERNETWORKS**  
**2009 - 2010 DEGREE REQUIREMENTS**  
 COLLEGE OF COMPUTING  
 Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
LAB SCIENCE SEQUENCE	4
HUMANITIES ELECTIVE	3
MATH 3012 APPLIED COMBINATORICS	3
CS 2110 COMPUTER ORGANIZATION & PROGRAMMING *	4
LCC 3401 TECHNICAL COMMUNICATION PRACTICES	2
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
LAB SCIENCE SEQUENCE	4
SOCIAL SCIENCE ELECTIVE	3
CS 2200 COMPUTER SYSTEMS & NETWORKS *	4
ECE 2031 DIGITAL DESIGN LAB*	2
FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
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

<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>
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<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>14</b>

**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 Free Elective.

# DEVICES AND INFORMATION INTERNETWORKS

## THREAD PICKS AND ELECTIVE COURSES

### Building Devices \*

- \_\_\_\_\_ CS3651 The Art of Building Intelligent Appliances
- \_\_\_\_\_ ECE4175 Embedded Micro-controller Design

### Devices in the Real World \*

- \_\_\_\_\_ CS3630 Robotics and Perception
- \_\_\_\_\_ CS4261 Mobile Appl & Services for Converged Netwks
- \_\_\_\_\_ CS4605 Mobile and Ubiquitous Computing

### 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

- \_\_\_\_\_ CS4470 Introduction to User Interface Software
- \_\_\_\_\_ CS4605 Mobile and Ubiquitous Computing
- \_\_\_\_\_ CS4685 Pervasive Systems and Networking

### Introduction to Information Management \*

- \_\_\_\_\_ CS4235 Introduction to Information Security
- \_\_\_\_\_ CS4400 Introduction to Database Systems

### Advanced Information Management \*

- \_\_\_\_\_ (Pick 1 of) **Database Systems**<sup>1</sup>
- \_\_\_\_\_ (Pick 1 of) **Enterprise Computing**<sup>2</sup>
- \_\_\_\_\_ (Pick 1 of) **Information Security**<sup>3</sup>
- \_\_\_\_\_ (Pick 1 of) **Network Systems**<sup>4</sup>

### Database Systems<sup>1</sup>

- \_\_\_\_\_ CS4420 Database System Implementation
- \_\_\_\_\_ CS4440 Emerging Database Technologies & Appl
- \_\_\_\_\_ CS4460 Information Visualization

### Enterprise Computing<sup>2</sup>

- \_\_\_\_\_ CS4365 Introduction to Enterprise Computing

### Information Security<sup>3</sup>

- \_\_\_\_\_ CS4237 Computer and Network Security

### Network Systems<sup>4</sup>

- \_\_\_\_\_ CS4251 Computer Networking II
- \_\_\_\_\_ CS4255 Introduction to Network Management
- \_\_\_\_\_ CS4261 Mobile Appl & Services for Converged Netwks
- \_\_\_\_\_ CS4270 Data Communications Laboratory

### Management of Information

- \_\_\_\_\_ MGT4056 Electronic Commerce
- \_\_\_\_\_ MGT4057 Business Process Analysis and Design

\* 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****2009 - 2010 DEGREE REQUIREMENTS**

COLLEGE OF COMPUTING

Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
LAB SCIENCE SEQUENCE	4
HUMANITIES ELECTIVE	3
MATH 3012 APPLIED COMBINATORICS	3
CS 2110 COMPUTER ORGANIZATION & PROGRAMMING *	4
LCC 3401 TECHNICAL COMMUNICATION PRACTICES	2
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
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

<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>
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<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>14</b>

**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 Free Elective.

# DEVICES AND INTELLIGENCE

## THREAD PICKS AND ELECTIVE COURSES

### Building Devices \*

- \_\_\_\_\_ CS3651 The Art of Building Intelligent Appliances
- \_\_\_\_\_ ECE4175 Embedded Micro-controller Design

### Devices in the Real World \*

- \_\_\_\_\_ CS3630 Robotics and Perception
- \_\_\_\_\_ CS4261 Mobile Appl & Services for Converged Netwks
- \_\_\_\_\_ CS4605 Mobile and Ubiquitous Computing

### 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

- \_\_\_\_\_ CS4470 Introduction to User Interface Software
- \_\_\_\_\_ CS4605 Mobile and Ubiquitous Computing
- \_\_\_\_\_ CS4685 Pervasive Systems and Networking

### 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 \*

- \_\_\_\_\_ CS4495 Computer Vision
- \_\_\_\_\_ CS4635 Knowledge-based AI
- \_\_\_\_\_ CS4641 Machine Learning

### Knowledge-Based Intelligence

- \_\_\_\_\_ CS3790 Introduction to Cognitive Science
- \_\_\_\_\_ CS4615 Knowledge-based Modeling & Design
- \_\_\_\_\_ CS4635 Knowledge-based AI
- \_\_\_\_\_ CS4650 Natural Language Understanding

### Data-Driven Intelligence

- \_\_\_\_\_ CS4616 Pattern Recognition
- \_\_\_\_\_ CS4641 Machine Learning
- \_\_\_\_\_ MATH4280 Introduction to Information Theory

### Embodied Intelligent Systems

- \_\_\_\_\_ CS3651 The Art of Building Intelligent Appliances
- \_\_\_\_\_ CS4495 Computer Vision
- \_\_\_\_\_ CS4625 Intelligent and Interactive Systems
- \_\_\_\_\_ CS4632 Advanced Intelligent Robotics
- \_\_\_\_\_ CS4731 Game AI

### Philosophical Issues in Intelligence

- \_\_\_\_\_ CS4752 Philosophical Issues in Computation
- \_\_\_\_\_ CS4793 Perspectives in Cognitive Science

\* 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****2009 - 2010 DEGREE REQUIREMENTS**

COLLEGE OF COMPUTING

Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
LAB SCIENCE SEQUENCE	4
HUMANITIES ELECTIVE	3
MATH 3012 APPLIED COMBINATORICS	3
CS 2110 COMPUTER ORGANIZATION & PROGRAMMING *	4
LCC 3401 TECHNICAL COMMUNICATION PRACTICES	2
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
LAB SCIENCE SEQUENCE	4
SOCIAL SCIENCE ELECTIVE	3
CS 2200 COMPUTER SYSTEMS & NETWORKS *	4
ECE 2031 DIGITAL DESIGN LAB *	2
FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
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

<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>
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<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>14</b>

**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 Free Elective.



# DEVICES AND MEDIA

## THREAD PICKS AND ELECTIVE COURSES

### Building Devices \*

- \_\_\_\_\_ CS3651 The Art of Building Intelligent Appliances
- \_\_\_\_\_ ECE4175 Embedded Micro-controller Design

### Devices in the Real World \*

- \_\_\_\_\_ CS3630 Robotics and Perception
- \_\_\_\_\_ CS4261 Mobile Appl & Services for Converged Netwks
- \_\_\_\_\_ CS4605 Mobile and Ubiquitous Computing

### Algorithm Fundamentals \*

- \_\_\_\_\_ CS3240 Languages and Computation
- \_\_\_\_\_ CS3510 Design and Analysis of Algorithms

### 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

- \_\_\_\_\_ CS4470 Introduction to User Interface Software
- \_\_\_\_\_ CS4605 Mobile and Ubiquitous Computing
- \_\_\_\_\_ CS4685 Pervasive Systems and Networking

### 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

- \_\_\_\_\_ CS4464 Computational Journalism
- \_\_\_\_\_ CS4475 Computational Photography
- \_\_\_\_\_ 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: MODELING - SIMULATION & DEVICES**  
**2009 - 2010 DEGREE REQUIREMENTS**  
 COLLEGE OF COMPUTING  
 Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
LAB SCIENCE SEQUENCE	4
HUMANITIES ELECTIVE	3
MATH 3012 APPLIED COMBINATORICS	3
CS 2110 COMPUTER ORGANIZATION & PROGRAMMING *	4
LCC 3401 TECHNICAL COMMUNICATION PRACTICES	2
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>14</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
MATH/CE/ISYE 3770 STATISTICS AND APPLICATIONS or MATH 3215 PROBABILITY & STATISTICS	3
FREE ELECTIVE	3
MATH 2403 DIFFERENTIAL EQUATIONS *	4
CS 2340 OBJECTS & DESIGN *	3
BUILDING DEVICES - PICK ONE *	4
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
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

<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>
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<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

\*Must earn a C or better in each of these courses.

# DEVICES AND MODELING - SIMULATION

## THREAD PICKS AND ELECTIVE COURSES

### Building Devices \*

- \_\_\_\_\_ CS3651 The Art of Building Intelligent Appliances
- \_\_\_\_\_ ECE4175 Embedded Micro-controller Design

### Devices in the Real World \*

- \_\_\_\_\_ CS3630 Robotics and Perception
- \_\_\_\_\_ CS4261 Mobile Appl & Services for Converged Netwks
- \_\_\_\_\_ CS4605 Mobile and Ubiquitous Computing

### 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

- \_\_\_\_\_ CS4470 Introduction to User Interface Software
- \_\_\_\_\_ CS4605 Mobile and Ubiquitous Computing
- \_\_\_\_\_ CS4685 Pervasive Systems and Networking

### Computational Science and Engineering \*

- \_\_\_\_\_ CS4140 Computational Modeling Algorithms
- \_\_\_\_\_ CS4225 Introduction to High Performance Computing
- \_\_\_\_\_ CS4245 Introduction to Data Mining and Analysis
- \_\_\_\_\_ CS4335 Computer Simulation
- \_\_\_\_\_ CS4642 Numerical Analysis I

### Advanced Computational Methods & Software

- \_\_\_\_\_ CHBE2120 Numerical Methods
- \_\_\_\_\_ CS2335 Software Practicum
- \_\_\_\_\_ 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
- \_\_\_\_\_ CS4343 Simulation and Military Gaming
- \_\_\_\_\_ CS4495 Computer Vision
- \_\_\_\_\_ CS4496 Computer Animation
- \_\_\_\_\_ CS4550 Scientific Data Processing and Visualization
- \_\_\_\_\_ CS4641 Machine Learning
- \_\_\_\_\_ CS4643 Numerical Analysis II
- \_\_\_\_\_ CS4777 Vector and Parallel Scientific Computing
- \_\_\_\_\_ ISYE2028 Basic Statistics Methods
- \_\_\_\_\_ ISYE4331 Honors Optimization
- \_\_\_\_\_ MATH4255 Monte Carlo Methods
- \_\_\_\_\_ ME2016 Computing Techniques

### Aerospace Engineering

- \_\_\_\_\_ AE1350 Introduction to Aerospace Engineering
- \_\_\_\_\_ AE4375 Fundamentals of Computer-Aided Eng & Design
- \_\_\_\_\_ PHYS3266 Computational Physics

### Biology/Chemistry

- \_\_\_\_\_ BIOL2400 Mathematical Models in Biology
- \_\_\_\_\_ BIOL4401 Exp Design & Statistical Methods in Biology
- \_\_\_\_\_ CHBE2100 Chemical Process Principles

### Digital Signal Processing

- \_\_\_\_\_ ECE3025 Electromagnetics
- \_\_\_\_\_ ECE3075 Random Signals
- \_\_\_\_\_ ECE4270 Fundamentals of Digital Signal Processing
- \_\_\_\_\_ ECE4271 Applications of Digital Signal Processing

### Geoscience

- \_\_\_\_\_ EAS3620 Geochemistry
- \_\_\_\_\_ EAS4602 Biochemical Cycles
- \_\_\_\_\_ EAS4610 Earth System Modeling
- \_\_\_\_\_ EAS4630 Physics of the Earth
- \_\_\_\_\_ EAS4655 Atmospheric Dynamics
- \_\_\_\_\_ EAS4803 Water Chemistry Modeling
- \_\_\_\_\_ PHYS3266 Computational Physics

### Modeling & Simulation in Industrial Engineering

- \_\_\_\_\_ ISYE2030 Modeling in Industrial Engineering
- \_\_\_\_\_ ISYE3044 Simulation Analysis and Design
- \_\_\_\_\_ ISYE3133 Engineering Optimization
- \_\_\_\_\_ ISYE3232 Stochastic Manufacturing & Service Sys

\* Required Thread Pick

**BACHELOR OF SCIENCE IN COMPUTER SCIENCE****THREAD: DEVICES & PEOPLE****2009 - 2010 DEGREE REQUIREMENTS**

COLLEGE OF COMPUTING

Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
LAB SCIENCE SEQUENCE	4
HUMANITIES ELECTIVE	3
MATH 3012 APPLIED COMBINATORICS	3
CS 2110 COMPUTER ORGANIZATION & PROGRAMMING *	4
LCC 3401 TECHNICAL COMMUNICATION PRACTICES	2
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
LAB SCIENCE SEQUENCE	4
SOCIAL SCIENCE ELECTIVE	3
CS 2200 COMPUTER SYSTEMS & NETWORKS *	4
ECE 2031 DIGITAL DESIGN LAB *	2
FREE ELECTIVE	1
<b>TOTAL SEMESTER HOURS =</b>	<b>14</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
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

<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>
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<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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
FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

**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 Free Elective.

# DEVICES AND PEOPLE

## THREAD PICKS AND ELECTIVE COURSES

### Building Devices \*

- \_\_\_\_\_ CS3651 The Art of Building Intelligent Appliances
- \_\_\_\_\_ ECE4175 Embedded Micro-controller Design

### Devices in the Real World \*

- \_\_\_\_\_ CS3630 Robotics and Perception
- \_\_\_\_\_ CS4261 Mobile Appl & Services for Converged Netwks
- \_\_\_\_\_ CS4605 Mobile and Ubiquitous Computing

### Algorithm Fundamentals \*

- \_\_\_\_\_ CS3240 Languages and Computation
- \_\_\_\_\_ CS3510 Design and Analysis of Algorithms

### 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

- \_\_\_\_\_ CS4470 Introduction to User Interface Software
- \_\_\_\_\_ CS4605 Mobile and Ubiquitous Computing
- \_\_\_\_\_ CS4685 Pervasive Systems and Networking

### Social/Behavioral Science for Computing \*

- \_\_\_\_\_ PSYC2210 Social Psychology
- \_\_\_\_\_ PSYC2760 Psychology of Human Language
- \_\_\_\_\_ PSYC3040 Sensation and Perception

### Human-Centered Technology \*

- \_\_\_\_\_ CS3750 Human-Computer Interface Design and Eval
- \_\_\_\_\_ CS3790 Introduction to Cognitive Science
- \_\_\_\_\_ 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

- \_\_\_\_\_ CS3750 Human-Computer Interface Design and Eval
- \_\_\_\_\_ CS4472 Design of Online Communities
- \_\_\_\_\_ CS4690 Empirical Methods in HCI
- \_\_\_\_\_ CS4770 Mixed Reality Experience Design
- \_\_\_\_\_ PSYC2020 Psychological Statistics

### 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****2009 - 2010 DEGREE REQUIREMENTS**

COLLEGE OF COMPUTING

Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
LAB SCIENCE SEQUENCE	4
HUMANITIES ELECTIVE	3
MATH 3012 APPLIED COMBINATORICS	3
CS 2110 COMPUTER ORGANIZATION & PROGRAMMING *	4
LCC 3401 TECHNICAL COMMUNICATION PRACTICES	2
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
LAB SCIENCE SEQUENCE	4
SOCIAL SCIENCE ELECTIVE	3
CS 2200 COMPUTER SYSTEMS & NETWORKS *	4
ECE 2031 DIGITAL DESIGN LAB *	2
FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
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



<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>
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<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>14</b>

**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 Free Elective.

# DEVICES AND PLATFORMS

## THREAD PICKS AND ELECTIVE COURSES

### Building Devices \*

- \_\_\_\_\_ CS3651 The Art of Building Intelligent Appliances
- \_\_\_\_\_ ECE4175 Embedded Micro-controller Design

### Devices in the Real World \*

- \_\_\_\_\_ CS3630 Robotics and Perception
- \_\_\_\_\_ CS4261 Mobile Appl & Services for Converged Netwks
- \_\_\_\_\_ CS4605 Mobile and Ubiquitous Computing

### 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

- \_\_\_\_\_ CS4470 Introduction to User Interface Software
- \_\_\_\_\_ CS4605 Mobile and Ubiquitous Computing
- \_\_\_\_\_ CS4685 Pervasive Systems and Networking

### 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
- \_\_\_\_\_ CS4233 Parallel Computer Architecture
- \_\_\_\_\_ CS4290 Advanced Computer Organization
- \_\_\_\_\_ CS4803 Design of Gaming Consoles
- \_\_\_\_\_ CS4803 Scalable Information Systems & Technologies

### Distributed Platforms

- \_\_\_\_\_ CS4210 Advanced Operating Systems
- \_\_\_\_\_ CS4675 Internet Computing Systems
- \_\_\_\_\_ CS4685 Pervasive Systems and Networking
- \_\_\_\_\_ CS4803 Scalable Information Systems & Technologies

### Embedded and Ubiquitous Platforms

- \_\_\_\_\_ CS4220 Programming Embedded Systems
- \_\_\_\_\_ CS4685 Pervasive Systems and Networking
- \_\_\_\_\_ CS4803 Design of Gaming Consoles

### Domain Specific Platforms

- \_\_\_\_\_ CS4220 Programming Embedded Systems
- \_\_\_\_\_ CS4803 Design of Gaming Consoles
- \_\_\_\_\_ CS4803 Scalable Information Systems & Technologies

### Platform Technologies

- \_\_\_\_\_ CS4210 Advanced Operating Systems
- \_\_\_\_\_ CS4220 Programming Embedded Systems
- \_\_\_\_\_ CS4235 Introduction to Information Security
- \_\_\_\_\_ CS4237 Computer and Network Security
- \_\_\_\_\_ CS4560 Verification of Systems

### Software Interfaces, Tools & Technologies

- \_\_\_\_\_ CS4220 Programming Embedded Systems
- \_\_\_\_\_ CS4240 Compilers, Interpreters, & Program Analyzers
- \_\_\_\_\_ CS4392 Programming Language Design
- \_\_\_\_\_ CS6241 Design and Implementation of Compilers
- \_\_\_\_\_ CS6246 Object-oriented Systems and Languages

\* Required Thread Pick

**BACHELOR OF SCIENCE IN COMPUTER SCIENCE****THREAD: DEVICES & THEORY****2009 - 2010 DEGREE REQUIREMENTS**

COLLEGE OF COMPUTING

Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
LAB SCIENCE SEQUENCE	4
SOCIAL SCIENCE ELECTIVE	3
CS 2200 COMPUTER SYSTEMS & NETWORKS *	4
ECE 2031 DIGITAL DESIGN LAB *	2
FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
PROBABILITY & STATISTICS OPTION (See Note 1)	3
FREE ELECTIVE (See Note 1)	3
CS 2340 OBJECTS & DESIGN *	3
BUILDING DEVICES - PICK ONE *	4
CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * or CS 3511 DESIGN AND ANALYSIS OF ALGORITHMS, HONORS *	3
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
CS SR PROJECT (4980 or 4911) *	3
CS 3251 COMPUTER NETWORKING I *	3
CS 4540 ADVANCED ALGORITHMS *	3
DEVICES IN THE REAL WORLD - PICK ONE *	3

FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>13</b>

**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 Free Elective.

# DEVICES AND THEORY

## THREAD PICKS AND ELECTIVE COURSES

### Building Devices \*

- \_\_\_\_\_ CS3651 The Art of Building Intelligent Appliances
- \_\_\_\_\_ ECE4175 Embedded Micro-controller Design

### Devices in the Real World \*

- \_\_\_\_\_ CS3630 Robotics and Perception
- \_\_\_\_\_ CS4261 Mobile Appl & Services for Converged Netwks
- \_\_\_\_\_ CS4605 Mobile and Ubiquitous Computing

### 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

- \_\_\_\_\_ CS4470 Introduction to User Interface Software
- \_\_\_\_\_ CS4605 Mobile and Ubiquitous Computing
- \_\_\_\_\_ CS4685 Pervasive Systems and Networking

### 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

- \_\_\_\_\_ CS3210 Design of Operating Systems
- \_\_\_\_\_ CS3451 Computer Graphics
- \_\_\_\_\_ CS3600 Introduction to Artificial Intelligence
- \_\_\_\_\_ CS4140 Computational Modeling Algorithms
- \_\_\_\_\_ CS4235 Introduction to Information Security
- \_\_\_\_\_ CS4335 Computer Simulation
- \_\_\_\_\_ CS4400 Introduction to Database Systems
- \_\_\_\_\_ CS4496 Computer Animation
- \_\_\_\_\_ CS4641 Machine Learning

### Topics in Algorithms and Complexity

- \_\_\_\_\_ CS3240 Languages and Computation
- \_\_\_\_\_ CS4510 Automata and Complexity Theory
- \_\_\_\_\_ CS4520 Approximation Algorithms
- \_\_\_\_\_ CS4530 Randomized Algorithms
- \_\_\_\_\_ CS6520 Computational Complexity

### Mathematics with CS Applications

- \_\_\_\_\_ MATH2406 Abstract Vector Spaces
- \_\_\_\_\_ MATH3770 Statistics and Applications
- \_\_\_\_\_ MATH4012 Algebraic Structures for Coding Theory
- \_\_\_\_\_ MATH4107 Abstract Algebra I
- \_\_\_\_\_ MATH4150 Intro to Number Theory & Cryptography
- \_\_\_\_\_ MATH4255 Monte Carlo Methods
- \_\_\_\_\_ MATH4280 Introduction to Information Theory
- \_\_\_\_\_ MATH4305 Topics in Linear Algebra
- \_\_\_\_\_ MATH4580 Linear Programming
- \_\_\_\_\_ MATH4640/CS4642 Numerical Analysis I
- \_\_\_\_\_ MATH4782 Quantum Info & Quantum Computation

### Computational Methods in the Sciences

- \_\_\_\_\_ BIOL2400 Mathematical Models in Biology
- \_\_\_\_\_ BIOL4755 Mathematical Biology
- \_\_\_\_\_ ECON3110 Advanced Microeconomic Analysis
- \_\_\_\_\_ ECON3120 Advanced Macroeconomic Analysis
- \_\_\_\_\_ ISYE3133 Optimization
- \_\_\_\_\_ MGT3076 Investments
- \_\_\_\_\_ MGT3078 Finance and Investments
- \_\_\_\_\_ MGT3084 Derivative Securities
- \_\_\_\_\_ PHYS3151 Mathematical Physics
- \_\_\_\_\_ PHYS3266 Computational Physics

\* Required Thread Pick

**BACHELOR OF SCIENCE IN COMPUTER SCIENCE  
 THREAD: INFORMATION NETWORKS & INTELLIGENCE**

**2009 - 2010 DEGREE REQUIREMENTS**

COLLEGE OF COMPUTING

Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
LAB SCIENCE SEQUENCE	4
HUMANITIES ELECTIVE	3
MATH 3012 APPLIED COMBINATORICS	3
CS 2110 COMPUTER ORGANIZATION & PROGRAMMING *	4
LCC 3401 TECHNICAL COMMUNICATION PRACTICES	2
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
LAB SCIENCE SEQUENCE	4
SOCIAL SCIENCE ELECTIVE	3
CS 3600 INTRODUCTION TO ARTIFICIAL INTELLIGENCE *	3
CS 2200 COMPUTER SYSTEMS & NETWORKS *	4
FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
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

<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>
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<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>14</b>

**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 Free Elective.

# INFORMATION INTERNETWORKS AND INTELLIGENCE

## THREAD PICKS AND ELECTIVE COURSES

### Introduction to Information Management \*

- \_\_\_\_\_ CS3251 Computer Networking I
- \_\_\_\_\_ CS4235 Introduction to Information Security
- \_\_\_\_\_ CS4400 Introduction to Database Systems

### Advanced Information Management \*

- \_\_\_\_\_ (Pick 1 of) **Database Systems**<sup>1</sup>
- \_\_\_\_\_ (Pick 1 of) **Enterprise Computing**<sup>2</sup>
- \_\_\_\_\_ (Pick 1 of) **Information Security**<sup>3</sup>
- \_\_\_\_\_ (Pick 1 of) **Network Systems**<sup>4</sup>

### Database Systems<sup>1</sup>

- \_\_\_\_\_ CS4420 Database System Implementation
- \_\_\_\_\_ CS4440 Emerging Database Technologies & Appl
- \_\_\_\_\_ CS4460 Information Visualization

### Enterprise Computing<sup>2</sup>

- \_\_\_\_\_ CS4365 Introduction to Enterprise Computing

### Information Security<sup>3</sup>

- \_\_\_\_\_ CS4237 Computer and Network Security

### Network Systems<sup>4</sup>

- \_\_\_\_\_ CS4251 Computer Networking II
- \_\_\_\_\_ CS4255 Introduction to Network Management
- \_\_\_\_\_ CS4261 Mobile Appl & Services for Converged Netwks
- \_\_\_\_\_ CS4270 Data Communications Laboratory

### Management of Information

- \_\_\_\_\_ MGT4056 Electronic Commerce
- \_\_\_\_\_ MGT4057 Business Process Analysis and Design

### 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 \*

- \_\_\_\_\_ CS4495 Computer Vision
- \_\_\_\_\_ CS4635 Knowledge-based AI
- \_\_\_\_\_ CS4641 Machine Learning

### Knowledge-Based Intelligence

- \_\_\_\_\_ CS3790 Introduction to Cognitive Science
- \_\_\_\_\_ CS4615 Knowledge-based Modeling & Design
- \_\_\_\_\_ CS4635 Knowledge-based AI
- \_\_\_\_\_ CS4650 Natural Language Understanding

### Data-Driven Intelligence

- \_\_\_\_\_ CS4616 Pattern Recognition
- \_\_\_\_\_ CS4641 Machine Learning
- \_\_\_\_\_ MATH4280 Introduction to Information Theory

### Embodied Intelligent Systems

- \_\_\_\_\_ CS3651 The Art of Building Intelligent Appliances
- \_\_\_\_\_ CS4495 Computer Vision
- \_\_\_\_\_ CS4625 Intelligent and Interactive Systems
- \_\_\_\_\_ CS4632 Advanced Intelligent Robotics
- \_\_\_\_\_ CS4731 Game AI

### Philosophical Issues in Intelligence

- \_\_\_\_\_ CS4752 Philosophical Issues in Computation
- \_\_\_\_\_ CS4793 Perspectives in Cognitive Science

\* Required Thread Pick



**BACHELOR OF SCIENCE IN COMPUTER SCIENCE**  
**THREAD: INFORMATION NETWORKS & MEDIA**  
**2009 - 2010 DEGREE REQUIREMENTS**  
 COLLEGE OF COMPUTING  
 Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
LAB SCIENCE SEQUENCE	4
HUMANITIES ELECTIVE	3
MATH 3012 APPLIED COMBINATORICS	3
CS 2110 COMPUTER ORGANIZATION & PROGRAMMING *	4
LCC 3401 TECHNICAL COMMUNICATION PRACTICES	2
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
LAB SCIENCE SEQUENCE	4
SOCIAL SCIENCE ELECTIVE	3
CS 2340 OBJECTS & DESIGN *	3
CS 2200 COMPUTER SYSTEMS & NETWORKS *	4
FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
PROBABILITY & STATISTICS OPTION (See Note 1)	3
FREE ELECTIVE (See Note 1)	3
CS 3451 COMPUTER GRAPHICS *	3
INFORMATION MANAGEMENT - PICK ONE *	3
FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
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

<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>
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<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>14</b>

**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 Free Elective.

# INFORMATION INTERNETWORKS AND MEDIA

## THREAD PICKS AND ELECTIVE COURSES

### Introduction to Information Management \*

- \_\_\_\_\_ CS3251 Computer Networking I
- \_\_\_\_\_ CS4235 Introduction to Information Security
- \_\_\_\_\_ CS4400 Introduction to Database Systems

### Advanced Information Management \*

- \_\_\_\_\_ (Pick 1 of) **Database Systems**<sup>1</sup>
- \_\_\_\_\_ (Pick 1 of) **Enterprise Computing**<sup>2</sup>
- \_\_\_\_\_ (Pick 1 of) **Information Security**<sup>3</sup>
- \_\_\_\_\_ (Pick 1 of) **Network Systems**<sup>4</sup>

### Database Systems<sup>1</sup>

- \_\_\_\_\_ CS4420 Database System Implementation
- \_\_\_\_\_ CS4440 Emerging Database Technologies & Appl
- \_\_\_\_\_ CS4460 Information Visualization

### Enterprise Computing<sup>2</sup>

- \_\_\_\_\_ CS4365 Introduction to Enterprise Computing

### Information Security<sup>3</sup>

- \_\_\_\_\_ CS4237 Computer and Network Security

### Network Systems<sup>4</sup>

- \_\_\_\_\_ CS4251 Computer Networking II
- \_\_\_\_\_ CS4255 Introduction to Network Management
- \_\_\_\_\_ CS4261 Mobile Appl & Services for Converged Netwks
- \_\_\_\_\_ CS4270 Data Communications Laboratory

### Management of Information

- \_\_\_\_\_ MGT4056 Electronic Commerce
- \_\_\_\_\_ MGT4057 Business Process Analysis and Design

### 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

- \_\_\_\_\_ CS4464 Computational Journalism
- \_\_\_\_\_ CS4475 Computational Photography
- \_\_\_\_\_ 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: MODELING - SIMULATION & INFORMATION INTERNETWORKS**  
**2009 - 2010 DEGREE REQUIREMENTS**  
 COLLEGE OF COMPUTING  
 Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
LAB SCIENCE SEQUENCE	4
SOCIAL SCIENCE ELECTIVE	3
CS 2200 COMPUTER SYSTEMS & NETWORKS *	4
INTRODUCTION TO INFORMATION MANAGEMENT - PICK ONE *	3
<b>TOTAL SEMESTER HOURS =</b>	<b>14</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
CS SR PROJECT (4980 or 4911) *	3
COMPUTATIONAL SCIENCE & ENGINEERING - PICK ONE *	3
ADVANCED INFORMATION MANAGEMENT - PICK ONE *	3
FREE ELECTIVE	6
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

\*Must earn a C or better in each of these courses.

# INFORMATION INTERNETWORKS AND MODELING-SIMULATION

## THREAD PICKS AND ELECTIVE COURSES

### Introduction to Information Management \*

- \_\_\_\_\_ CS3251 Computer Networking I
- \_\_\_\_\_ CS4235 Introduction to Information Security
- \_\_\_\_\_ CS4400 Introduction to Database Systems

### Advanced Information Management \*

- \_\_\_\_\_ (Pick 1 of) **Database Systems**<sup>1</sup>
- \_\_\_\_\_ (Pick 1 of) **Enterprise Computing**<sup>2</sup>
- \_\_\_\_\_ (Pick 1 of) **Information Security**<sup>3</sup>
- \_\_\_\_\_ (Pick 1 of) **Network Systems**<sup>4</sup>

### Database Systems<sup>1</sup>

- \_\_\_\_\_ CS4420 Database System Implementation
- \_\_\_\_\_ CS4440 Emerging Database Technologies & Appl
- \_\_\_\_\_ CS4460 Information Visualization

### Enterprise Computing<sup>2</sup>

- \_\_\_\_\_ CS4365 Introduction to Enterprise Computing

### Information Security<sup>3</sup>

- \_\_\_\_\_ CS4237 Computer and Network Security

### Network Systems<sup>4</sup>

- \_\_\_\_\_ CS4251 Computer Networking II
- \_\_\_\_\_ CS4255 Introduction to Network Management
- \_\_\_\_\_ CS4261 Mobile Appl & Services for Converged Netwks
- \_\_\_\_\_ CS4270 Data Communications Laboratory

### Management of Information

- \_\_\_\_\_ MGT4056 Electronic Commerce
- \_\_\_\_\_ MGT4057 Business Process Analysis and Design

### Computational Science and Engineering \*

- \_\_\_\_\_ CS4140 Computational Modeling Algorithms
- \_\_\_\_\_ CS4225 Introduction to High Performance Computing
- \_\_\_\_\_ CS4245 Introduction to Data Mining and Analysis
- \_\_\_\_\_ CS4335 Computer Simulation
- \_\_\_\_\_ CS4642 Numerical Analysis I

### Advanced Computational Methods & Software

- \_\_\_\_\_ CHBE2120 Numerical Methods
- \_\_\_\_\_ CS2335 Software Practicum
- \_\_\_\_\_ 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
- \_\_\_\_\_ CS4343 Simulation and Military Gaming
- \_\_\_\_\_ CS4495 Computer Vision
- \_\_\_\_\_ CS4496 Computer Animation
- \_\_\_\_\_ CS4550 Scientific Data Processing and Visualization
- \_\_\_\_\_ CS4641 Machine Learning
- \_\_\_\_\_ CS4643 Numerical Analysis II
- \_\_\_\_\_ CS4777 Vector and Parallel Scientific Computing
- \_\_\_\_\_ ISYE2028 Basic Statistics Methods
- \_\_\_\_\_ ISYE4331 Honors Optimization
- \_\_\_\_\_ MATH4255 Monte Carlo Methods
- \_\_\_\_\_ ME2016 Computing Techniques

### Aerospace Engineering

- \_\_\_\_\_ AE1350 Introduction to Aerospace Engineering
- \_\_\_\_\_ AE4375 Fundamentals of Computer-Aided Eng & Design
- \_\_\_\_\_ PHYS3266 Computational Physics

### Biology/Chemistry

- \_\_\_\_\_ BIOL2400 Mathematical Models in Biology
- \_\_\_\_\_ BIOL4401 Exp Design & Statistical Methods in Biology
- \_\_\_\_\_ CHBE2100 Chemical Process Principles

### Digital Signal Processing

- \_\_\_\_\_ ECE3025 Electromagnetics
- \_\_\_\_\_ ECE3075 Random Signals
- \_\_\_\_\_ ECE4270 Fundamentals of Digital Signal Processing
- \_\_\_\_\_ ECE4271 Applications of Digital Signal Processing

### Geoscience

- \_\_\_\_\_ EAS3620 Geochemistry
- \_\_\_\_\_ EAS4602 Biochemical Cycles
- \_\_\_\_\_ EAS4610 Earth System Modeling
- \_\_\_\_\_ EAS4630 Physics of the Earth
- \_\_\_\_\_ EAS4655 Atmospheric Dynamics
- \_\_\_\_\_ EAS4803 Water Chemistry Modeling
- \_\_\_\_\_ PHYS3266 Computational Physics

### Modeling & Simulation in Industrial Engineering

- \_\_\_\_\_ ISYE2030 Modeling in Industrial Engineering
- \_\_\_\_\_ ISYE3044 Simulation Analysis and Design
- \_\_\_\_\_ ISYE3133 Engineering Optimization
- \_\_\_\_\_ ISYE3232 Stochastic Manufacturing & Service Sys

\* Required Thread Pick

**BACHELOR OF SCIENCE IN COMPUTER SCIENCE**  
**THREAD: INFORMATION INTERNETWORKS & PEOPLE**  
**2009 - 2010 DEGREE REQUIREMENTS**  
 COLLEGE OF COMPUTING  
 Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
LAB SCIENCE SEQUENCE	4
HUMANITIES ELECTIVE	3
MATH 3012 APPLIED COMBINATORICS	3
CS 2110 COMPUTER ORGANIZATION & PROGRAMMING *	4
LCC 3401 TECHNICAL COMMUNICATION PRACTICES	2
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
LAB SCIENCE SEQUENCE	4
SOCIAL SCIENCE ELECTIVE	3
CS 2200 COMPUTER SYSTEMS & NETWORKS *	4
PSYC 2015 RESEARCH METHODS *	4
FREE ELECTIVE	1
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
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

<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>
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<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

**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 Free Elective.



# INFORMATION INTERNETWORKS AND PEOPLE

## THREAD PICKS AND ELECTIVE COURSES

### Introduction to Information Management \*

- \_\_\_\_\_ CS3251 Computer Networking I
- \_\_\_\_\_ CS4235 Introduction to Information Security
- \_\_\_\_\_ CS4400 Introduction to Database Systems

### Advanced Information Management \*

- \_\_\_\_\_ (Pick 1 of) **Database Systems**<sup>1</sup>
- \_\_\_\_\_ (Pick 1 of) **Enterprise Computing**<sup>2</sup>
- \_\_\_\_\_ (Pick 1 of) **Information Security**<sup>3</sup>
- \_\_\_\_\_ (Pick 1 of) **Network Systems**<sup>4</sup>

### Database Systems<sup>1</sup>

- \_\_\_\_\_ CS4420 Database System Implementation
- \_\_\_\_\_ CS4440 Emerging Database Technologies & Appl
- \_\_\_\_\_ CS4460 Information Visualization

### Enterprise Computing<sup>2</sup>

- \_\_\_\_\_ CS4365 Introduction to Enterprise Computing

### Information Security<sup>3</sup>

- \_\_\_\_\_ CS4237 Computer and Network Security

### Network Systems<sup>4</sup>

- \_\_\_\_\_ CS4251 Computer Networking II
- \_\_\_\_\_ CS4255 Introduction to Network Management
- \_\_\_\_\_ CS4261 Mobile Appl & Services for Converged Netwks
- \_\_\_\_\_ CS4270 Data Communications Laboratory

### Management of Information

- \_\_\_\_\_ MGT4056 Electronic Commerce
- \_\_\_\_\_ MGT4057 Business Process Analysis and Design

### Social/Behavioral Science for Computing \*

- \_\_\_\_\_ PSYC2210 Social Psychology
- \_\_\_\_\_ PSYC2760 Psychology of Human Language
- \_\_\_\_\_ PSYC3040 Sensation and Perception

### Human-Centered Technology \*

- \_\_\_\_\_ CS3750 Human-Computer Interface Design and Eval
- \_\_\_\_\_ CS3790 Introduction to Cognitive Science
- \_\_\_\_\_ 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

- \_\_\_\_\_ CS3750 Human-Computer Interface Design and Eval
- \_\_\_\_\_ CS4472 Design of Online Communities
- \_\_\_\_\_ CS4690 Empirical Methods in HCI
- \_\_\_\_\_ CS4770 Mixed Reality Experience Design
- \_\_\_\_\_ PSYC2020 Psychological Statistics

### 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**

**2009 - 2010 DEGREE REQUIREMENTS**

COLLEGE OF COMPUTING

Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
LAB SCIENCE SEQUENCE	4
HUMANITIES ELECTIVE	3
MATH 3012 APPLIED COMBINATORICS	3
CS 2110 COMPUTER ORGANIZATION & PROGRAMMING *	4
LCC 3401 TECHNICAL COMMUNICATION PRACTICES	2
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
LAB SCIENCE SEQUENCE	4
SOCIAL SCIENCE ELECTIVE	3
CS 2340 OBJECTS & DESIGN *	3
CS 2200 COMPUTER SYSTEMS & NETWORKS *	4
FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
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

<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>
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<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY *	3
CS 3510 DESIGN & ANALYSIS OF ALGORITHMS *	3
PLATFORM INTERFACES - PICK ONE *	3
FREE ELECTIVE	3
FREE ELECTIVE	2
<b>TOTAL SEMESTER HOURS =</b>	<b>14</b>

**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 Free Elective.

# INFORMATION INTERNETWORKS AND PLATFORMS

## THREAD PICKS AND ELECTIVE COURSES

### Introduction to Information Management \*

- \_\_\_\_\_ CS3251 Computer Networking I
- \_\_\_\_\_ CS4235 Introduction to Information Security
- \_\_\_\_\_ CS4400 Introduction to Database Systems

### Advanced Information Management \*

- \_\_\_\_\_ (Pick 1 of) **Database Systems**<sup>1</sup>
- \_\_\_\_\_ (Pick 1 of) **Enterprise Computing**<sup>2</sup>
- \_\_\_\_\_ (Pick 1 of) **Information Security**<sup>3</sup>
- \_\_\_\_\_ (Pick 1 of) **Network Systems**<sup>4</sup>

### Database Systems<sup>1</sup>

- \_\_\_\_\_ CS4420 Database System Implementation
- \_\_\_\_\_ CS4440 Emerging Database Technologies & Appl
- \_\_\_\_\_ CS4460 Information Visualization

### Enterprise Computing<sup>2</sup>

- \_\_\_\_\_ CS4365 Introduction to Enterprise Computing

### Information Security<sup>3</sup>

- \_\_\_\_\_ CS4237 Computer and Network Security

### Network Systems<sup>4</sup>

- \_\_\_\_\_ CS4251 Computer Networking II
- \_\_\_\_\_ CS4255 Introduction to Network Management
- \_\_\_\_\_ CS4261 Mobile Appl & Services for Converged Netwks
- \_\_\_\_\_ CS4270 Data Communications Laboratory

### Management of Information

- \_\_\_\_\_ MGT4056 Electronic Commerce
- \_\_\_\_\_ MGT4057 Business Process Analysis and Design

### 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
- \_\_\_\_\_ CS4233 Parallel Computer Architecture
- \_\_\_\_\_ CS4290 Advanced Computer Organization
- \_\_\_\_\_ CS4803 Design of Gaming Consoles
- \_\_\_\_\_ CS4803 Scalable Information Systems & Technologies

### Distributed Platforms

- \_\_\_\_\_ CS4210 Advanced Operating Systems
- \_\_\_\_\_ CS4675 Internet Computing Systems
- \_\_\_\_\_ CS4685 Pervasive Systems and Networking
- \_\_\_\_\_ CS4803 Scalable Information Systems & Technologies

### Embedded and Ubiquitous Platforms

- \_\_\_\_\_ CS4220 Programming Embedded Systems
- \_\_\_\_\_ CS4685 Pervasive Systems and Networking
- \_\_\_\_\_ CS4803 Design of Gaming Consoles

### Domain Specific Platforms

- \_\_\_\_\_ CS4220 Programming Embedded Systems
- \_\_\_\_\_ CS4803 Design of Gaming Consoles
- \_\_\_\_\_ CS4803 Scalable Information Systems & Technologies

### Platform Technologies

- \_\_\_\_\_ CS4210 Advanced Operating Systems
- \_\_\_\_\_ CS4220 Programming Embedded Systems
- \_\_\_\_\_ CS4235 Introduction to Information Security
- \_\_\_\_\_ CS4237 Computer and Network Security
- \_\_\_\_\_ CS4560 Verification of Systems

### Software Interfaces, Tools & Technologies

- \_\_\_\_\_ CS4220 Programming Embedded Systems
- \_\_\_\_\_ CS4240 Compilers, Interpreters, & Program Analyzers
- \_\_\_\_\_ CS4392 Programming Language Design
- \_\_\_\_\_ CS6241 Design and Implementation of Compilers
- \_\_\_\_\_ CS6246 Object-oriented Systems and Languages

\* 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: THEORY & INFORMATION INTERNETWORKS**  
**2009 - 2010 DEGREE REQUIREMENTS**

COLLEGE OF COMPUTING  
Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
LAB SCIENCE SEQUENCE	4
SOCIAL SCIENCE ELECTIVE	3
CS 2200 COMPUTER SYSTEMS & NETWORKS *	4
CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * or CS 3511 Design and Analysis of Algorithms, Honors *	3
FREE ELECTIVE	1
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
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
FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
CS SR PROJECT (4980 or 4911) *	3
INTRODUCTION TO INFORMATION MANAGEMENT - PICK ONE *	3
ADVANCED INFORMATION MANAGEMENT - PICK ONE *	3
CS 4540 ADVANCED ALGORITHMS *	3

FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

**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 Free Elective.

# INFORMATION INTERNETWORKS AND THEORY

## THREAD PICKS AND ELECTIVE COURSES

### Introduction to Information Management \*

- \_\_\_\_\_ CS3251 Computer Networking I
- \_\_\_\_\_ CS4235 Introduction to Information Security
- \_\_\_\_\_ CS4400 Introduction to Database Systems

### Advanced Information Management \*

- \_\_\_\_\_ (Pick 1 of) **Database Systems**<sup>1</sup>
- \_\_\_\_\_ (Pick 1 of) **Enterprise Computing**<sup>2</sup>
- \_\_\_\_\_ (Pick 1 of) **Information Security**<sup>3</sup>
- \_\_\_\_\_ (Pick 1 of) **Network Systems**<sup>4</sup>

### Database Systems<sup>1</sup>

- \_\_\_\_\_ CS4420 Database System Implementation
- \_\_\_\_\_ CS4440 Emerging Database Technologies & Appl
- \_\_\_\_\_ CS4460 Information Visualization

### Enterprise Computing<sup>2</sup>

- \_\_\_\_\_ CS4365 Introduction to Enterprise Computing

### Information Security<sup>3</sup>

- \_\_\_\_\_ CS4237 Computer and Network Security

### Network Systems<sup>4</sup>

- \_\_\_\_\_ CS4251 Computer Networking II
- \_\_\_\_\_ CS4255 Introduction to Network Management
- \_\_\_\_\_ CS4261 Mobile Appl & Services for Converged Netwks
- \_\_\_\_\_ CS4270 Data Communications Laboratory

### Management of Information

- \_\_\_\_\_ MGT4056 Electronic Commerce
- \_\_\_\_\_ MGT4057 Business Process Analysis and Design

### 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

- \_\_\_\_\_ CS3210 Design of Operating Systems
- \_\_\_\_\_ CS3251 Computer Networking I
- \_\_\_\_\_ CS3451 Computer Graphics
- \_\_\_\_\_ CS3600 Introduction to Artificial Intelligence
- \_\_\_\_\_ CS4140 Computational Modeling Algorithms
- \_\_\_\_\_ CS4235 Introduction to Information Security
- \_\_\_\_\_ CS4335 Computer Simulation
- \_\_\_\_\_ CS4400 Introduction to Database Systems
- \_\_\_\_\_ CS4496 Computer Animation
- \_\_\_\_\_ CS4641 Machine Learning

### Topics in Algorithms and Complexity

- \_\_\_\_\_ CS3240 Languages and Computation
- \_\_\_\_\_ CS4510 Automata and Complexity Theory
- \_\_\_\_\_ CS4520 Approximation Algorithms
- \_\_\_\_\_ CS4530 Randomized Algorithms
- \_\_\_\_\_ CS6520 Computational Complexity

### Mathematics with CS Applications

- \_\_\_\_\_ MATH2406 Abstract Vector Spaces
- \_\_\_\_\_ MATH3770 Statistics and Applications
- \_\_\_\_\_ MATH4012 Algebraic Structures for Coding Theory
- \_\_\_\_\_ MATH4107 Abstract Algebra I
- \_\_\_\_\_ MATH4150 Intro to Number Theory & Cryptography
- \_\_\_\_\_ MATH4255 Monte Carlo Methods
- \_\_\_\_\_ MATH4280 Introduction to Information Theory
- \_\_\_\_\_ MATH4305 Topics in Linear Algebra
- \_\_\_\_\_ MATH4580 Linear Programming
- \_\_\_\_\_ MATH4640/CS4642 Numerical Analysis I
- \_\_\_\_\_ MATH4782 Quantum Info & Quantum Computation

### Computational Methods in the Sciences

- \_\_\_\_\_ BIOL2400 Mathematical Models in Biology
- \_\_\_\_\_ BIOL4755 Mathematical Biology
- \_\_\_\_\_ ECON3110 Advanced Microeconomic Analysis
- \_\_\_\_\_ ECON3120 Advanced Macroeconomic Analysis
- \_\_\_\_\_ ISYE3133 Optimization
- \_\_\_\_\_ MGT3076 Investments
- \_\_\_\_\_ MGT3078 Finance and Investments
- \_\_\_\_\_ MGT3084 Derivative Securities
- \_\_\_\_\_ PHYS3151 Mathematical Physics
- \_\_\_\_\_ PHYS3266 Computational Physics

\* Required Thread Pick

**BACHELOR OF SCIENCE IN COMPUTER SCIENCE****THREAD: INTELLIGENCE & MEDIA****2009 - 2010 DEGREE REQUIREMENTS**

COLLEGE OF COMPUTING

Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
LAB SCIENCE SEQUENCE	4
SOCIAL SCIENCE ELECTIVE	3
CS 2340 OBJECTS & DESIGN *	3
CS 3451 COMPUTER GRAPHICS *	3
FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
CS SR PROJECT (4980 or 4911) *	3
APPROACHES TO INTELLIGENCE - PICK ONE *	3
MEDIA TECHNOLOGIES - PICK ONE *	3
FREE ELECTIVE	3
FREE ELECTIVE	3



<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>
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<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

**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 Free Elective.

# INTELLIGENCE AND MEDIA

## THREAD PICKS AND ELECTIVE COURSES

### 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 \*

- \_\_\_\_\_ CS4495 Computer Vision
- \_\_\_\_\_ CS4635 Knowledge-based AI
- \_\_\_\_\_ CS4641 Machine Learning

### Knowledge-Based Intelligence

- \_\_\_\_\_ CS3790 Introduction to Cognitive Science
- \_\_\_\_\_ CS4615 Knowledge-based Modeling & Design
- \_\_\_\_\_ CS4635 Knowledge-based AI
- \_\_\_\_\_ CS4650 Natural Language Understanding

### Data-Driven Intelligence

- \_\_\_\_\_ CS4616 Pattern Recognition
- \_\_\_\_\_ CS4641 Machine Learning
- \_\_\_\_\_ MATH4280 Introduction to Information Theory

### Embodied Intelligent Systems

- \_\_\_\_\_ CS3651 The Art of Building Intelligent Appliances
- \_\_\_\_\_ CS4495 Computer Vision
- \_\_\_\_\_ CS4625 Intelligent and Interactive Systems
- \_\_\_\_\_ CS4632 Advanced Intelligent Robotics
- \_\_\_\_\_ CS4731 Game AI

### Philosophical Issues in Intelligence

- \_\_\_\_\_ CS4752 Philosophical Issues in Computation
- \_\_\_\_\_ CS4793 Perspectives in Cognitive Science

### 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

- \_\_\_\_\_ CS4464 Computational Journalism
- \_\_\_\_\_ CS4475 Computational Photography
- \_\_\_\_\_ 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: MODELING - SIMULATION & INTELLIGENCE**  
**2009 - 2010 DEGREE REQUIREMENTS**

COLLEGE OF COMPUTING  
Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
LAB SCIENCE SEQUENCE	4
SOCIAL SCIENCE ELECTIVE	3
CS 2200 COMPUTER SYSTEMS & NETWORKS *	4
MATH 2403 DIFFERENTIAL EQUATIONS *	4
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
MATH/CE/ISYE 3770 STATISTICS AND APPLICATIONS or 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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
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

<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>
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<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

\*Must earn a C or better in each of these courses.

# INTELLIGENCE AND MODELING-SIMULATION

## THREAD PICKS AND ELECTIVE COURSES

### 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 \*

- \_\_\_\_\_ CS4495 Computer Vision
- \_\_\_\_\_ CS4635 Knowledge-based AI
- \_\_\_\_\_ CS4641 Machine Learning

### Knowledge-Based Intelligence

- \_\_\_\_\_ CS3790 Introduction to Cognitive Science
- \_\_\_\_\_ CS4615 Knowledge-based Modeling & Design
- \_\_\_\_\_ CS4635 Knowledge-based AI
- \_\_\_\_\_ CS4650 Natural Language Understanding

### Data-Driven Intelligence

- \_\_\_\_\_ CS4616 Pattern Recognition
- \_\_\_\_\_ CS4641 Machine Learning
- \_\_\_\_\_ MATH4280 Introduction to Information Theory

### Embodied Intelligent Systems

- \_\_\_\_\_ CS3651 The Art of Building Intelligent Appliances
- \_\_\_\_\_ CS4495 Computer Vision
- \_\_\_\_\_ CS4625 Intelligent and Interactive Systems
- \_\_\_\_\_ CS4632 Advanced Intelligent Robotics
- \_\_\_\_\_ CS4731 Game AI

### Philosophical Issues in Intelligence

- \_\_\_\_\_ CS4752 Philosophical Issues in Computation
- \_\_\_\_\_ CS4793 Perspectives in Cognitive Science

### Computational Science and Engineering \*

- \_\_\_\_\_ CS4140 Computational Modeling Algorithms
- \_\_\_\_\_ CS4225 Introduction to High Performance Computing
- \_\_\_\_\_ CS4245 Introduction to Data Mining and Analysis
- \_\_\_\_\_ CS4335 Computer Simulation
- \_\_\_\_\_ CS4642 Numerical Analysis I

### Advanced Computational Methods & Software

- \_\_\_\_\_ CHBE2120 Numerical Methods
- \_\_\_\_\_ CS2335 Software Practicum
- \_\_\_\_\_ CS3220 Comp Struct: HW/SW Codesign of a Processor
- \_\_\_\_\_ CS3451 Computer Graphics
- \_\_\_\_\_ CS4210 Advanced Operating Systems
- \_\_\_\_\_ CS4230 Distributed Simulation Systems
- \_\_\_\_\_ CS4343 Simulation and Military Gaming
- \_\_\_\_\_ CS4495 Computer Vision
- \_\_\_\_\_ CS4496 Computer Animation
- \_\_\_\_\_ CS4550 Scientific Data Processing and Visualization
- \_\_\_\_\_ CS4641 Machine Learning
- \_\_\_\_\_ CS4643 Numerical Analysis II
- \_\_\_\_\_ CS4777 Vector and Parallel Scientific Computing
- \_\_\_\_\_ ISYE2028 Basic Statistics Methods
- \_\_\_\_\_ ISYE4331 Honors Optimization
- \_\_\_\_\_ MATH4255 Monte Carlo Methods
- \_\_\_\_\_ ME2016 Computing Techniques

### Aerospace Engineering

- \_\_\_\_\_ AE1350 Introduction to Aerospace Engineering
- \_\_\_\_\_ AE4375 Fundamentals of Computer-Aided Eng & Design
- \_\_\_\_\_ PHYS3266 Computational Physics

### Biology/Chemistry

- \_\_\_\_\_ BIOL2400 Mathematical Models in Biology
- \_\_\_\_\_ BIOL4401 Exp Design & Statistical Methods in Biology
- \_\_\_\_\_ CHBE2100 Chemical Process Principles

### Digital Signal Processing

- \_\_\_\_\_ ECE3025 Electromagnetics
- \_\_\_\_\_ ECE3075 Random Signals
- \_\_\_\_\_ ECE4270 Fundamentals of Digital Signal Processing
- \_\_\_\_\_ ECE4271 Applications of Digital Signal Processing

### Geoscience

- \_\_\_\_\_ EAS3620 Geochemistry
- \_\_\_\_\_ EAS4602 Biochemical Cycles
- \_\_\_\_\_ EAS4610 Earth System Modeling
- \_\_\_\_\_ EAS4630 Physics of the Earth
- \_\_\_\_\_ EAS4655 Atmospheric Dynamics
- \_\_\_\_\_ EAS4803 Water Chemistry Modeling
- \_\_\_\_\_ PHYS3266 Computational Physics

### Modeling & Simulation in Industrial Engineering

- \_\_\_\_\_ ISYE2030 Modeling in Industrial Engineering
- \_\_\_\_\_ ISYE3044 Simulation Analysis and Design
- \_\_\_\_\_ ISYE3133 Engineering Optimization
- \_\_\_\_\_ ISYE3232 Stochastic Manufacturing & Service Sys

\* Required Thread Pick

**BACHELOR OF SCIENCE IN COMPUTER SCIENCE****THREAD: INTELLIGENCE & PEOPLE****2009 - 2010 DEGREE REQUIREMENTS**

COLLEGE OF COMPUTING

Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
LAB SCIENCE SEQUENCE	4
HUMANITIES ELECTIVE	3
MATH 3012 APPLIED COMBINATORICS	3
CS 2110 COMPUTER ORGANIZATION & PROGRAMMING *	4
LCC 3401 TECHNICAL COMMUNICATION PRACTICES	2
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
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

<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>
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<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>14</b>

**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 Free Elective.

# INTELLIGENCE AND PEOPLE

## THREAD PICKS AND ELECTIVE COURSES

### 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 \*

- \_\_\_\_\_ CS4495 Computer Vision
- \_\_\_\_\_ CS4635 Knowledge-based AI
- \_\_\_\_\_ CS4641 Machine Learning

### Knowledge-Based Intelligence

- \_\_\_\_\_ CS3790 Introduction to Cognitive Science
- \_\_\_\_\_ CS4615 Knowledge-based Modeling & Design
- \_\_\_\_\_ CS4635 Knowledge-based AI
- \_\_\_\_\_ CS4650 Natural Language Understanding

### Data-Driven Intelligence

- \_\_\_\_\_ CS4616 Pattern Recognition
- \_\_\_\_\_ CS4641 Machine Learning
- \_\_\_\_\_ MATH4280 Introduction to Information Theory

### Embodied Intelligent Systems

- \_\_\_\_\_ CS3651 The Art of Building Intelligent Appliances
- \_\_\_\_\_ CS4495 Computer Vision
- \_\_\_\_\_ CS4625 Intelligent and Interactive Systems
- \_\_\_\_\_ CS4632 Advanced Intelligent Robotics
- \_\_\_\_\_ CS4731 Game AI

### Philosophical Issues in Intelligence

- \_\_\_\_\_ CS4752 Philosophical Issues in Computation
- \_\_\_\_\_ CS4793 Perspectives in Cognitive Science

### Social/Behavioral Science for Computing \*

- \_\_\_\_\_ PSYC2210 Social Psychology
- \_\_\_\_\_ PSYC2760 Psychology of Human Language
- \_\_\_\_\_ PSYC3040 Sensation and Perception

### Human-Centered Technology \*

- \_\_\_\_\_ CS3750 Human-Computer Interface Design and Eval
- \_\_\_\_\_ CS3790 Introduction to Cognitive Science
- \_\_\_\_\_ 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

- \_\_\_\_\_ CS3750 Human-Computer Interface Design and Eval
- \_\_\_\_\_ CS4472 Design of Online Communities
- \_\_\_\_\_ CS4690 Empirical Methods in HCI
- \_\_\_\_\_ CS4770 Mixed Reality Experience Design
- \_\_\_\_\_ PSYC2020 Psychological Statistics

### 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**  
**2009 - 2010 DEGREE REQUIREMENTS**  
 COLLEGE OF COMPUTING  
 Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
LAB SCIENCE SEQUENCE	4
HUMANITIES ELECTIVE	3
MATH 3012 APPLIED COMBINATORICS	3
CS 2110 COMPUTER ORGANIZATION & PROGRAMMING *	4
LCC 3401 TECHNICAL COMMUNICATION PRACTICES	2
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
LAB SCIENCE SEQUENCE	4
SOCIAL SCIENCE ELECTIVE	3
CS 2340 OBJECTS & DESIGN *	3
CS 2200 COMPUTER SYSTEMS & NETWORKS *	4
FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
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

<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>
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<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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
FREE ELECTIVE	2
<b>TOTAL SEMESTER HOURS =</b>	<b>14</b>

**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 Free Elective.

# INTELLIGENCE AND PLATFORMS

## THREAD PICKS AND ELECTIVE COURSES

### Embodied Intelligence \*

- \_\_\_\_\_ CS3630 Robotics and Perception
- \_\_\_\_\_ CS3790 Introduction to Cognitive Science
- \_\_\_\_\_ PSY3040 Sensation and Perception

### Approaches to Intelligence \*

- \_\_\_\_\_ CS4495 Computer Vision
- \_\_\_\_\_ CS4635 Knowledge-based AI
- \_\_\_\_\_ CS4641 Machine Learning

### 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

- \_\_\_\_\_ CS4616 Pattern Recognition
- \_\_\_\_\_ CS4641 Machine Learning
- \_\_\_\_\_ MATH4280 Introduction to Information Theory

### Embodied Intelligent Systems

- \_\_\_\_\_ CS3651 The Art of Building Intelligent Appliances
- \_\_\_\_\_ CS4495 Computer Vision
- \_\_\_\_\_ CS4625 Intelligent and Interactive Systems
- \_\_\_\_\_ CS4632 Advanced Intelligent Robotics
- \_\_\_\_\_ CS4731 Game AI

### Philosophical Issues in Intelligence

- \_\_\_\_\_ CS4752 Philosophical Issues in Computation
- \_\_\_\_\_ CS4793 Perspectives in Cognitive Science

### 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
- \_\_\_\_\_ CS4233 Parallel Computer Architecture
- \_\_\_\_\_ CS4290 Advanced Computer Organization
- \_\_\_\_\_ CS4803 Design of Gaming Consoles
- \_\_\_\_\_ CS4803 Scalable Information Systems & Technologies

### Distributed Platforms

- \_\_\_\_\_ CS4210 Advanced Operating Systems
- \_\_\_\_\_ CS4675 Internet Computing Systems
- \_\_\_\_\_ CS4685 Pervasive Systems and Networking
- \_\_\_\_\_ CS4803 Scalable Information Systems & Technologies

### Embedded and Ubiquitous Platforms

- \_\_\_\_\_ CS4220 Programming Embedded Systems
- \_\_\_\_\_ CS4685 Pervasive Systems and Networking
- \_\_\_\_\_ CS4803 Design of Gaming Consoles

### Domain Specific Platforms

- \_\_\_\_\_ CS4220 Programming Embedded Systems
- \_\_\_\_\_ CS4803 Design of Gaming Consoles
- \_\_\_\_\_ CS4803 Scalable Information Systems & Technologies

### Platform Technologies

- \_\_\_\_\_ CS4210 Advanced Operating Systems
- \_\_\_\_\_ CS4220 Programming Embedded Systems
- \_\_\_\_\_ CS4235 Introduction to Information Security
- \_\_\_\_\_ CS4237 Computer and Network Security
- \_\_\_\_\_ CS4560 Verification of Systems

### Software Interfaces, Tools & Technologies

- \_\_\_\_\_ CS4220 Programming Embedded Systems
- \_\_\_\_\_ CS4240 Compilers, Interpreters, & Program Analyzers
- \_\_\_\_\_ CS4392 Programming Language Design
- \_\_\_\_\_ CS6241 Design and Implementation of Compilers
- \_\_\_\_\_ CS6246 Object-oriented Systems and Languages

\* Required Thread Pick

**BACHELOR OF SCIENCE IN COMPUTER SCIENCE****THREAD: THEORY & INTELLIGENCE****2009 - 2010 DEGREE REQUIREMENTS**

COLLEGE OF COMPUTING

Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
LAB SCIENCE SEQUENCE	4
SOCIAL SCIENCE ELECTIVE	3
CS 2340 OBJECTS & DESIGN *	3
CS 3510 DESIGN & ANALYSIS OF ALGORITHMS * or CS 3511 Design and Analysis of Algorithms, Honors *	3
FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
CS SR PROJECT (4980 or 4911) *	3
APPROACHES TO INTELLIGENCE - PICK ONE *	3
CS 4540 ADVANCED ALGORITHMS *	3
FREE ELECTIVE	3

FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY *	3
APPROACHES TO INTELLIGENCE - PICK ONE *	3
MATHEMATICS RELATED TO COMPUTER SCIENCE - PICK ONE *	3
FREE ELECTIVE	3
FREE ELECTIVE	2
<b>TOTAL SEMESTER HOURS =</b>	<b>14</b>

**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 Free Elective.

# INTELLIGENCE AND THEORY

## THREAD PICKS AND ELECTIVE COURSES

### 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 \*

- \_\_\_\_\_ CS4495 Computer Vision
- \_\_\_\_\_ CS4635 Knowledge-based AI
- \_\_\_\_\_ CS4641 Machine Learning

### Knowledge-Based Intelligence

- \_\_\_\_\_ CS3790 Introduction to Cognitive Science
- \_\_\_\_\_ CS4615 Knowledge-based Modeling & Design
- \_\_\_\_\_ CS4635 Knowledge-based AI
- \_\_\_\_\_ CS4650 Natural Language Understanding

### Data-Driven Intelligence

- \_\_\_\_\_ CS4616 Pattern Recognition
- \_\_\_\_\_ CS4641 Machine Learning
- \_\_\_\_\_ MATH4280 Introduction to Information Theory

### Embodied Intelligent Systems

- \_\_\_\_\_ CS3651 The Art of Building Intelligent Appliances
- \_\_\_\_\_ CS4495 Computer Vision
- \_\_\_\_\_ CS4625 Intelligent and Interactive Systems
- \_\_\_\_\_ CS4632 Advanced Intelligent Robotics
- \_\_\_\_\_ CS4731 Game AI

### Philosophical Issues in Intelligence

- \_\_\_\_\_ CS4752 Philosophical Issues in Computation
- \_\_\_\_\_ CS4793 Perspectives in Cognitive Science

### Mathematics Related to Computer Science \*

- \_\_\_\_\_ MATH2406 Abstract Vector Spaces
- \_\_\_\_\_ MATH4032 Combinatorial Analysis

### CS Appl Involving Algorithms & Complexity

- \_\_\_\_\_ CS3210 Design of Operating Systems
- \_\_\_\_\_ CS3251 Computer Networking I
- \_\_\_\_\_ CS3451 Computer Graphics
- \_\_\_\_\_ CS4140 Computational Modeling Algorithms
- \_\_\_\_\_ CS4235 Introduction to Information Security
- \_\_\_\_\_ CS4335 Computer Simulation
- \_\_\_\_\_ CS4400 Introduction to Database Systems
- \_\_\_\_\_ CS4496 Computer Animation
- \_\_\_\_\_ CS4641 Machine Learning

### Topics in Algorithms and Complexity

- \_\_\_\_\_ CS3240 Languages and Computation
- \_\_\_\_\_ CS4510 Automata and Complexity Theory
- \_\_\_\_\_ CS4520 Approximation Algorithms
- \_\_\_\_\_ CS4530 Randomized Algorithms
- \_\_\_\_\_ CS6520 Computational Complexity

### Mathematics with CS Applications

- \_\_\_\_\_ MATH2406 Abstract Vector Spaces
- \_\_\_\_\_ MATH3770 Statistics and Applications
- \_\_\_\_\_ MATH4012 Algebraic Structures for Coding Theory
- \_\_\_\_\_ MATH4107 Abstract Algebra I
- \_\_\_\_\_ MATH4150 Intro to Number Theory & Cryptography
- \_\_\_\_\_ MATH4255 Monte Carlo Methods
- \_\_\_\_\_ MATH4280 Introduction to Information Theory
- \_\_\_\_\_ MATH4305 Topics in Linear Algebra
- \_\_\_\_\_ MATH4580 Linear Programming
- \_\_\_\_\_ MATH4640/CS4642 Numerical Analysis I
- \_\_\_\_\_ MATH4782 Quantum Info & Quantum Computation

### Computational Methods in the Sciences

- \_\_\_\_\_ BIOL2400 Mathematical Models in Biology
- \_\_\_\_\_ BIOL4755 Mathematical Biology
- \_\_\_\_\_ ECON3110 Advanced Microeconomic Analysis
- \_\_\_\_\_ ECON3120 Advanced Macroeconomic Analysis
- \_\_\_\_\_ ISYE3133 Optimization
- \_\_\_\_\_ MGT3076 Investments
- \_\_\_\_\_ MGT3078 Finance and Investments
- \_\_\_\_\_ MGT3084 Derivative Securities
- \_\_\_\_\_ PHYS3151 Mathematical Physics
- \_\_\_\_\_ PHYS3266 Computational Physics

**BACHELOR OF SCIENCE IN COMPUTER SCIENCE****THREAD: MODELING - SIMULATION & MEDIA****2009 - 2010 DEGREE REQUIREMENTS**

COLLEGE OF COMPUTING

Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
LAB SCIENCE SEQUENCE	4
SOCIAL SCIENCE ELECTIVE	3
CS 2200 COMPUTER SYSTEMS & NETWORKS *	4
MATH 2403 DIFFERENTIAL EQUATIONS *	4
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
CS SR PROJECT (4980 or 4911) *	3
COMPUTATIONAL SCIENCE & ENGINEERING - PICK ONE *	3
MEDIA TECHNOLOGIES - PICK ONE *	3
FREE ELECTIVES	6

<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>
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<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

\*Must earn a C or better in each of these courses.



# MEDIA AND MODELING-SIMULATION

## THREAD PICKS AND ELECTIVE COURSES

### 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

- \_\_\_\_\_ CS4464 Computational Journalism
- \_\_\_\_\_ CS4475 Computational Photography
- \_\_\_\_\_ 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 Science and Engineering \*

- \_\_\_\_\_ CS4140 Computational Modeling Algorithms
- \_\_\_\_\_ CS4225 Introduction to High Performance Computing
- \_\_\_\_\_ CS4245 Introduction to Data Mining and Analysis
- \_\_\_\_\_ CS4335 Computer Simulation
- \_\_\_\_\_ CS4642 Numerical Analysis I

### Advanced Computational Methods & Software

- \_\_\_\_\_ CHBE2120 Numerical Methods
- \_\_\_\_\_ CS2335 Software Practicum
- \_\_\_\_\_ CS3220 Comp Struct: HW/SW Codesign of a Processor
- \_\_\_\_\_ CS3600 Introduction to Artificial Intelligence
- \_\_\_\_\_ CS4210 Advanced Operating Systems
- \_\_\_\_\_ CS4230 Distributed Simulation Systems
- \_\_\_\_\_ CS4343 Simulation and Military Gaming
- \_\_\_\_\_ CS4495 Computer Vision
- \_\_\_\_\_ CS4496 Computer Animation
- \_\_\_\_\_ CS4550 Scientific Data Processing and Visualization
- \_\_\_\_\_ CS4641 Machine Learning
- \_\_\_\_\_ CS4643 Numerical Analysis II
- \_\_\_\_\_ CS4777 Vector and Parallel Scientific Computing
- \_\_\_\_\_ ISYE2028 Basic Statistics Methods
- \_\_\_\_\_ ISYE4331 Honors Optimization
- \_\_\_\_\_ MATH4255 Monte Carlo Methods
- \_\_\_\_\_ ME2016 Computing Techniques

### Aerospace Engineering

- \_\_\_\_\_ AE1350 Introduction to Aerospace Engineering
- \_\_\_\_\_ AE4375 Fundamentals of Computer-Aided Eng & Design
- \_\_\_\_\_ PHYS3266 Computational Physics

### Biology/Chemistry

- \_\_\_\_\_ BIOL2400 Mathematical Models in Biology
- \_\_\_\_\_ BIOL4401 Exp Design & Statistical Methods in Biology
- \_\_\_\_\_ CHBE2100 Chemical Process Principles

### Digital Signal Processing

- \_\_\_\_\_ ECE3025 Electromagnetics
- \_\_\_\_\_ ECE3075 Random Signals
- \_\_\_\_\_ ECE4270 Fundamentals of Digital Signal Processing
- \_\_\_\_\_ ECE4271 Applications of Digital Signal Processing

### Geoscience

- \_\_\_\_\_ EAS3620 Geochemistry
- \_\_\_\_\_ EAS4602 Biochemical Cycles
- \_\_\_\_\_ EAS4610 Earth System Modeling
- \_\_\_\_\_ EAS4630 Physics of the Earth
- \_\_\_\_\_ EAS4655 Atmospheric Dynamics
- \_\_\_\_\_ EAS4803 Water Chemistry Modeling
- \_\_\_\_\_ PHYS3266 Computational Physics

### Modeling & Simulation in Industrial Engineering

- \_\_\_\_\_ ISYE2030 Modeling in Industrial Engineering
- \_\_\_\_\_ ISYE3044 Simulation Analysis and Design
- \_\_\_\_\_ ISYE3133 Engineering Optimization
- \_\_\_\_\_ ISYE3232 Stochastic Manufacturing & Service Sys

\* Required Thread Pick

**BACHELOR OF SCIENCE IN COMPUTER SCIENCE****THREAD: MEDIA & PEOPLE****2009 - 2010 DEGREE REQUIREMENTS**

COLLEGE OF COMPUTING

Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
LAB SCIENCE SEQUENCE	4
HUMANITIES ELECTIVE	3
MATH 3012 APPLIED COMBINATORICS	3
CS 2261 (Media Thread)	4
LCC 3401 TECHNICAL COMMUNICATION PRACTICES	2
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
LAB SCIENCE SEQUENCE	4
SOCIAL SCIENCE ELECTIVE	3
CS 2340 OBJECTS & DESIGN *	3
CS 3451 COMPUTER GRAPHICS *	3
FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
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

<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>
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<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>14</b>

**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 Free Elective.

# MEDIA AND PEOPLE

## THREAD PICKS AND ELECTIVE COURSES

### 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

- \_\_\_\_\_ CS4464 Computational Journalism
- \_\_\_\_\_ CS4475 Computational Photography
- \_\_\_\_\_ 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 \*

- \_\_\_\_\_ CS3750 Human-Computer Interface Design and Eval
- \_\_\_\_\_ CS3790 Introduction to Cognitive Science
- \_\_\_\_\_ 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

- \_\_\_\_\_ CS3750 Human-Computer Interface Design and Eval
- \_\_\_\_\_ CS4472 Design of Online Communities
- \_\_\_\_\_ CS4690 Empirical Methods in HCI
- \_\_\_\_\_ CS4770 Mixed Reality Experience Design
- \_\_\_\_\_ PSYC2020 Psychological Statistics

### 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****2009 - 2010 DEGREE REQUIREMENTS**

COLLEGE OF COMPUTING

Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
LAB SCIENCE SEQUENCE	4
HUMANITIES ELECTIVE	3
MATH 3012 APPLIED COMBINATORICS	3
CS 2110 COMPUTER ORGANIZATION & PROGRAMMING *	4
LCC 3401 TECHNICAL COMMUNICATION PRACTICES	2
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
LAB SCIENCE SEQUENCE	4
SOCIAL SCIENCE ELECTIVE	3
CS 2340 OBJECTS & DESIGN *	3
CS 2200 COMPUTER SYSTEMS & NETWORKS *	4
FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
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

<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>
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<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY *	3
CS 3240 LANGUAGES & COMPUTATION *	3
MEDIA TECHNOLOGIES - PICK ONE *	3
FREE ELECTIVE	3
FREE ELECTIVE	2
<b>TOTAL SEMESTER HOURS =</b>	<b>14</b>

**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 Free Elective.

# MEDIA AND PLATFORMS

## THREAD PICKS AND ELECTIVE COURSES

### 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

- \_\_\_\_\_ CS4464 Computational Journalism
- \_\_\_\_\_ CS4475 Computational Photography
- \_\_\_\_\_ 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
- \_\_\_\_\_ CS4233 Parallel Computer Architecture
- \_\_\_\_\_ CS4290 Advanced Computer Organization
- \_\_\_\_\_ CS4803 Design of Gaming Consoles
- \_\_\_\_\_ CS4803 Scalable Information Systems & Technologies

### Distributed Platforms

- \_\_\_\_\_ CS4210 Advanced Operating Systems
- \_\_\_\_\_ CS4675 Internet Computing Systems
- \_\_\_\_\_ CS4685 Pervasive Systems and Networking
- \_\_\_\_\_ CS4803 Scalable Information Systems & Technologies

### Embedded and Ubiquitous Platforms

- \_\_\_\_\_ CS4220 Programming Embedded Systems
- \_\_\_\_\_ CS4685 Pervasive Systems and Networking
- \_\_\_\_\_ CS4803 Design of Gaming Consoles

### Domain Specific Platforms

- \_\_\_\_\_ CS4220 Programming Embedded Systems
- \_\_\_\_\_ CS4803 Design of Gaming Consoles
- \_\_\_\_\_ CS4803 Scalable Information Systems & Technologies

### Platform Technologies

- \_\_\_\_\_ CS4210 Advanced Operating Systems
- \_\_\_\_\_ CS4220 Programming Embedded Systems
- \_\_\_\_\_ CS4235 Introduction to Information Security
- \_\_\_\_\_ CS4237 Computer and Network Security
- \_\_\_\_\_ CS4560 Verification of Systems

### Software Interfaces, Tools & Technologies

- \_\_\_\_\_ CS4220 Programming Embedded Systems
- \_\_\_\_\_ CS4240 Compilers, Interpreters, & Program Analyzers
- \_\_\_\_\_ CS4392 Programming Language Design
- \_\_\_\_\_ CS6241 Design and Implementation of Compilers
- \_\_\_\_\_ CS6246 Object-oriented Systems and Languages

\* Required Thread Pick

**BACHELOR OF SCIENCE IN COMPUTER SCIENCE****THREAD: THEORY & MEDIA****2009 - 2010 DEGREE REQUIREMENTS**

COLLEGE OF COMPUTING

Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
CS SR PROJECT (4980 or 4911) *	3
MEDIA TECHNOLOGIES - PICK ONE *	3
CS 4540 ADVANCED ALGORITHMS *	3



FREE ELECTIVE	3
FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>14</b>

**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 Free Elective.

# MEDIA AND THEORY

## THREAD PICKS AND ELECTIVE COURSES

### 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

- \_\_\_\_\_ CS4464 Computational Journalism
- \_\_\_\_\_ CS4475 Computational Photography
- \_\_\_\_\_ 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

- \_\_\_\_\_ CS3210 Design of Operating Systems
- \_\_\_\_\_ CS3251 Computer Networking I
- \_\_\_\_\_ CS3600 Introduction to Artificial Intelligence
- \_\_\_\_\_ CS4140 Computational Modeling Algorithms
- \_\_\_\_\_ CS4235 Introduction to Information Security
- \_\_\_\_\_ CS4335 Computer Simulation
- \_\_\_\_\_ CS4400 Introduction to Database Systems
- \_\_\_\_\_ CS4496 Computer Animation
- \_\_\_\_\_ CS4641 Machine Learning

### Topics in Algorithms and Complexity

- \_\_\_\_\_ CS3240 Languages and Computation
- \_\_\_\_\_ CS4510 Automata and Complexity Theory
- \_\_\_\_\_ CS4520 Approximation Algorithms
- \_\_\_\_\_ CS4530 Randomized Algorithms
- \_\_\_\_\_ CS6520 Computational Complexity

### Mathematics with CS Applications

- \_\_\_\_\_ MATH2406 Abstract Vector Spaces
- \_\_\_\_\_ MATH3770 Statistics and Applications
- \_\_\_\_\_ MATH4012 Algebraic Structures for Coding Theory
- \_\_\_\_\_ MATH4107 Abstract Algebra I
- \_\_\_\_\_ MATH4150 Intro to Number Theory & Cryptography
- \_\_\_\_\_ MATH4255 Monte Carlo Methods
- \_\_\_\_\_ MATH4280 Introduction to Information Theory
- \_\_\_\_\_ MATH4305 Topics in Linear Algebra
- \_\_\_\_\_ MATH4580 Linear Programming
- \_\_\_\_\_ MATH4640/CS4642 Numerical Analysis I
- \_\_\_\_\_ MATH4782 Quantum Info & Quantum Computation

### Computational Methods in the Sciences

- \_\_\_\_\_ BIOL2400 Mathematical Models in Biology
- \_\_\_\_\_ BIOL4755 Mathematical Biology
- \_\_\_\_\_ ECON3110 Advanced Microeconomic Analysis
- \_\_\_\_\_ ECON3120 Advanced Macroeconomic Analysis
- \_\_\_\_\_ ISYE3133 Optimization
- \_\_\_\_\_ MGT3076 Investments
- \_\_\_\_\_ MGT3078 Finance and Investments
- \_\_\_\_\_ MGT3084 Derivative Securities
- \_\_\_\_\_ PHYS3151 Mathematical Physics
- \_\_\_\_\_ PHYS3266 Computational Physics

**BACHELOR OF SCIENCE IN COMPUTER SCIENCE**  
**THREAD: MODELING - SIMULATION & PEOPLE**  
**2009 - 2010 DEGREE REQUIREMENTS**  
 COLLEGE OF COMPUTING  
 Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
LAB SCIENCE SEQUENCE	4
SOCIAL SCIENCE ELECTIVE	3
CS 2200 COMPUTER SYSTEMS & NETWORKS *	4
MATH 2403 DIFFERENTIAL EQUATIONS *	4
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
MATH/CE/ISYE 3770 STATISTICS AND APPLICATIONS or MATH 3215 PROBABILITY & STATISTICS	3
FREE ELECTIVE	6
CS 2340 OBJECTS & DESIGN *	3
SOCIAL/BEHAVIORAL SCIENCE FOR COMPUTING - PICK ONE *	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>14</b>

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

\*Must earn a C or better in each of these courses.

# MODELING-SIMULATION AND PEOPLE

## THREAD PICKS AND ELECTIVE COURSES

### Computational Science and Engineering \*

- \_\_\_\_\_ CS4140 Computational Modeling Algorithms
- \_\_\_\_\_ CS4225 Introduction to High Performance Computing
- \_\_\_\_\_ CS4245 Introduction to Data Mining and Analysis
- \_\_\_\_\_ CS4335 Computer Simulation
- \_\_\_\_\_ CS4642 Numerical Analysis I

### Advanced Computational Methods & Software

- \_\_\_\_\_ CHBE2120 Numerical Methods
- \_\_\_\_\_ CS2335 Software Practicum
- \_\_\_\_\_ 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
- \_\_\_\_\_ CS4343 Simulation and Military Gaming
- \_\_\_\_\_ CS4495 Computer Vision
- \_\_\_\_\_ CS4496 Computer Animation
- \_\_\_\_\_ CS4550 Scientific Data Processing and Visualization
- \_\_\_\_\_ CS4641 Machine Learning
- \_\_\_\_\_ CS4643 Numerical Analysis II
- \_\_\_\_\_ CS4777 Vector and Parallel Scientific Computing
- \_\_\_\_\_ ISYE2028 Basic Statistics Methods
- \_\_\_\_\_ ISYE4331 Honors Optimization
- \_\_\_\_\_ MATH4255 Monte Carlo Methods
- \_\_\_\_\_ ME2016 Computing Techniques

### Aerospace Engineering

- \_\_\_\_\_ AE1350 Introduction to Aerospace Engineering
- \_\_\_\_\_ AE4375 Fundamentals of Computer-Aided Eng & Design
- \_\_\_\_\_ PHYS3266 Computational Physics

### Biology/Chemistry

- \_\_\_\_\_ BIOL2400 Mathematical Models in Biology
- \_\_\_\_\_ BIOL4401 Exp Design & Statistical Methods in Biology
- \_\_\_\_\_ CHBE2100 Chemical Process Principles

### Digital Signal Processing

- \_\_\_\_\_ ECE3025 Electromagnetics
- \_\_\_\_\_ ECE3075 Random Signals
- \_\_\_\_\_ ECE4270 Fundamentals of Digital Signal Processing
- \_\_\_\_\_ ECE4271 Applications of Digital Signal Processing

### Geoscience

- \_\_\_\_\_ EAS3620 Geochemistry
- \_\_\_\_\_ EAS4602 Biochemical Cycles
- \_\_\_\_\_ EAS4610 Earth System Modeling
- \_\_\_\_\_ EAS4630 Physics of the Earth
- \_\_\_\_\_ EAS4655 Atmospheric Dynamics
- \_\_\_\_\_ EAS4803 Water Chemistry Modeling
- \_\_\_\_\_ PHYS3266 Computational Physics

### Modeling & Simulation in Industrial Engineering

- \_\_\_\_\_ ISYE2030 Modeling in Industrial Engineering
- \_\_\_\_\_ ISYE3044 Simulation Analysis and Design
- \_\_\_\_\_ ISYE3133 Engineering Optimization
- \_\_\_\_\_ ISYE3232 Stochastic Manufacturing & Service Sys

### Social/Behavioral Science for Computing \*

- \_\_\_\_\_ PSYC2210 Social Psychology
- \_\_\_\_\_ PSYC2760 Psychology of Human Language
- \_\_\_\_\_ PSYC3040 Sensation and Perception

### Human-Centered Technology \*

- \_\_\_\_\_ CS3750 Human-Computer Interface Design and Eval
- \_\_\_\_\_ CS3790 Introduction to Cognitive Science
- \_\_\_\_\_ 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

- \_\_\_\_\_ CS3750 Human-Computer Interface Design and Eval
- \_\_\_\_\_ CS4472 Design of Online Communities
- \_\_\_\_\_ CS4690 Empirical Methods in HCI
- \_\_\_\_\_ CS4770 Mixed Reality Experience Design
- \_\_\_\_\_ PSYC2020 Psychological Statistics

### 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 & PLATFORMS**  
**2009 - 2010 DEGREE REQUIREMENTS**  
 COLLEGE OF COMPUTING  
 Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
LAB SCIENCE SEQUENCE	4
SOCIAL SCIENCE ELECTIVE	3
CS 2200 COMPUTER SYSTEMS & NETWORKS *	4
MATH 2403 DIFFERENTIAL EQUATIONS *	4
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
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

<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>
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<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

\*Must earn a C or better in each of these courses.

# MODELING-SIMULATION AND PLATFORMS

## THREAD PICKS AND ELECTIVE COURSES

### Computational Science and Engineering \*

- \_\_\_\_\_ CS4140 Computational Modeling Algorithms
- \_\_\_\_\_ CS4225 Introduction to High Performance Computing
- \_\_\_\_\_ CS4245 Introduction to Data Mining and Analysis
- \_\_\_\_\_ CS4335 Computer Simulation
- \_\_\_\_\_ CS4642 Numerical Analysis I

### Advanced Computational Methods & Software

- \_\_\_\_\_ CHBE2120 Numerical Methods
- \_\_\_\_\_ CS2335 Software Practicum
- \_\_\_\_\_ 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
- \_\_\_\_\_ CS4343 Simulation and Military Gaming
- \_\_\_\_\_ CS4495 Computer Vision
- \_\_\_\_\_ CS4496 Computer Animation
- \_\_\_\_\_ CS4550 Scientific Data Processing and Visualization
- \_\_\_\_\_ CS4641 Machine Learning
- \_\_\_\_\_ CS4643 Numerical Analysis II
- \_\_\_\_\_ CS4777 Vector and Parallel Scientific Computing
- \_\_\_\_\_ ISYE2028 Basic Statistics Methods
- \_\_\_\_\_ ISYE4331 Honors Optimization
- \_\_\_\_\_ MATH4255 Monte Carlo Methods
- \_\_\_\_\_ ME2016 Computing Techniques

### Aerospace Engineering

- \_\_\_\_\_ AE1350 Introduction to Aerospace Engineering
- \_\_\_\_\_ AE4375 Fundamentals of Computer-Aided Eng & Design
- \_\_\_\_\_ PHYS3266 Computational Physics

### Biology/Chemistry

- \_\_\_\_\_ BIOL2400 Mathematical Models in Biology
- \_\_\_\_\_ BIOL4401 Exp Design & Statistical Methods in Biology
- \_\_\_\_\_ CHBE2100 Chemical Process Principles

### Digital Signal Processing

- \_\_\_\_\_ ECE3025 Electromagnetics
- \_\_\_\_\_ ECE3075 Random Signals
- \_\_\_\_\_ ECE4270 Fundamentals of Digital Signal Processing
- \_\_\_\_\_ ECE4271 Applications of Digital Signal Processing

### Geoscience

- \_\_\_\_\_ EAS3620 Geochemistry
- \_\_\_\_\_ EAS4602 Biochemical Cycles
- \_\_\_\_\_ EAS4610 Earth System Modeling
- \_\_\_\_\_ EAS4630 Physics of the Earth
- \_\_\_\_\_ EAS4655 Atmospheric Dynamics
- \_\_\_\_\_ EAS4803 Water Chemistry Modeling
- \_\_\_\_\_ PHYS3266 Computational Physics

### Modeling & Simulation in Industrial Engineering

- \_\_\_\_\_ ISYE2030 Modeling in Industrial Engineering
- \_\_\_\_\_ ISYE3044 Simulation Analysis and Design
- \_\_\_\_\_ ISYE3133 Engineering Optimization
- \_\_\_\_\_ ISYE3232 Stochastic Manufacturing & Service Sys

### 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
- \_\_\_\_\_ CS4233 Parallel Computer Architecture
- \_\_\_\_\_ CS4290 Advanced Computer Organization
- \_\_\_\_\_ CS4803 Design of Gaming Consoles
- \_\_\_\_\_ CS4803 Scalable Information Systems & Technologies

### Distributed Platforms

- \_\_\_\_\_ CS4210 Advanced Operating Systems
- \_\_\_\_\_ CS4675 Internet Computing Systems
- \_\_\_\_\_ CS4685 Pervasive Systems and Networking
- \_\_\_\_\_ CS4803 Scalable Information Systems & Technologies

### Embedded and Ubiquitous Platforms

- \_\_\_\_\_ CS4220 Programming Embedded Systems
- \_\_\_\_\_ CS4685 Pervasive Systems and Networking
- \_\_\_\_\_ CS4803 Design of Gaming Consoles

### Domain Specific Platforms

- \_\_\_\_\_ CS4220 Programming Embedded Systems
- \_\_\_\_\_ CS4803 Design of Gaming Consoles
- \_\_\_\_\_ CS4803 Scalable Information Systems & Technologies

### Platform Technologies

- \_\_\_\_\_ CS4210 Advanced Operating Systems
- \_\_\_\_\_ CS4220 Programming Embedded Systems
- \_\_\_\_\_ CS4235 Introduction to Information Security
- \_\_\_\_\_ CS4237 Computer and Network Security
- \_\_\_\_\_ CS4560 Verification of Systems

### Software Interfaces, Tools & Technologies

- \_\_\_\_\_ CS4220 Programming Embedded Systems
- \_\_\_\_\_ CS4240 Compilers, Interpreters, & Program Analyzers
- \_\_\_\_\_ CS4392 Programming Language Design
- \_\_\_\_\_ CS6241 Design and Implementation of Compilers
- \_\_\_\_\_ CS6246 Object-oriented Systems and Languages

\* Required Thread Pick



**BACHELOR OF SCIENCE IN COMPUTER SCIENCE**  
**THREAD: MODELING - SIMULATION & THEORY**  
**2009 - 2010 DEGREE REQUIREMENTS**  
 COLLEGE OF COMPUTING  
 Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
LAB SCIENCE SEQUENCE	4
SOCIAL SCIENCE ELECTIVE	3
CS 2200 COMPUTER SYSTEMS & NETWORKS *	4
MATH 2403 DIFFERENTIAL EQUATIONS *	4
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
CS SR PROJECT (4980 or 4911) *	3
COMPUTATIONAL SCIENCE & ENGINEERING - PICK ONE *	3
CS 4540 ADVANCED ALGORITHMS *	3
FREE ELECTIVE	6

<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>
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<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

\*Must earn a C or better in each of these courses.

# MODELING-SIMULATION AND THEORY

## THREAD PICKS AND ELECTIVE COURSES

### Computational Science and Engineering \*

- \_\_\_\_\_ CS4140 Computational Modeling Algorithms
- \_\_\_\_\_ CS4225 Introduction to High Performance Computing
- \_\_\_\_\_ CS4245 Introduction to Data Mining and Analysis
- \_\_\_\_\_ CS4335 Computer Simulation
- \_\_\_\_\_ CS4642 Numerical Analysis I

### Advanced Computational Methods & Software

- \_\_\_\_\_ CHBE2120 Numerical Methods
- \_\_\_\_\_ CS2335 Software Practicum
- \_\_\_\_\_ 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
- \_\_\_\_\_ CS4343 Simulation and Military Gaming
- \_\_\_\_\_ CS4495 Computer Vision
- \_\_\_\_\_ CS4496 Computer Animation
- \_\_\_\_\_ CS4550 Scientific Data Processing and Visualization
- \_\_\_\_\_ CS4641 Machine Learning
- \_\_\_\_\_ CS4643 Numerical Analysis II
- \_\_\_\_\_ CS4777 Vector and Parallel Scientific Computing
- \_\_\_\_\_ ISYE2028 Basic Statistics Methods
- \_\_\_\_\_ ISYE4331 Honors Optimization
- \_\_\_\_\_ MATH4255 Monte Carlo Methods
- \_\_\_\_\_ ME2016 Computing Techniques

### Aerospace Engineering

- \_\_\_\_\_ AE1350 Introduction to Aerospace Engineering
- \_\_\_\_\_ AE4375 Fundamentals of Computer-Aided Eng & Design
- \_\_\_\_\_ PHYS3266 Computational Physics

### Biology/Chemistry

- \_\_\_\_\_ BIOL2400 Mathematical Models in Biology
- \_\_\_\_\_ BIOL4401 Exp Design & Statistical Methods in Biology
- \_\_\_\_\_ CHBE2100 Chemical Process Principles

### Digital Signal Processing

- \_\_\_\_\_ ECE3025 Electromagnetics
- \_\_\_\_\_ ECE3075 Random Signals
- \_\_\_\_\_ ECE4270 Fundamentals of Digital Signal Processing
- \_\_\_\_\_ ECE4271 Applications of Digital Signal Processing

### Geoscience

- \_\_\_\_\_ EAS3620 Geochemistry
- \_\_\_\_\_ EAS4602 Biochemical Cycles
- \_\_\_\_\_ EAS4610 Earth System Modeling
- \_\_\_\_\_ EAS4630 Physics of the Earth
- \_\_\_\_\_ EAS4655 Atmospheric Dynamics
- \_\_\_\_\_ EAS4803 Water Chemistry Modeling
- \_\_\_\_\_ PHYS3266 Computational Physics

### Modeling & Simulation in Industrial Engineering

- \_\_\_\_\_ ISYE2030 Modeling in Industrial Engineering
- \_\_\_\_\_ ISYE3044 Simulation Analysis and Design
- \_\_\_\_\_ ISYE3133 Engineering Optimization
- \_\_\_\_\_ ISYE3232 Stochastic Manufacturing & Service Sys

### 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

- \_\_\_\_\_ CS3210 Design of Operating Systems
- \_\_\_\_\_ CS3251 Computer Networking I
- \_\_\_\_\_ CS3451 Computer Graphics
- \_\_\_\_\_ CS3600 Introduction to Artificial Intelligence
- \_\_\_\_\_ CS4140 Computational Modeling Algorithms
- \_\_\_\_\_ CS4235 Introduction to Information Security
- \_\_\_\_\_ CS4335 Computer Simulation
- \_\_\_\_\_ CS4400 Introduction to Database Systems
- \_\_\_\_\_ CS4496 Computer Animation
- \_\_\_\_\_ CS4641 Machine Learning

### Topics in Algorithms and Complexity

- \_\_\_\_\_ CS3240 Languages and Computation
- \_\_\_\_\_ CS4510 Automata and Complexity Theory
- \_\_\_\_\_ CS4520 Approximation Algorithms
- \_\_\_\_\_ CS4530 Randomized Algorithms
- \_\_\_\_\_ CS6520 Computational Complexity

### Mathematics with CS Applications

- \_\_\_\_\_ MATH2406 Abstract Vector Spaces
- \_\_\_\_\_ MATH3770 Statistics and Applications
- \_\_\_\_\_ MATH4012 Algebraic Structures for Coding Theory
- \_\_\_\_\_ MATH4107 Abstract Algebra I
- \_\_\_\_\_ MATH4150 Intro to Number Theory & Cryptography
- \_\_\_\_\_ MATH4255 Monte Carlo Methods
- \_\_\_\_\_ MATH4280 Introduction to Information Theory
- \_\_\_\_\_ MATH4305 Topics in Linear Algebra
- \_\_\_\_\_ MATH4580 Linear Programming
- \_\_\_\_\_ MATH4640/CS4642 Numerical Analysis I
- \_\_\_\_\_ MATH4782 Quantum Info & Quantum Computation

### Computational Methods in the Sciences

- \_\_\_\_\_ BIOL2400 Mathematical Models in Biology
- \_\_\_\_\_ BIOL4755 Mathematical Biology
- \_\_\_\_\_ ECON3110 Advanced Microeconomic Analysis
- \_\_\_\_\_ ECON3120 Advanced Macroeconomic Analysis
- \_\_\_\_\_ ISYE3133 Optimization
- \_\_\_\_\_ MGT3076 Investments
- \_\_\_\_\_ MGT3078 Finance and Investments
- \_\_\_\_\_ MGT3084 Derivative Securities
- \_\_\_\_\_ PHYS3151 Mathematical Physics
- \_\_\_\_\_ PHYS3266 Computational Physics

\* 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: PEOPLE & PLATFORMS****2009 - 2010 DEGREE REQUIREMENTS**

COLLEGE OF COMPUTING

Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
LAB SCIENCE SEQUENCE	4
HUMANITIES ELECTIVE	3
MATH 3012 APPLIED COMBINATORICS	3
CS 2110 COMPUTER ORGANIZATION & PROGRAMMING *	4
LCC 3401 TECHNICAL COMMUNICATION PRACTICES	2
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
LAB SCIENCE SEQUENCE	4
SOCIAL SCIENCE ELECTIVE	3
CS 2340 OBJECTS & DESIGN *	3
CS 2200 COMPUTER SYSTEMS & NETWORKS *	4
FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
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

<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>
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<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>13</b>

**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 Free Elective.

# PEOPLE AND PLATFORMS

## THREAD PICKS AND ELECTIVE COURSES

### Social/Behavioral Science for Computing \*

- \_\_\_\_\_ PSYC2210 Social Psychology
- \_\_\_\_\_ PSYC2760 Psychology of Human Language
- \_\_\_\_\_ PSYC3040 Sensation and Perception

### Human-Centered Technology \*

- \_\_\_\_\_ CS3750 Human-Computer Interface Design and Eval
- \_\_\_\_\_ CS3790 Introduction to Cognitive Science
- \_\_\_\_\_ 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

- \_\_\_\_\_ CS3750 Human-Computer Interface Design and Eval
- \_\_\_\_\_ CS4472 Design of Online Communities
- \_\_\_\_\_ CS4690 Empirical Methods in HCI
- \_\_\_\_\_ CS4770 Mixed Reality Experience Design
- \_\_\_\_\_ PSYC2020 Psychological Statistics

### 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
- \_\_\_\_\_ CS4233 Parallel Computer Architecture
- \_\_\_\_\_ CS4290 Advanced Computer Organization
- \_\_\_\_\_ CS4803 Design of Gaming Consoles
- \_\_\_\_\_ CS4803 Scalable Information Systems & Technologies

### Distributed Platforms

- \_\_\_\_\_ CS4210 Advanced Operating Systems
- \_\_\_\_\_ CS4675 Internet Computing Systems
- \_\_\_\_\_ CS4685 Pervasive Systems and Networking
- \_\_\_\_\_ CS4803 Scalable Information Systems & Technologies

### Embedded and Ubiquitous Platforms

- \_\_\_\_\_ CS4220 Programming Embedded Systems
- \_\_\_\_\_ CS4685 Pervasive Systems and Networking
- \_\_\_\_\_ CS4803 Design of Gaming Consoles

### Domain Specific Platforms

- \_\_\_\_\_ CS4220 Programming Embedded Systems
- \_\_\_\_\_ CS4803 Design of Gaming Consoles
- \_\_\_\_\_ CS4803 Scalable Information Systems & Technologies

### Platform Technologies

- \_\_\_\_\_ CS4210 Advanced Operating Systems
- \_\_\_\_\_ CS4220 Programming Embedded Systems
- \_\_\_\_\_ CS4235 Introduction to Information Security
- \_\_\_\_\_ CS4237 Computer and Network Security
- \_\_\_\_\_ CS4560 Verification of Systems

### Software Interfaces, Tools & Technologies

- \_\_\_\_\_ CS4220 Programming Embedded Systems
- \_\_\_\_\_ CS4240 Compilers, Interpreters, & Program Analyzers
- \_\_\_\_\_ CS4392 Programming Language Design
- \_\_\_\_\_ CS6241 Design and Implementation of Compilers
- \_\_\_\_\_ CS6246 Object-oriented Systems and Languages

\* Required Thread Pick

**BACHELOR OF SCIENCE IN COMPUTER SCIENCE****THREAD: THEORY & PEOPLE****2009 - 2010 DEGREE REQUIREMENTS**

COLLEGE OF COMPUTING

Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
CS SR PROJECT (4980 or 4911) *	3
PSYC 2015 RESEARCH METHODS *	4
HUMAN CENTERED TECHNOLOGY - PICK ONE *	3
CS 4540 ADVANCED ALGORITHMS *	3

FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>13</b>

**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 Free Elective.



# PEOPLE AND THEORY

## THREAD PICKS AND ELECTIVE COURSES

### Social/Behavioral Science for Computing \*

- \_\_\_\_\_ PSYC2210 Social Psychology
- \_\_\_\_\_ PSYC2760 Psychology of Human Language
- \_\_\_\_\_ PSYC3040 Sensation and Perception

### Human-Centered Technology \*

- \_\_\_\_\_ CS3750 Human-Computer Interface Design and Eval
- \_\_\_\_\_ CS3790 Introduction to Cognitive Science
- \_\_\_\_\_ 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

- \_\_\_\_\_ CS3750 Human-Computer Interface Design and Eval
- \_\_\_\_\_ CS4472 Design of Online Communities
- \_\_\_\_\_ CS4690 Empirical Methods in HCI
- \_\_\_\_\_ CS4770 Mixed Reality Experience Design
- \_\_\_\_\_ PSYC2020 Psychological Statistics

### 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

- \_\_\_\_\_ CS3210 Design of Operating Systems
- \_\_\_\_\_ CS3251 Computer Networking I
- \_\_\_\_\_ CS3451 Computer Graphics
- \_\_\_\_\_ CS3600 Introduction to Artificial Intelligence
- \_\_\_\_\_ CS4140 Computational Modeling Algorithms
- \_\_\_\_\_ CS4235 Introduction to Information Security
- \_\_\_\_\_ CS4335 Computer Simulation
- \_\_\_\_\_ CS4400 Introduction to Database Systems
- \_\_\_\_\_ CS4496 Computer Animation
- \_\_\_\_\_ CS4641 Machine Learning

### Topics in Algorithms and Complexity

- \_\_\_\_\_ CS3240 Languages and Computation
- \_\_\_\_\_ CS4510 Automata and Complexity Theory
- \_\_\_\_\_ CS4520 Approximation Algorithms
- \_\_\_\_\_ CS4530 Randomized Algorithms
- \_\_\_\_\_ CS6520 Computational Complexity

### Mathematics with CS Applications

- \_\_\_\_\_ MATH2406 Abstract Vector Spaces
- \_\_\_\_\_ MATH3770 Statistics and Applications
- \_\_\_\_\_ MATH4012 Algebraic Structures for Coding Theory
- \_\_\_\_\_ MATH4107 Abstract Algebra I
- \_\_\_\_\_ MATH4150 Intro to Number Theory & Cryptography
- \_\_\_\_\_ MATH4255 Monte Carlo Methods
- \_\_\_\_\_ MATH4280 Introduction to Information Theory
- \_\_\_\_\_ MATH4305 Topics in Linear Algebra
- \_\_\_\_\_ MATH4580 Linear Programming
- \_\_\_\_\_ MATH4640/CS4642 Numerical Analysis I
- \_\_\_\_\_ MATH4782 Quantum Info & Quantum Computation

### Computational Methods in the Sciences

- \_\_\_\_\_ BIOL2400 Mathematical Models in Biology
- \_\_\_\_\_ BIOL4755 Mathematical Biology
- \_\_\_\_\_ ECON3110 Advanced Microeconomic Analysis
- \_\_\_\_\_ ECON3120 Advanced Macroeconomic Analysis
- \_\_\_\_\_ ISYE3133 Optimization
- \_\_\_\_\_ MGT3076 Investments
- \_\_\_\_\_ MGT3078 Finance and Investments
- \_\_\_\_\_ MGT3084 Derivative Securities
- \_\_\_\_\_ PHYS3151 Mathematical Physics
- \_\_\_\_\_ PHYS3266 Computational Physics

**BACHELOR OF SCIENCE IN COMPUTER SCIENCE**  
**THREAD: THEORY & PLATFORMS**  
**2009 - 2010 DEGREE REQUIREMENTS**  
 COLLEGE OF COMPUTING  
 Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
LAB SCIENCE SEQUENCE	4
SOCIAL SCIENCE ELECTIVE	3
CS 2340 OBJECTS & DESIGN *	3
CS 2200 COMPUTER SYSTEMS & NETWORKS *	4
FREE ELECTIVE	1
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
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 CS 3511 Design and Analysis of Algorithms, Honors	3
FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
CS SR PROJECT (4980 or 4911) *	3
COMPUTER ARCHITECTURES - PICK ONE *	3
PLATFORM INTERFACES - PICK ONE *	3
CS 4540 ADVANCED ALGORITHMS *	3

FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
CS 4001 COMPUTING , SOCIETY, & PROFESSIONALISM * or CS 4002 ROBOT & SOCIETY *	3
CS 3240 LANGUAGES & COMPUTATION *	3
MATHEMATICS RELATED TO COMPUTER SCIENCE - PICK ONE *	3
FREE ELECTIVE	3
FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

**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 Free Elective.

# PLATFORMS AND THEORY

## THREAD PICKS AND ELECTIVE COURSES

### 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
- \_\_\_\_\_ CS4233 Parallel Computer Architecture
- \_\_\_\_\_ CS4290 Advanced Computer Organization
- \_\_\_\_\_ CS4803 Design of Gaming Consoles
- \_\_\_\_\_ CS4803 Scalable Information Systems & Technologies

### Distributed Platforms

- \_\_\_\_\_ CS4210 Advanced Operating Systems
- \_\_\_\_\_ CS4675 Internet Computing Systems
- \_\_\_\_\_ CS4685 Pervasive Systems and Networking
- \_\_\_\_\_ CS4803 Scalable Information Systems & Technologies

### Embedded and Ubiquitous Platforms

- \_\_\_\_\_ CS4220 Programming Embedded Systems
- \_\_\_\_\_ CS4685 Pervasive Systems and Networking
- \_\_\_\_\_ CS4803 Design of Gaming Consoles

### Domain Specific Platforms

- \_\_\_\_\_ CS4220 Programming Embedded Systems
- \_\_\_\_\_ CS4803 Design of Gaming Consoles
- \_\_\_\_\_ CS4803 Scalable Information Systems & Technologies

### Platform Technologies

- \_\_\_\_\_ CS4210 Advanced Operating Systems
- \_\_\_\_\_ CS4220 Programming Embedded Systems
- \_\_\_\_\_ CS4235 Introduction to Information Security
- \_\_\_\_\_ CS4237 Computer and Network Security
- \_\_\_\_\_ CS4560 Verification of Systems

### Software Interfaces, Tools & Technologies

- \_\_\_\_\_ CS4220 Programming Embedded Systems
- \_\_\_\_\_ CS4240 Compilers, Interpreters, & Program Analyzers
- \_\_\_\_\_ CS4392 Programming Language Design
- \_\_\_\_\_ CS6241 Design and Implementation of Compilers
- \_\_\_\_\_ CS6246 Object-oriented Systems and Languages

### Mathematics Related to Computer Science \*

- \_\_\_\_\_ MATH2406 Abstract Vector Spaces
- \_\_\_\_\_ MATH4032 Combinatorial Analysis

### CS Appl Involving Algorithms & Complexity

- \_\_\_\_\_ CS3251 Computer Networking I
- \_\_\_\_\_ CS3451 Computer Graphics
- \_\_\_\_\_ CS3600 Introduction to Artificial Intelligence
- \_\_\_\_\_ CS4140 Computational Modeling Algorithms
- \_\_\_\_\_ CS4235 Introduction to Information Security
- \_\_\_\_\_ CS4335 Computer Simulation
- \_\_\_\_\_ CS4400 Introduction to Database Systems
- \_\_\_\_\_ CS4496 Computer Animation
- \_\_\_\_\_ CS4641 Machine Learning

### Topics in Algorithms and Complexity

- \_\_\_\_\_ CS3240 Languages and Computation
- \_\_\_\_\_ CS4510 Automata and Complexity Theory
- \_\_\_\_\_ CS4520 Approximation Algorithms
- \_\_\_\_\_ CS4530 Randomized Algorithms
- \_\_\_\_\_ CS6520 Computational Complexity

### Mathematics with CS Applications

- \_\_\_\_\_ MATH2406 Abstract Vector Spaces
- \_\_\_\_\_ MATH3770 Statistics and Applications
- \_\_\_\_\_ MATH4012 Algebraic Structures for Coding Theory
- \_\_\_\_\_ MATH4107 Abstract Algebra I
- \_\_\_\_\_ MATH4150 Intro to Number Theory & Cryptography
- \_\_\_\_\_ MATH4255 Monte Carlo Methods
- \_\_\_\_\_ MATH4280 Introduction to Information Theory
- \_\_\_\_\_ MATH4305 Topics in Linear Algebra
- \_\_\_\_\_ MATH4580 Linear Programming
- \_\_\_\_\_ MATH4640/CS4642 Numerical Analysis I
- \_\_\_\_\_ MATH4782 Quantum Info & Quantum Computation

### Computational Methods in the Sciences

- \_\_\_\_\_ BIOL2400 Mathematical Models in Biology
- \_\_\_\_\_ BIOL4755 Mathematical Biology
- \_\_\_\_\_ ECON3110 Advanced Microeconomic Analysis
- \_\_\_\_\_ ECON3120 Advanced Macroeconomic Analysis
- \_\_\_\_\_ ISYE3133 Optimization
- \_\_\_\_\_ MGT3076 Investments
- \_\_\_\_\_ MGT3078 Finance and Investments
- \_\_\_\_\_ MGT3084 Derivative Securities
- \_\_\_\_\_ PHYS3151 Mathematical Physics
- \_\_\_\_\_ PHYS3266 Computational Physics

\* Required Thread Pick

## **COOPERATIVE PROGRAMS**

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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**  
**2009 - 2010 DEGREE REQUIREMENTS**  
COLLEGE OF COMPUTING

The College of Computing has an approved BS CS 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

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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](http://www.urop.gatech.edu).

## SCHOOL OF COMPUTER SCIENCE

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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; MS in Information Security; MS in BioInformatics), and the PhD level (PhD in Computer Science; PhD in Algorithms, Combinatorics & Optimization; PhD in BioEngineering, PhD 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

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In response to the increased need for engineers and medical scientists with advanced training in bioengineering, Georgia Tech now offers master's and PhD 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](http://www.bme.gatech.edu/academics/grad/bioengineering.html).

## **MASTER OF SCIENCE IN BIOENGINEERING**

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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](http://www.bme.gatech.edu/academics/grad/bioengineering.html).

## MASTER OF SCIENCE IN COMPUTER SCIENCE

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The program for the Master of Science in Computer Science (MS CS) prepares students for more highly productive careers in industry. Graduates receive the MS CS 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 MS CS 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 BS CS degree may not be used toward the MS CS 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 MS CS degree is three. Students may choose from one of three options in pursuing the MS CS degree, including:

**Course option:** This option requires the student to complete 36 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 27 hours of coursework and a 9 hour project. The project requires approval by a faculty advisor and the MS program coordinator in the semester prior to its inception.

Total Credit Hours 36  
MS 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 12 hour thesis. The thesis process is defined elsewhere in this catalog.

Total Credit Hours 36  
MS Thesis Hours 12 hour  
Total Course Credit Hours 24  
Minimum Credit Hours in CS 24\*  
Minimum Credit Hours (6000/8000 Level) in CS 18\*

\* May not include MS project or thesis hours.

All three of these options require students to complete 3 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 MS CS 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 MS CS while that student is also pursuing his or her degree in the other major. To be granted permission to pursue the MS CS, a student must submit to the MS program coordinator of the College of Computing the material required for admission to the MS CS 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 MS CS, 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 MS program coordinator of the College of Computing.

A student enrolled in the MS degree program in computer science who wishes to be admitted to the PhD 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 MS CS program, visit [www.cc.gatech.edu](http://www.cc.gatech.edu).

## MASTER OF SCIENCE IN INFORMATION SECURITY

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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 32 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 (23 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: 9 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: 9 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 MS IS program, visit [www.cc.gatech.edu](http://www.cc.gatech.edu).

## **DOCTOR OF PHILOSOPHY WITH A MAJOR IN ALGORITHMS, COMBINATORICS, OPTIMIZATION**

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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](http://www.math.gatech.edu/aco).

## **DOCTOR OF PHILOSOPHY WITH A MAJOR IN BIOENGINEERING**

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The Bioengineering PhD 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 6 hours of coursework in a mixture of bioscience, mathematics, bioengineering, traditional engineering, and elective classes.



## DOCTOR OF PHILOSOPHY WITH A MAJOR IN BIOINFORMATICS

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The mission of the Georgia Tech Bioinformatics PhD 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 PhD 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 PhD in Biology with a concentration in Bioinformatics. This option will stay in place for those students who would like to pursue a PhD in Biology.

The group of prospective applicants for the PhD program is expected to consist of students with an MS in Bioinformatics as well as holders of BS/BA 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

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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 3 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 PhD program, visit [www.cc.gatech.edu](http://www.cc.gatech.edu).

## **COOPERATIVE PROGRAMS**

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The College of Computing participates in the undergraduate and graduate Cooperative Programs.

See links below for further Information.

## SCHOOL OF INTERACTIVE COMPUTING

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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 PhD degrees in Computer Science, or a PhD in Human-Centric Computing-the first of its kind in the nation. The School of Interactive Computing is also developing a Robotics PhD to be offered in conjunction with schools from the College of Engineering.

## BACHELOR OF SCIENCE IN COMPUTATIONAL MEDIA

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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 36 semester hours of courses in computer science and 30 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 BS 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  
2009 - 2010 DEGREE REQUIREMENTS**

INTERDISCIPLINARY DEGREE WITH THE COLLEGE OF COMPUTING AND IVAN ALLEN COLLEGE

Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>13</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
CAPSTONE *	4
CS SPECIALTY COURSE (3000 OR 4000 LEVEL, FROM CS MEDIA THREAD OR CS PEOPLE THREAD) *	3
FREE ELECTIVES	8
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

**TOTAL PROGRAM HOURS = 120 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

\* All required CS and LCC courses must be taken on a letter-grade basis, with a final grade of C or better.

## REQUIREMENTS AND ELECTIVES

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### Computing Requirement

Students must complete CS 1315, CS 1301, CS 1371, 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

As part of the humanities requirement, students must complete either LCC 3206 or LCC 3314.

All students must take 28 hours of CS courses including the following groups:

1. CS 1331
2. CS 2261
3. CS 1050
4. CS 2340
5. CS 4001
6. 12 hours from the Media or People threads of CS. (CS 3240, 3451, 3510, 3640, 4230, 4455, 4460, 4465, 4470, 4480, 4496, 4550, 4590, 4770, 3750, 3790, 4605, 4625, 4660, 4665, 4670, 4690, 4793, 3300, 3600, 4235, 4400, 4440, 4635, 4699, 4731, 4803) (PSYC 3011, 3040, 4090, 4260).

All students must take 30 hours of LCC courses including the following groups:

1. LCC 2700 and 2720
2. LCC 2400, 2500, or 2600
3. 6 hours of Studio courses (LCC 2730, 3705, or 3710)
4. 9 hours of LCC Specialty courses in one of the following categories:
  - Film: LCC 3252, 3254, 3256, 3352, 3853, 4500
  - Technology and Culture: LCC 3302, 3304, 3306, 3308, 3310, 3316, 3318, 3362, 3833, 4100.
  - Performance Studies: LCC 3262, 3362, 3863, 4600.
  - Narrative: LCC 3202, 3208, 3212, 3214, 3216, 3218, 3220, 3222, 3226, 3228.
5. 3 hours of Advanced Studio courses (LCC 4699, 4720, 4725, 4730, 4731, 4732).
6. 3 hours of an LCC elective (any LCC course 2000 level or higher).

### Mathematics

The mathematics requirement may be satisfied by Math 1501, 1502, and 2605.

### Science

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.

### Freshman Composition/Humanities/Fine Arts

Students are required to complete 3 hours in humanities or fine arts, 3 hours of either LCC 3206, or 3314, and 6 hours in freshman composition (ENGL 1101 and 1102), for a total of 12 hours.



### **Social Sciences**

Students are required to complete 12 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) three additional social science courses.

### **Senior Capstone**

Each student must complete a senior capstone course of 4 hours. A student must have a signed contract with the academic advisor in order to receive permission to register for a capstone course.

### **Free Electives**

Each student must accumulate at least 122 hours of credit toward the Bachelor of Science in Computational Media. Therefore, in addition to the listed requirements, a student must take 11 hours of elective courses either within or outside LCC or CS to complete 122 hours.

## **COOPERATIVE PROGRAMS**

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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**

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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 36 hours of courses in CS and 30 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**

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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 9 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 36 hours of courses in CS and 30 hours of courses in LCC (in addition to the basic humanities requirement). Students will also:

1. complete 9 hours of undergraduate research and
2. complete LCC 4700 Writing the Undergraduate Thesis.

## **FIVE-YEAR BS/MS COMPUTATIONAL MEDIA AND DIGITAL MEDIA**

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Students who desire to pursue the five-year BS/MS combination in CM and DM must apply to the School after completing at least 75 hours of work towards the CM degree. Applicants should have shown a cumulative grade point average (GPA) of at least 3.5.

Students admitted to the five-year program will take a total of 12 hours of graduate course work during their final undergraduate year. 6 hours of that work, in DM courses, will count toward the CM Advanced Studio and Capstone requirements 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 their fifth year, students will take a total of 24 hours, including either LCC 6800 (Project) or LCC 7000 (Thesis), and with no more than three courses taken outside of the DM program.

## MASTER OF SCIENCE IN COMPUTER SCIENCE

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The program for the Master of Science in Computer Science (MS CS) prepares students for more highly productive careers in industry. Graduates receive the MS CS 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 MS CS 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 BS CS degree may not be used toward the MS CS 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 MS CS degree is three. Students may choose from one of three options in pursuing the MS CS degree, including:

**Course option:** This option requires the student to complete 36 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 27 hours of coursework and a 9 hour project. The project requires approval by a faculty advisor and the MS program coordinator in the semester prior to its inception.

Total Credit Hours 36  
MS 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 12 hour thesis. The thesis process is defined elsewhere in this catalog.

Total Credit Hours 36  
MS Thesis Hours 12 hour  
Total Course Credit Hours 24  
Minimum Credit Hours in CS 24\*  
Minimum Credit Hours (6000/8000 Level) in CS 18\*

\* May not include MS project or thesis hours.

All three of these options require students to complete 3 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 MS CS 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 MS CS while that student is also pursuing his or her degree in the other major. To be granted permission to pursue the MS CS, a student must submit to the MS program coordinator of the College of Computing the material required for admission to the MS CS 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 MS CS, 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 MS program coordinator of the College of Computing.

A student enrolled in the MS degree program in computer science who wishes to be admitted to the PhD 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 MS CS program, visit [www.cc.gatech.edu](http://www.cc.gatech.edu).

## 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 36 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 (9 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 9 hours of the Flexible Core must be taken outside your specialization. A maximum of 3 hours of CS 8903 may count toward the Flexible Core.

### COMPUTING

COA/CS 6763, Design of Environments  
COA 8901, Special Proble Network Music  
COA 8903, Special Proble Project Studio in Music Technology  
COA 8903, Special Proble 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 Proble Computer Music Composition  
COA 8903, Special Proble 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 Assistive Technologies

## **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](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 3 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 6 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

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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 3 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 PhD program, visit [www.cc.gatech.edu](http://www.cc.gatech.edu).

## **DOCTOR OF PHILOSOPHY WITH A MAJOR IN HUMAN-CENTERED COMPUTING (HCC)**

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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](http://www.cc.gatech.edu).

## **DOCTOR OF PHILOSOPHY WITH A MAJOR IN ROBOTICS**

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Students pursuing a PhD in Robotics must take 36 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 PhD program in robotics through that home school.

## **COOPERATIVE PROGRAMS**

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The College of Computing participates in the undergraduate and graduate Cooperative Programs.

See links below for further Information.

## COMPUTATIONAL SCIENCE AND ENGINEERING DIVISION

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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 addition 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

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In response to the increased need for engineers and medical scientists with advanced training in bioengineering, Georgia Tech now offers master's and PhD 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](http://www.bme.gatech.edu/academics/grad/bioengineering.html).



## **MASTER OF SCIENCE IN BIOENGINEERING**

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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](http://www.bme.gatech.edu/academics/grad/bioengineering.html).

## MASTER OF SCIENCE IN COMPUTATIONAL SCIENCE AND ENGINEERING

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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 MS 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 12 hours of coursework relevant to the CSE discipline that includes one applications area; this must include at least 6 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 MS thesis (thesis option) that is defended to the student's thesis committee who is responsible for overseeing the student's research. 6 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 COMPUTER SCIENCE

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The program for the Master of Science in Computer Science (MS CS) prepares students for more highly productive careers in industry. Graduates receive the MS CS 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 MS CS 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 BS CS degree may not be used toward the MS CS 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 MS CS degree is three. Students may choose from one of three options in pursuing the MS CS degree, including:

**Course option:** This option requires the student to complete 36 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 27 hours of coursework and a 9 hour project. The project requires approval by a faculty advisor and the MS program coordinator in the semester prior to its inception.

Total Credit Hours 36  
MS 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 12 hour thesis. The thesis process is defined elsewhere in this catalog.

Total Credit Hours 36  
MS Thesis Hours 12 hour  
Total Course Credit Hours 24  
Minimum Credit Hours in CS 24\*  
Minimum Credit Hours (6000/8000 Level) in CS 18\*

\* May not include MS project or thesis hours.

All three of these options require students to complete 3 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 MS CS 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 MS CS while that student is also pursuing his or her degree in the other major. To be granted permission to pursue the MS CS, a student must submit to the MS program coordinator of the College of Computing the material required for admission to the MS CS 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 MS CS, 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 MS program coordinator of the College of Computing.

A student enrolled in the MS degree program in computer science who wishes to be admitted to the PhD 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 MS CS program, visit [www.cc.gatech.edu](http://www.cc.gatech.edu).

## **DOCTOR OF PHILOSOPHY WITH A MAJOR IN BIOENGINEERING**

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The Bioengineering PhD 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 6 hours of coursework in a mixture of bioscience, mathematics, bioengineering, traditional engineering, and elective classes.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN BIOINFORMATICS

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The mission of the Georgia Tech Bioinformatics PhD 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 PhD 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 PhD in Biology with a concentration in Bioinformatics. This option will stay in place for those students who would like to pursue a PhD in Biology.

The group of prospective applicants for the PhD program is expected to consist of students with an MS in Bioinformatics as well as holders of BS/BA 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.

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 PhD 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 (12 hours), a computation specialization (9 hours), and an application specialization (9 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 9 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 9 hours of courses that increase depth of understanding in an application field; these need not be computation-focused courses. At least 9 hours of PhD 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

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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 3 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 PhD program, visit [www.cc.gatech.edu](http://www.cc.gatech.edu).



## **COOPERATIVE PROGRAMS**

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The College of Computing participates in the undergraduate and graduate Cooperative Programs.

See links below for further Information.

## **MINOR IN COMPUTER SCIENCE**

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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. [Click here](#) for additional information.

## CERTIFICATE IN SOFTWARE ENGINEERING

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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 taken 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**

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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](http://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.

## COLLEGE OF ENGINEERING ACCREDITATION STATEMENT

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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)

## **COURSES OF INSTRUCTION**

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Courses offered by the College of Engineering (COE) can be viewed on the course catalog .

## MULTIDISCIPLINARY ACTIVITIES AND PROGRAMS

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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	BS	MS	PhD
Geohydrology		MS	PhD
Manufacturing		MS	PhD
Mechanical Properties of Solids			PhD
Polymer Engineering	BS	MS	PhD
Pulp and Paper Engineering	BS		

### 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 12 credit hours (not required by name and number in the student's major) must be taken in a coherent program.
4. At least 9 credit hours must be at the 3000 level or higher.
5. At least 3 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 9 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**

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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**

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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.

## COLLEGE OF ENGINEERING

### SCHOOL OF AEROSPACE ENGINEERING

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Bachelor of Science in Aerospace Engineering

**Additional Options:**

Cooperative Plan

International Plan

Research Option

BS/MS A.E. - Five-year

BS/MS 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

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Bachelor of Science in Chemical and Biomolecular Engineering

**Additional Options:**

Cooperative Plan

Biotechnology Option

Research Option

BS/MS C.H.B.E. - Five-year

BS/MS 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 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

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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

BS/MS C.E. - Five-year

BS/MS ENV.E. - Five-year

BS/MS C.E. - Five-year

BS/MS ENV.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

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## 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

BS/MS E.C.E. - Five-year

BS/MS 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)

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**

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Bachelor of Science in Industrial Engineering

**Additional Options:**

Cooperative Plan

International Plan

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

Supply Chain Engineering

System Informatics & Control Track

Doctor of Philosophy with a Major in Operations Research

## **SCHOOL OF MATERIALS SCIENCE & ENGINEERING**

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Bachelor of Science in Materials Science and Engineering

**Additional Options:**

Cooperative Plan

Research Option

BS/MS MSE - Five-year

BS/MS MSE - 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 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**

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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

BS/MS M.E. - Five-year

BS/MS 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

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### **SCHOOL OF POLYMER, TEXTILE & FIBER ENGINEERING**

Bachelor of Science in Polymer and Fiber Engineering

**Additional Options:**

Cooperative Plan

BS/MS P.T.F.E. - Five-year

BS/MS P.T.F.E. - Five-year

Master of Science in Polymer, Textile and Fiber Engineering

Doctor of Philosophy with a Major in Polymer, Textile and Fiber Engineering

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### **GT/EMORY DEPARTMENT OF BIOMEDICAL ENGINEERING**

Bachelor of Science in Biomedical Engineering

**Additional Options:**

Cooperative Plan

International Plan

Research Option

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

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### **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)



## **GUGGENHEIM SCHOOL OF AEROSPACE ENGINEERING**

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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](http://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 BS/MS 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](http://www.ae.gatech.edu).



## **BACHELOR OF SCIENCE IN AEROSPACE ENGINEERING ACCREDITATION**

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The BS 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**

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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

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- 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****2009 - 2010 DEGREE REQUIREMENTS**

## SCHOOL OF AEROSPACE ENGINEERING

## Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
MATH 1501 CALCULUS I	4
ENGL 1101 ENGLISH COMPOSITION I	3
CHEM 1310 GENERAL CHEMISTRY	4
CS 1371 COMPUTING FOR ENGINEERS	3
WELLNESS	2
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
HUMANITIES ELECTIVE	3
CAPSTONE COURSE *	3
AE 3021 HIGH SPEED AERODYNAMICS	3
AE 3145 STRUCTURES LAB	1
SOCIAL SCIENCE ELECTIVE	3
FREE ELECTIVES	4

<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>
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<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
AE 4220 AEROELASTICITY	3
CAPSTONE COURSE *	3
SOCIAL SCIENCE ELECTIVE	3
FREE ELECTIVES	6
AE 4525 CONTROL SYSTEMS DESIGN LAB	2
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

**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**

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### **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 12 hour humanities requirement. An additional 6 hours of Institute-approved humanities courses are required to fulfill the 12 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 9 hours of Institute-approved social science courses, satisfies the 12 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](http://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 6 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](http://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 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 - COOPERATIVE PLAN**

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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](http://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**

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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.internationalplan.gatech.edu> 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 BS 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**

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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 6 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

## **BS/MS HONORS PROGRAM**

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A combined BS/MS honors program is also offered that prepares students for graduate studies and research. Please see [www.ae.gatech.edu/undergraduate/semester/honors/index.html](http://www.ae.gatech.edu/undergraduate/semester/honors/index.html) for more information.

## **MINORS**

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The School of Aerospace Engineering offers a minor in aerospace engineering for students majoring in all disciplines (other than AE) at Georgia Tech.

## MASTER OF SCIENCE IN AEROSPACE ENGINEERING

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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 33 semester hours of coursework, which must include 3 hours of Special Problems research credit. Alternatively, the candidate may elect to complete twenty-four semester hours of coursework along with 9 hours of MS 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 MS 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](http://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](http://www.ae.gatech.edu/research).

## MASTER OF SCIENCE IN COMPUTATIONAL SCIENCE AND ENGINEERING

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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 MS 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 12 hours of coursework relevant to the CSE discipline that includes one applications area; this must include at least 6 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 MS thesis (thesis option) that is defended to the student's thesis committee who is responsible for overseeing the student's research. 6 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.

## **BS/MS HONORS PROGRAM**

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A combined BS/MS honors program is also offered that prepares students for graduate studies and research. Please see [www.ae.gatech.edu/undergraduate/semester/honors/index.html](http://www.ae.gatech.edu/undergraduate/semester/honors/index.html) for more information.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN AEROSPACE ENGINEERING

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The School of Aerospace Engineering offers a doctoral degree. The PhD 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 PhD 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 PhD 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](http://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](http://www.ae.gatech.edu/research).

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 PhD 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 (12 hours), a computation specialization (9 hours), and an application specialization (9 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 9 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 9 hours of courses that increase depth of understanding in an application field; these need not be computation-focused courses. At least 9 hours of PhD 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**

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Students pursuing a PhD in Robotics must take 36 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 PhD program in robotics through that home school.

## **CERTIFICATE PROGRAM IN REMOTE SENSING**

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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>.

## **BACHELOR OF SCIENCE IN BIOMEDICAL ENGINEERING ACCREDITATION**

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The BS 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.

**WALLACE H. COULTER DEPARTMENT OF BIOMEDICAL ENGINEERING  
AT GEORGIA TECH AND EMORY UNIVERSITY**

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Established in 1997

Location: U. A. Whitaker Building

Telephone: 404.385.0124

Fax: 404.894.4243

Web site: [www.bme.gatech.edu](http://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 biomaterials and regenerative medicine, cardiovascular biology and biomechanics, cellular and biomolecular engineering, integrative biosystems, medical imaging, and neuroengineering.

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**

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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**

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### **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 BS 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****2009 - 2010 DEGREE REQUIREMENTS**

## SCHOOL OF BIOMEDICAL ENGINEERING

## Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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 WELLNESS	1 2
<b>TOTAL SEMESTER HOURS =</b>	<b>18</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
MATH 2403 DIFFERENTIAL EQUATIONS **	4
BMED 2210 CONSERVATION PRINCIPALS IN BMED * **	4
COE 2001 STATICS *	2
BMED 2300 PROBLEMS IN BIOMEDICAL ENGINEERING II **	3
HUMANITIES ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
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 BMED 2400 INTRODUCTION TO BIOENGINEERING STATISTICS	3
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
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
LCC 3401 TECHNICAL COMMUNICATION PRACTICES or CHBE 4600 ENGINEERING COMMUNICATION ***	2 / 3
<b>TOTAL SEMESTER HOURS = ***</b>	<b>15 / 16</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
MSE 2001 PRINCIPLES & APPLICATIONS OF ENGINEERING MATERIALS	3
BMED 4600 SENIOR DESIGN PROJECT I **	2
BME TECHNICAL ELECTIVES	6
HUMANITIES ELECTIVE	3
FREE ELECTIVE ***	3 / 4

<b>TOTAL SEMESTER HOURS = ***</b>	<b>17 / 18</b>
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<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
BMED 4601 SENIOR DESIGN PROJECT II **	3
BME TECHNICAL ELECTIVE	3
ECON 2100 or 2105 or 2106	3
HUMANITIES / SOCIAL SCIENCE ELECTIVES	6
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

**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.

\*\*\* If CHBE 4600 is taken in place of LCC 3401





The biomedical engineering curriculum includes 29 semester hours of electives, subject to the following requirements:

### **HUMANITIES/SOCIAL SCIENCES ELECTIVES**

ENGL 1101 and 1102 apply toward satisfaction of the 12 hour humanities requirement. An additional 6 hours of Institute-approved humanities courses are required to fulfill the 12 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 9 hours of Institute-approved social science courses, satisfies the 12 hour social sciences requirement.

### **BME TECHNICAL ELECTIVES**

9 hours of BME technical elective courses are required. The purpose of these electives is to provide students with an opportunity for in-depth learning 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 4781 Biomedical Instrumentation
- 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, 4781 and/or 4784
- Biomechanics: BMED 4751, 4757 and 4758
- Biomaterials and Tissue Engineering: BMED 4500, 4751, 4758 and/or 4765
- Neuroengineering: BMED 4400, 4752, 4781 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 6 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**

3 or 4 hours , depending on which communications course (LCC 3401 or CHBE 4600) are taken.

### **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**

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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**

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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 26 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](http://www.oie.gatech.edu/internationalplan).

## **BACHELOR OF SCIENCE IN BIOMEDICAL ENGINEERING - RESEARCH OPTION**

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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 9 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**

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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**

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The Department of Biomedical Engineering participates in an undergraduate Multidisciplinary Certificate in "Biomaterials".

See [www.mse.gatech.edu/Academics/Certificate\\_Programs/Biomaterials/biomaterials.html](http://www.mse.gatech.edu/Academics/Certificate_Programs/Biomaterials/biomaterials.html) for more details.



## **DOCTOR OF PHILOSOPHY WITH A MAJOR IN BIOENGINEERING**

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This program is interdisciplinary in scope, where advanced courses in engineering specialties, life sciences, and bioengineering are combined with training in biomedical research. The PhD 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.

### **PARTICIPATING SCHOOLS**

College of Computing  
School of Biology  
School of Biomedical Engineering  
School of Chemistry and Biochemistry  
School of Industrial and Systems Engineering  
School of Mathematics

### **OBJECTIVE OF THE PROGRAM**

The mission of the Georgia Tech Bioinformatics PhD 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 PhD 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/graduate-programs/bioinformatics/new/bioinformatics\\_phd.php](http://www.biology.gatech.edu/graduate-programs/bioinformatics/new/bioinformatics_phd.php).

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN BIOMEDICAL ENGINEERING

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The Joint Biomedical Engineering PhD 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 PhD degree by the graduate schools of Georgia Tech and Emory.

### **Minimum Prerequisites**

BS 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 ROBOTICS**

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Students pursuing a PhD in Robotics must take 36 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 PhD program in robotics through that home school.

## **M.D. / PHD PROGRAM**

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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 PhD in Biomedical Engineering or Bioengineering.

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 PhD 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 (12 hours), a computation specialization (9 hours), and an application specialization (9 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 9 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 9 hours of courses that increase depth of understanding in an application field; these need not be computation-focused courses. At least 9 hours of PhD 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 CHEMICAL AND BIOMOLECULAR ENGINEERING

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Established in 1901

Location: Ford Environmental Science and Technology Building

Telephone: 404.894.1838

Fax: 404.894.2866

Web site: [www.chbe.gatech.edu](http://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 BS 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 BS, the School of Chemical and Biomolecular Engineering offers programs leading to the MS and the PhD. Students should check the School Web site for detailed curriculum information and recent updates.

Georgia Tech's BS 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.

**BACHELOR OF SCIENCE IN CHEMICAL AND BIOMOLECULAR ENGINEERING ACCREDITATION**

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The BS 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.



### 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 BS 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 6 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**

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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

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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.
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- 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.

**BS IN CHEMICAL AND BIOMOLECULAR ENGINEERING****2009 - 2010 DEGREE REQUIREMENTS**

SCHOOL OF CHEMICAL &amp; BIOMOLECULAR ENGINEERING

Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
MATH 1501 CALCULUS I	4
CHEM 1310 GENERAL CHEMISTRY	4
ENGL 1101 ENGLISH COMPOSITION I	3
BIOL 1510 BIOLOGICAL PRINCIPLES	4
WELLNESS	2
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>18</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
CHBE 3210 TRANSPORT PROCESSES II	3
CHBE 4300 KINETICS & REACTOR DESIGN	3
CHEM 3281 or CHEM 3511	3
SOCIAL SCIENCE ELECTIVE	3
FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
CHBE 3225 SEPARATION PROCESS	3
CHBE 4400 CHEMICAL PROCESS CONTROL	4
CHBE 4515 CHEMICAL PROCESS SAFETY	1
CHBE ELECTIVE	3
HUMANITIES ELECTIVE	3
TECHNICAL ELECTIVE	3

<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>
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<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
CHBE 4200 TRANSPORTATION PHENOMENA / UNIT OPERATIONS LAB	3
CHBE 4505 PROCESS DESIGN & ECONOMICS	3
CHBE ELECTIVE	3
HUMANITIES ELECTIVE	3
TECHNICAL ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

**TOTAL PROGRAM HOURS = 130 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

## ELECTIVES

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### 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 12 hour humanities requirement. An additional 6 hours of Institute-approved humanities courses are required to fulfill the 12 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. 3 hours each of economics (ECON 2100) and history/political science, combined with an additional 6 hours of Institute-approved social science courses, will satisfy the 12 hour social sciences requirement.

### CHEMICAL AND BIOMOLECULAR ENGINEERING ELECTIVES

ChBE elective(s) may be chosen from the below list of ChBE courses at the 4000-level or higher. Some courses are offered once a year, whereas others are offered only every other year. You should discuss the offering schedule with Ms. Susan McCoy (ChBE Academic Advisor for the Undergraduate Program).

- ChBE 4020 Chemical Engineering in Nano-scale Systems
- ChBE 4310 Bioprocess Engineering (required course for biotech option)
- ChBE 4535 Product Design
- ChBE 4752 Integrated Circuit Fabrication
- ChBE 4757 Biofluid mechanics
- ChBE 4760 Biocatalysis and Metabolic Engineering
- ChBE 4763 Pulping & Chemical Recovery
- ChBE 4764 Bleaching & Paper-making
- ChBE 4765 Drug Design, Development, and Delivery
- ChBE 4770 Nuclear Chemical Engineering
- ChBE 4775 Polymer Science and Engineering I
- ChBE 4776 Polymer Science and Engineering II
- ChBE 4791 Mechanical Behavior of Composites
- ChBE 4793 Composite Materials and Processes
- ChBE 4794 Composite Materials and Manufacturing
- ChBE 4803 Microfluidics and Nanofluidics
- ChBE 4803 Surfaces and Colloids
- ChBE 4803 Data-Driven Modeling & Analyses for Chemical and Biomolecular Systems

All ChBE courses at 6000 level or higher may be taken as ChBE elective, but permit may be required for registration (see Ms. Susan McCoy, ChBE Academic Advisor).

Undergraduate Research (ChBE 4699) will not count as ChBE elective, but may be used as technical electives.

Effective Communication for Professional Engineers (ChBE 4600) will not count as technical or ChBE elective, but it may be used as free elective.



No two courses will be allowed towards satisfying the degree requirements if there is more than 20% overlap in their course content.

## **BIOTECHNOLOGY ELECTIVE**

One biotechnology elective (3 credit hours) must be chosen to include engineering topics. Thus, the following courses would be acceptable towards satisfying the biotechnology electives requirements.

- ChBE 4699 Undergraduate Research (must be in the biotech area)
- ChBE 4757 Biofluid Mechanics
- ChBE 4760/6760 Biocatalysis and Metabolic Engineering
- ChBE 4765/6765 Drug Design, Development, and Delivery
- ChBE 4803/8803 Microfluidics/ Nanofluidics
- ChBE 6794 Tissue Engineering
- BMED 3510 Biomedical Systems and Modeling
- BMED 4477 Bio Networks and Genomics
- BMED 4699 Undergraduate Research
- BMED 4751 Biomaterials
- BMED 4783 Intro Medical Image Processing
- BMED 4784 Engineering Electrophysiology

No two courses will be allowed towards satisfying the degree requirements if there is a more than 20% overlap in their course content.

## **TECHNICAL ELECTIVES-STANDARD PROGRAM**

6 hours of technical electives are required for the standard program. To qualify as a technical elective, a course must be chosen from the list below. Students may count up to 6 hours of undergraduate research (CHBE 4699) toward fulfilling the technical elective requirements, and research credit in excess of 6 hours may be used to satisfy the free elective requirement.

- AE 2020 Low Speed Aerodynamics
- AE 2120 Introduction to Mechanics
- AE 4451 Jet & Rocket Propulsion
- AE 4461 Intro. to Combustion
- AE 4883 Micro-renewable Energy Syst.
- BMED 2400 Intro. Bioengr. Stats.
- BMED 3400 Intro. To Biomechanics
- BMED 3510 Biomed Systems & Modeling
- BMED 4477 Bio Networks & Genomics
- BMED 4751 Intro. to Biomaterials
- BMED 4784 Engr. Electrophysiology
- CEE 2040 Dynamics
- CEE 2300 Environ. Engr. Principles
- CEE 4300 Environ. Engr. Systems
- CEE 4330 Air Pollution Engr.

- CEE 4620 Environ. Impact Assessment
- ChBE 4020 Chem. Eng. in Nanoscale Sys.
- ChBE 4310 Bioprocess Engineering
- ChBE 4535 Product Design
- ChBE 4752 Integrated Circuit Fabrication
- ChBE 4757 Biofluid Mechanics
- ChBE 4763 Pulping & Chemical Recovery
- ChBE 4764 Bleaching & Paper-making
- ChBE 4765 Drug Design, Development & Delivery
- ChBE 4770 Nuclear Chemical Engr.
- ChBE 4775 Polymer Science & Engineering I
- ChBE 4776 Polymer Science & Engineering II
- ChBE 4791 Mechanical Behavior of Composites
- ChBE 4793 Composite Materials & Processes
- ChBE 4794 Composite Materials & Manufacturing
- ChBE 4803 Data-Driven Modeling & Anal. For Ch
- ChBE 4803 Microfluidics/BioMEMS
- ChBE 4803 Surface & Colloid Chemistry & Engr.
- ChBE 6120 Molecular Modeling
- ChBE 6794 Tissue Engineering
- CoE 2001 Statics
- CoE 3001 Deformable Bodies
- CoE 3002 Intro. to the Microelectronics & Nanote
- ECE 2025 Intro. to Signal processing
- ECE 2030 Intro. to Computer Engr.
- ECE 2040 Circuit Analysis
- ECE 3025 Electromagnetics
- ECE 3040 Microelectronic Circuits
- ECE 3065 Electromagnetic Applications
- ECE 3071 Modern Electric Energy Systems
- ECE 3080 Semiconductor Devices
- ECE 3710 Circuits & Electronics
- ECE 3741 Instrum & Electronic Lab
- ISyE 2027 Probability w/Applications
- ISyE 2028 Basic Statistical Methods
- ISyE 3025 Engineering Economy
- ISyE 3039 Methods of Quality Improvement
- ISyE 3133 Engineering Optimization
- ISyE 3232 Stochastic Manufact & Svc.
- ISyE 4803 EDA Supply Chain Econom.
- ISyE 4803 Leadership Skills for Tech. Org.
- ISyE 4803 Regression/ Forecasting

- ME 2202 Dynamics of Rigid Bodies
- ME 3057 Experimental Methodology
- ME 4011 IC Engines
- ME 4210 Mfg Processes & Engr.
- MSE 2020 Characterization of Materials
- MSE 3002 Structural Trans. in Metallic, Ceram
- MSE 3003 Mech. Behavior of Materials
- MSE 4751 Introduction to Biomaterials
- MSE 4803 Biologically Inspired Design
- MSE 4803 Fund. of Nanomater.& Struct.
- NRE 3301 Radiation Physics
- NRE 4204 Nuclear Reactor Physics
- NRE 4328 Radiation Sources & Applic.
- NRE 4610 Plasma Phys. & Fusion Engr.
- NRE 4803 Nuclear & Radiation Technol.
- NRE 4803 Probabilistic Risk Assessment
- NRE 6501 Nuclear Fuel Cycle
- PTFE 2200 Str. & Prop. of Fibers & Poly.
- PTFE 3720 Intro. To Fiber Enterprise
- PTFE 4100 Chem. Proc. of Text. Mater.
- PTFE 4140 Poly. Solns & Surfaces
- PTFE 4141 Instr. Methods of Poly. Char.

### **TECHNICAL ELECTIVES-BIOTECHNOLOGY OPTION**

There are no technical electives for the Biotechnology Option.

### **FREE ELECTIVES**

Any course may be used to satisfy the three credit hour requirement for free electives.

Elective courses (ChBE, technical, biotechnology, social sciences, humanities, free) must not have significant overlap with any other course being used towards the degree requirements.

### **PASS/FAIL COURSES**

Up to 9 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.

## **BS CHEMICAL AND BIOMOLECULAR ENGINEERING - BIOTECHNOLOGY OPTION**

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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**

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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**

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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.

## **BS/MS CHEMICAL AND BIOMOLECULAR ENGINEERING**

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This program seeks to engage undergraduate students who indicate an interest in and ability for additional education beyond the BS degree. The key components of such a program are:

1. a meaningful undergraduate research experience (CHBE 4699, Undergraduate Research Project) for those seeking the MS 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 BS degree in Chemical and Biomolecular Engineering. Students participating in the program will be eligible for the six-credit-hour Graduate Course Option.

## **MINORS**

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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](http://www.chbe.gatech.edu/current/ugrads/special.php) for more information.



## **TRANSFER STUDENTS**

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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.

## **BS/MS CHEMICAL AND BIOMOLECULAR ENGINEERING**

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This program seeks to engage undergraduate students who indicate an interest in and ability for additional education beyond the BS degree. The key components of such a program are:

1. a meaningful undergraduate research experience (CHBE 4699, Undergraduate Research Project) for those seeking the MS 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.

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The program will require thirty credit hours beyond those required for the BS 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**

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The Bioengineering Program offers two options for students interested in pursuing an MS 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 MS degree, several schools award traditional MS degrees, which may have a bioengineering topic. See [www.bioengineering.gatech.edu/academics/ms.html](http://www.bioengineering.gatech.edu/academics/ms.html) for more information.

## MASTER OF SCIENCE IN CHEMICAL ENGINEERING

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The School of Chemical and Biomolecular Engineering offers graduate programs involving advanced-level coursework and independent research leading to MS and PhD degrees in chemical engineering. The MS degree may also be obtained by coursework only. Course selection for both the MS 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 phenomena, 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 MS and PhD degrees in Bioengineering, Polymers, and Paper Science and Engineering.

## MASTER OF SCIENCE IN PAPER SCIENCE AND ENGINEERING

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The Institute of Paper Science and Technology supports the MS 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 MS 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 MS 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](http://www.ipst.gatech.edu/degree_progs/index.html).

## **MASTER OF SCIENCE IN POLYMERS**

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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**

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The School of Chemical and Biomolecular Engineering offers graduate programs involving advanced-level coursework and independent research leading to MS and PhD degrees in chemical engineering. The MS degree may also be obtained by coursework only. Course selection for both the MS 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 phenomena, 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 MS and PhD degrees in Bioengineering, Polymers, and Paper Science and Engineering.

## **DOCTOR OF PHILOSOPHY WITH A MAJOR IN BIOENGINEERING**

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The Bioengineering PhD 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 6 hours of coursework in a mixture of bioscience, mathematics, bioengineering, traditional engineering, and elective classes.



## **DOCTOR OF PHILOSOPHY WITH A MAJOR IN CHEMICAL ENGINEERING**

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The School of Chemical and Biomolecular Engineering offers graduate programs involving advanced-level coursework and independent research leading to MS and PhD degrees in chemical engineering. The MS degree may also be obtained by coursework only. Course selection for both the MS 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 phenomena, 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 MS and PhD degrees in Bioengineering, Polymers, and Paper Science and Engineering.

## **DOCTOR OF PHILOSOPHY WITH A MAJOR IN PAPER SCIENCE AND ENGINEERING**

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The Institute of Paper Science and Technology supports the PhD 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 PhD 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 PhD 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](http://www.ipst.gatech.edu/degree_progs/index.html).

## **SCHOOL OF CIVIL AND ENVIRONMENTAL ENGINEERING**

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Established in 1896

Location: Mason Building

Telephone: 404.894.2201

Fax: 404.894.2278

Web site: [www.ce.gatech.edu](http://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 (undesigned), and Doctor of Philosophy. The School also offers a joint program leading to the degrees Master of Science in Civil Engineering or Master of Science (undesigned), with a concentration in transportation engineering, and Master of City Planning.

## ACCREDITATION

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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**

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The School awards two undergraduate degrees: Bachelor of Science in Civil Engineering (BS CE) and Bachelor of Science in Environmental Engineering (BS EnvE ). 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**

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The four-year curriculum leading to the Bachelor of Science in Civil Engineering (BS CE) 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 BS CE 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 BS CE 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 BS CE 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

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- 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****2009 - 2010 DEGREE REQUIREMENTS**

SCHOOL OF CIVIL AND ENVIRONMENTAL ENGINEERING

## Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
CEE 3055 or 4100 or 4200 or 4300 or 4405 or 4600 (Breadth Electives) *	12
CEE/MATH/ISYE 3770 STATISTICS & APPLICATIONS	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
CEE TECHNICAL ELECTIVES	9
APPROVED ELECTIVE	3
MSE 2001 or ECE 2025 or (ECE 3710 & 3741) (COE Technical Elective-Group B)	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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**

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### **WELLNESS REQUIREMENT**

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

### **HUMANITIES/SOCIAL SCIENCES**

A total of 12 credit hours of humanities and 12 credit hours of social sciences are required. The humanities requirement consists of ENGL 1101, ENGL 1102, a 3 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 6 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 15 hours of elective credit that students may use to pursue a specific area of interest within civil engineering. A maximum of 6 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 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 6 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**

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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 Georgia Tech 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 30 hours of coursework at Georgia Tech before they can participate in the program. For more details, visit [www.gtip.gatech.edu/](http://www.gtip.gatech.edu/).

In addition, there is the Work Abroad Program ([www.workabroad.gatech.edu](http://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, visit [www.profpractice.gatech.edu](http://www.profpractice.gatech.edu).

## **BACHELOR OF SCIENCE IN CIVIL ENGINEERING - INTERNATIONAL PLAN**

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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 26 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](http://www.oie.gatech.edu/internationalplan).

## **BACHELOR OF SCIENCE IN CIVIL ENGINEERING - RESEARCH OPTION**

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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 BSC.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 BS CE 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 6 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

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The School of Civil and Environmental Engineering (CEE) offers a BS degree in Environmental Engineering (BS EnvE). 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 BS EnvE 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 BS degree, the following requirements must be satisfied for the BS EnvE :

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

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- 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****2009 - 2010 DEGREE REQUIREMENTS**

SCHOOL OF CIVIL AND ENVIRONMENTAL ENGINEERING

## Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>18</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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FOCUS AREA ELECTIVE	3
CEE 4XXX ENVE DESIGN ELECTIVE	3
SOCIAL SCIENCE ELECTIVE	3
CEE 4090 CAPSTONE DESIGN	3
APPROVED ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

**TOTAL PROGRAM HOURS = 127 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

## **ELECTIVES**

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### **WELLNESS REQUIREMENT**

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

### **HUMANITIES/SOCIAL SCIENCES**

A total of 12 credit hours of humanities and 12 credit hours of social sciences are required. The humanities requirement consists of ENGL 1101, ENGL 1102, a 3 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 6 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**

3 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**

3 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 12 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**

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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 30 hours of coursework at Georgia Tech before they can participate in the program. For more details, see: [www.upi.gatech.edu](http://www.upi.gatech.edu).

In addition, there is a Work Abroad Program ([www.workabroad.gatech.edu](http://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](http://www.profpractice.gatech.edu).

## **BACHELOR OF SCIENCE IN ENVIRONMENTAL ENGINEERING - INTERNATIONAL PLAN**

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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 26 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](http://www.oie.gatech.edu/internationalplan).

## **BACHELOR OF SCIENCE IN ENVIRONMENTAL ENGINEERING - RESEARCH OPTION**

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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 BS EnvE – 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 BS EnvE 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 6 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 BS/MS DEGREE PROGRAM**

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The joint five-year BS/MS 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 will be eligible to apply for the program after completion of 30 semester credit hours at Georgia Tech and appropriate progress in their degree program.

Students should apply for the program at least three semesters prior to graduation in order to take graduate-level courses prior to receiving their BS degree. Students must have a Georgia Tech GPA of 3.5 or higher for admission into the Five-Year BS/MS Program in Civil and Environmental Engineering.

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 BS/MS program remain undergraduates until they meet the requirements for the bachelor's degree, at which point they will receive the BSCE degree. Their status 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 BS/MS program are eligible to use the Graduate Course Option even if their cumulative grade point average is below 3.5 at the time they complete their bachelor's degree.



## **JOINT BS/MS DEGREE PROGRAM**

---

The joint five-year BS/MS 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 will be eligible to apply for the program after completion of 30 semester credit hours at Georgia Tech and appropriate progress in their degree program.

Students should apply for the program at least three semesters prior to graduation in order to take graduate-level courses prior to receiving their BS degree. Students must have a Georgia Tech GPA of 3.5 or higher for admission into the Five-Year BS/MS Program in Civil and Environmental Engineering.

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 BS/MS program remain undergraduates until they meet the requirements for the bachelor's degree, at which point they will receive the BSCE degree. Their status 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 BS/MS program are eligible to use the Graduate Course Option even if their cumulative grade point average is below 3.5 at the time they complete their bachelor's degree.

## **JOINT BS/MS ENV.E. FIVE YEAR DEGREE PROGRAM**

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The joint five-year BS/MS 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 will be eligible to apply for the program after completion of 30 semester credit hours at Georgia Tech and appropriate progress in their degree program. As a practical matter, students should apply for the program at least three semesters prior to graduation in order to take graduate-level courses prior to receiving their BS degree. Students must have a Georgia Tech GPA of 3.5 or higher for admission into the Five-Year BS/MS Program in Environmental Engineering.

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 BS/MS program remain undergraduates until they meet the requirements for the bachelor's degree, at which point they will receive the BSEnvE degree. Their status 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 BS/MS program are eligible to use the Graduate Course Option even if their cumulative grade point average is below 3.5 at the time they complete their bachelor's degree.

## **JOINT BS/MS ENV.E. FIVE YEAR DEGREE PROGRAM**

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The joint five-year BS/MS 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 will be eligible to apply for the program after completion of 30 semester credit hours at Georgia Tech and appropriate progress in their degree program. As a practical matter, students should apply for the program at least three semesters prior to graduation in order to take graduate-level courses prior to receiving their BS degree. Students must have a Georgia Tech GPA of 3.5 or higher for admission into the Five-Year BS/MS Program in Environmental Engineering.

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 BS/MS program remain undergraduates until they meet the requirements for the bachelor's degree, at which point they will receive the BSEnvE degree. Their status 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 BS/MS program are eligible to use the Graduate Course Option 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**

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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 MS and PhD 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

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Students seeking this degree must have previously earned a BS CE or its equivalent.

a. **Course Option**

Required Courses in Major Area of Specialization 18 (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 (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**

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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 MS 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 12 hours of coursework relevant to the CSE discipline that includes one applications area; this must include at least 6 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 MS thesis (thesis option) that is defended to the student’s thesis committee who is responsible for overseeing the student’s research. 6 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

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Students seeking this degree must have a BS 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

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Students seeking this degree must have an engineering undergraduate degree.

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)

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Students who do not meet the undergraduate degree requirements for CEE's designated degrees but satisfy all the other requirements in their MS area of specialization receive the undesignated Master of Science degree.

a. **Course Option**

Required Courses in Major Area of Specialization 18  
(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  
(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**

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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 6 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**

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The School of Civil and Environmental Engineering (CEE) participates in Georgia Tech's interdisciplinary bioengineering PhD 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**

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The PhD 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 PhD degree should contact CEE's Graduate Office for application information. Admission to the PhD program does not constitute admission to candidacy for the PhD degree.

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 PhD 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 (12 hours), a computation specialization (9 hours), and an application specialization (9 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 9 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 9 hours of courses that increase depth of understanding in an application field; these need not be computation-focused courses. At least 9 hours of PhD 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 PhD 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 PhD degree should contact CEE's Graduate Office for application information. Admission to the PhD program does not constitute admission to candidacy for the PhD degree.

## **DOCTOR OF PHILOSOPHY WITH A MAJOR IN ENVIRONMENTAL ENGINEERING**

---

The PhD 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 PhD degree should contact CEE's Graduate Office for application information. Admission to the PhD program does not constitute admission to candidacy for the PhD degree.

## REQUIREMENTS FOR THE DEGREE

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- 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 PhD 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 9 hours of coursework. The minor field must be approved by the Office of Graduate Studies.
- b. Pass a PhD comprehensive (qualifying) examination consisting of written and oral portions.
- c. Defend a PhD Dissertation Proposal
- d. Complete a PhD dissertation.
- e. Pass the final doctoral examination.



## **SPECIALTY GROUPS**

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Applicants are encouraged to pursue interdisciplinary programs of study and research. For admission to the PhD program, students must select one specialty group from the following:

- Environmental Engineering
- Environmental Fluid Mechanics and Water Resources
- Geosystems Engineering
- Structural Engineering, Mechanics, and Materials
- Transportation Systems

If the student wishes to change from one specialty to another, he or she must obtain written permission from both specialty groups.

## **DISTANCE LEARNING AND PROFESSIONAL EDUCATION**

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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.

## **CERTIFICATE PROGRAM IN REMOTE SENSING**

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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 ELECTRICAL AND COMPUTER ENGINEERING

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Established in 1896

Principal location: Van Leer Building

Telephone: 404.894.2901

Fax: 404.894.4641

Web site: [www.ece.gatech.edu](http://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](http://www.ece.gatech.edu) or upon request by calling 404.894.2900.

## ACCREDITATION

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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**

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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 BS 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 BS CmpE degree, students may choose a computer engineering specialization within the BS EE degree program.

## **PROGRAM OBJECTIVES**

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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****2009 - 2010 DEGREE REQUIREMENTS**

SCHOOL OF ELECTRICAL AND COMPUTER ENGINEERING

Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
MATH 1501 CALCULUS I	4
ENGL 1101 ENGLISH COMPOSITION I	3
CHEM 1310 GENERAL CHEMISTRY	4
CS 1371 COMPUTING FOR ENGINEERS	3
WELLNESS	2
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>18</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>18</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
ECE 4001 ENGINEERING PRACTICE AND PROFESSIONALISM	2
ECE / CS ELECTIVE	3
ENGINEERING ELECTIVE	3
APPROVED ELECTIVE	3
HUMANITIES ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>14</b>



<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
ECE 4007 ECE CULMINATING DESIGN PROJECT	4
ECE / CS ELECTIVES	7
SOCIAL SCIENCE ELECTIVE	3
APPROVED ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

**TOTAL PROGRAM HOURS = 130 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

## **ELECTIVES**

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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 12 hour humanities requirement. An additional 6 hours of Institute-approved humanities courses are required to fulfill the 12 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 6 hours of Institute-approved social science courses, satisfy the 12 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**

3 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**

3 hours: MATH 2602, MATH 3012, or course(s) approved by the School; course must be taken on a letter-grade basis.

### **ENGINEERING ELECTIVES**

6 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**

10 hours : 3000 level or above in ECE or CS, at least 6 hours at the 4000 level or above.

### **APPROVED (FREE)**

9 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**

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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**

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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 BS CmpE - International Plan degree requirements are identical to those for the regular BS CmpE . Please refer to the BS 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**

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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 BS CmpE-Research Option degree requirements are identical to those for the regular BS CmpE . Please refer to the BS 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**

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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, electrical energy, electromagnetics, and telecommunications. Additionally, students may elect to take advanced courses in other programs such as computer science, mathematics, physics, or management.

## PROGRAM OBJECTIVES

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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****2009 - 2010 DEGREE REQUIREMENTS**

SCHOOL OF ELECTRICAL AND COMPUTER ENGINEERING

Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
MATH 1501 CALCULUS I	4
ENGL 1101 ENGLISH COMPOSITION I	3
CHEM 1310 GENERAL CHEMISTRY	4
CS 1371 COMPUTING FOR ENGINEERS	3
WELLNESS	2
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>18</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>18</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
ECE 3042 MICROELECTRONIC CIRCUITS LAB	2
ECE BREADTH ELECTIVES	9
APPROVED ELECTIVE	3
ENGINEERING ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
ECE 4001 ENGINEERING PRACTICE AND PROFESSIONALISM	2
ECE ELECTIVES	4
ENGINEERING ELECTIVE	3
APPROVED ELECTIVE	3
SOCIAL SCIENCE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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ECE 4007 ECE CULMINATING DESIGN PROJECT	4
ECE ELECTIVES	7
ENGINEERING ELECTIVE	2
APPROVED ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

**TOTAL PROGRAM HOURS = 130 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

## **ELECTIVES**

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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 12 hour humanities requirement. An additional 6 hours of Institute-approved humanities courses are required to fulfill the 12 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 6 hours of Institute-approved social science courses, satisfy the 12 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**

3 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, 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**

20 hours: 3000 level or above in ECE, at least 6 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)**

12 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**

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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 BS EE - International Plan degree requirements are identical to those for the regular BS EE. Please refer to the BS 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 BS EE - Research Option degree requirements are identical to those for the regular BS EE. Please refer to the BS 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.

## **BS/MS ELECTRICAL AND COMPUTER ENGINEERING - FIVE-YEAR**

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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 BS/MS 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 BIOENGINEERING

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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](http://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 IN ELECTRICAL AND COMPUTER ENGINEERING**

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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, electrical energy, electromagnetics, electronic design and applications, microsystems, optics and photonics, systems and controls, and telecommunications.

The master's degree program requires 30 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 MS degree in 12 months should start their programs in the fall semester.



## **DUAL MS PROGRAM IN ECE GT LORRAINE AND EUROPEAN PARTNER UNIVERSITIES**

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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 Supélec, 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 MS PROGRAM IN ECE WITH SHANGHAI JIAO TONG UNIVERSITY**

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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.

Georgia Tech-Shanghai coordinates a dual MS 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.

## **DUAL MS PROGRAM IN ECE WITH THE POLITECNICO DI TORINO (ITALY)**

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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.

## **BS/MS ELECTRICAL AND COMPUTER ENGINEERING - FIVE-YEAR**

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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 BS/MS 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**

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The Bioengineering PhD 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 36 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**

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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, electrical energy, 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**

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Students pursuing a PhD in Robotics must take 36 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 PhD program in robotics through that home school.

## **CERTIFICATE PROGRAM IN REMOTE SENSING**

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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**

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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-SAVANNAH**

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Established in 1998

Location: 210 Technology Circle

Savannah, GA 31407

Telephone: 912.966.7922

Fax: 912.966.7836

Web site: [www.gtsav.gatech.edu](http://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).

## **GEORGIA TECH SHANGHAI**

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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.

## **H. MILTON STEWART SCHOOL OF INDUSTRIAL AND SYSTEMS ENGINEERING**

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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](http://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.

## **VISITING SCHOLAR / PRACTITIONER OFFERINGS**

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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**

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The BS 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**

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The principal strength of the academic program leading to the Bachelor of Science in Industrial Engineering (BS IE) 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. The program features a unique track system that allows students to get a broad industrial engineering education and to specialize in areas such as supply chain, economic decision analysis, operations research and statistics, or quality engineering. This blend that produces the flexibility that is inherent in the field of industrial and systems engineering and that affords BS IE graduates a wide array of career options. Our graduates are constantly looking for ways to make anything in life work better, more efficiently and more productively.

## **PROGRAM OBJECTIVES**

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- A. To prepare our graduates to become accomplished Industrial Engineers
- B. To prepare our graduates to communicate effectively
- C. To prepare our graduates to achieve leadership positions
- D. To prepare our graduates to achieve life-long learning



**BACHELOR OF SCIENCE IN INDUSTRIAL ENGINEERING****2009 - 2010 DEGREE REQUIREMENTS**

SCHOOL OF INDUSTRIAL &amp; SYSTEMS ENGINEERING

Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
MATH 1501 CALCULUS I	4
ENGL 1101 ENGLISH COMPOSITION I	3
PSYC 1101 GENERAL PSYCHOLOGY	3
LAB SCIENCE (Biol, Chem, Eas)	4
<b>TOTAL SEMESTER HOURS =</b>	<b>14</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
ISYE 3044 SIMULATION ANALYSIS & DESIGN	3
ISYE ELECTIVES	6
HUMANITIES ELECTIVE	3
LCC 3401 TECHNICAL COMMUNICATION PRACTICES	2
ENGINEERING ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
ISYE ELECTIVES	6
ENGINEERING ELECTIVE	3
HUMANITIES ELECTIVE	3
FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
ISYE 4106 SENIOR DESIGN	4

ISYE ELECTIVES	6
SOCIAL SCIENCE ELECTIVE	3
FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

**TOTAL PROGRAM HOURS = 126 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

## **BACHELOR OF SCIENCE IN INDUSTRIAL ENGINEERING CURRICULUM TRACKS**

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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 (18 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

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### 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 12 hour humanities requirement. An additional 6 hours of Institute-approved humanities courses are required to fulfill the 12 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 9 hours of Institute-approved social science courses, satisfies the 12 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**

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The Co-op program enhances the student's education, employability and earnings potential. For more details, please visit Co-op pages from GT Web site.

- Co-op courses are designated in the schedule of classes as COOP. All students interested in registering for this course(s) must have been accepted into the Co-op Program. Students must have met with their co-op advisor to be issued a permit to register for restricted course(s). Students must register for the COOP 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.

For more details, please visit Division of Professional Practice.

## **BACHELOR OF SCIENCE IN INDUSTRIAL ENGINEERING - INTERNATIONAL PLAN**

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The Georgia Tech International Plan is designed to prepare graduates to develop significant global competence. Many Industrial Engineers work in consulting companies, supply chain, economic decision systems, etc. Global perspectives are very important. The significant global competence will give them an additional advantage on the job market and on the jobs.

The major components of International Plan include

1. Twenty six weeks of international experience (work, research or study)
2. Foreign language requirements. This can be satisfied by oral proficiency measured tested by an exam by the American Council for the Teaching of Foreign Languages (ACTFL). The foreign language requirement can also be satisfied by course work. It means the passing of two 2XXX level language classes.
3. Three internationally oriented courses plus an addendum in the capstone design on international perspective.

For more details of the International Plan, including application materials, visit the Office of International Education.



## **EXCEPTIONAL STUDENTS OPTIONS**

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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**

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With approval, students with a cumulative grade point average of 3.0 or above may take up to 9 credit hours of graduate-level courses. Students who would get both BS and MS in ISyE may use up to 6 credit hours of graduate-level course for both degrees. To take a graduate-level course for both degrees, the grade point average must be 3.5 or higher.

## **HONORS COURSES**

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When faculty resources permit, the School offers honors versions of some of the required courses for the BS 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**

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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 MS 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 12 hours of coursework relevant to the CSE discipline that includes one applications area; this must include at least 6 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 MS thesis (thesis option) that is defended to the student’s thesis committee who is responsible for overseeing the student’s research. 6 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**

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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**

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The School of Industrial and Systems Engineering offers seven master's degrees: the Master of Science in Industrial Engineering (MS IE); the Master of Science in Operations Research (MS OR); the Master of Science in Statistics (MS S); the Master of Science in Health Systems (MS HS); the Master of Science in Quantitative and Computational Finance (MS QCF); the Executive Master of Science in International Logistics (EM IL ); and the undesignated Master of Science (MS).

The MS IE 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 BS IE curriculum. The other master's programs are available for students holding the BS 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 MS program is typically for those students who wish to work in the area of human-integrated systems.

All proposed master's degree programs require 30 semester hours with the exception of EM IL and the MS QCF, both of which require 36 hours; one option, the undesignated MS in Human-Integrated Systems, requires a thesis. In addition, the MS IE 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**

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The School of Industrial and Systems Engineering offers seven master's degrees: the Master of Science in Industrial Engineering (MS IE); the Master of Science in Operations Research (MS OR); the Master of Science in Statistics (MS S); the Master of Science in Health Systems (MS HS); the Master of Science in Quantitative and Computational Finance (MS QCF); the Executive Master of Science in International Logistics (EM IL ); and the undesignated Master of Science (MS).

The MS IE 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 BS IE curriculum. The other master's programs are available for students holding the BS 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 MS program is typically for those students who wish to work in the area of human-integrated systems.

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## **MASTER OF SCIENCE IN INTERNATIONAL LOGISTICS**

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The School of Industrial and Systems Engineering offers seven master's degrees: the Master of Science in Industrial Engineering (MS IE); the Master of Science in Operations Research (MS OR); the Master of Science in Statistics (MS S); the Master of Science in Health Systems (MS HS); the Master of Science in Quantitative and Computational Finance (MS QCF); the Executive Master of Science in International Logistics (EM IL ); and the undesignated Master of Science (MS).

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## MASTER OF SCIENCE IN OPERATIONS RESEARCH

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The School of Industrial and Systems Engineering offers seven master's degrees: the Master of Science in Industrial Engineering (MS IE); the Master of Science in Operations Research (MS OR); the Master of Science in Statistics (MS S); the Master of Science in Health Systems (MS HS); the Master of Science in Quantitative and Computational Finance (MS QCF); the Executive Master of Science in International Logistics (EM IL ); and the undesignated Master of Science (MS).

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## **MASTER OF SCIENCE IN QUANTITATIVE AND COMPUTATIONAL FINANCE**

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The School of Industrial and Systems Engineering offers seven master's degrees: the Master of Science in Industrial Engineering (MS IE); the Master of Science in Operations Research (MS OR); the Master of Science in Statistics (MS S); the Master of Science in Health Systems (MS HS); the Master of Science in Quantitative and Computational Finance (MS QCF); the Executive Master of Science in International Logistics (EM IL ); and the undesignated Master of Science (MS).

The MS IE 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 BS IE curriculum. The other master's programs are available for students holding the BS 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 MS program is typically for those students who wish to work in the area of human-integrated systems.

All proposed master's degree programs require 30 semester hours with the exception of EM IL and the MS QCF, both of which require 36 hours; one option, the undesignated MS in Human-Integrated Systems, requires a thesis. In addition, the MS IE 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

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The School of Industrial and Systems Engineering offers seven master's degrees: the Master of Science in Industrial Engineering (MS IE); the Master of Science in Operations Research (MS OR); the Master of Science in Statistics (MS S); the Master of Science in Health Systems (MS HS); the Master of Science in Quantitative and Computational Finance (MS QCF); the Executive Master of Science in International Logistics (EM IL ); and the undesignated Master of Science (MS).

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All proposed master's degree programs require 30 semester hours with the exception of EM IL and the MS QCF, both of which require 36 hours; one option, the undesignated MS in Human-Integrated Systems, requires a thesis. In addition, the MS IE 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.

## **FINANCIAL AID FOR PHD**

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Financial aid for PhD 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**

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The PhD 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.

### **PARTICIPATING SCHOOLS**

College of Computing  
School of Biology  
School of Biomedical Engineering  
School of Chemistry and Biochemistry  
School of Industrial and Systems Engineering  
School of Mathematics

### **OBJECTIVE OF THE PROGRAM**

The mission of the Georgia Tech Bioinformatics PhD 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 PhD 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/graduate-programs/bioinformatics/new/bioinformatics\\_phd.php](http://www.biology.gatech.edu/graduate-programs/bioinformatics/new/bioinformatics_phd.php).

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 PhD 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 (12 hours), a computation specialization (9 hours), and an application specialization (9 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 9 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 9 hours of courses that increase depth of understanding in an application field; these need not be computation-focused courses. At least 9 hours of PhD 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**

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The PhD 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.



**DOCTOR OF PHILOSOPHY WITH A MAJOR IN INDUSTRIAL ENGINEERING  
HUMAN-INTEGRATED SYSTEMS TRACK**

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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  
SUPPLY CHAIN ENGINEERING TRACK**

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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.

**DOMAIN CORE**

- ISyE 6810 System Monitoring and Prognostics
- ISyE 7201 Production Systems Engineering
- ISyE 7204 Informatics in Production and Service Systems

**METHODS CORE (SELECT THREE)**

- ISyE 6661 Linear Optimization
- ISyE 6761 Stochastic Processes I
- ISyE 7406 Data Mining
- ECE 6550 Linear Systems and Control

**METHODS BREADTH (SELECT AT LEAST THREE COURSES FROM AT LEAST TWO OF THE FOLLOWING AREAS)**

- **Stochastics and Simulation**
  - ISyE 6644 Simulation
  - ISyE 6831 Advanced Simulation
  - ISyE 6656 Queueing Theory
  - ISyE 6762 Stochastic Processes II
- **Statistics**
  - ISyE 6402 Time Series
  - ISyE 6405 Statistical Methods for Manufacturing Systems Design/Improvement
  - ISyE 6412 Theoretical Statistics
  - ISyE 6413 Design and Analysis of Experiments
  - ISyE 6420 Bayesian Statistics
  - ISyE 7401 Advanced Statistical Modeling
  - ISyE 7405 Multivariate Data Analysis
  - ECE 6555 Optimal Estimation
- **Computing and Algorithms**
  - ISyE 6679 Computational Methods in Operations research
  - ISyE 6416 Computational Statistics
  - CS 6650 Design and Analysis of Algorithms
- **Dynamics and Control**
  - ECE 6559 Advanced Linear Systems
  - ECE 6552 Nonlinear Systems
  - ECE 6553 Optimal Control
  - ECE 6554 Adaptive Control
  - ECE 6551 Digital Control
  - ECE 6556 Intelligent Control
  - ECE 6120 Automata Theory

- ME 6401 Linear Systems Control
- ME 6402 Nonlinear Control Systems
- ME 6443 Variational Methods
- ME 6403 Digital Control Systems
- ME 6404 Advanced Control Systems Design and Implementation
- **Optimization**
  - ISyE 6664 Stochastic Optimization
  - ISyE 6662 Discrete Optimization
  - ISyE 6663 Nonlinear Optimization
- **Other possible methodology courses (consent of advisor required)**

#### **SEMINAR (REQUIRED)**

- ISyE 8014 Contemporary Topics in System Informatics and Control

#### **APPLICATIONS (SELECT AT LEAST ONE COURSE)**

- ISyE 6201 Manufacturing Systems
- ISyE 6202 Warehousing Systems
- ISyE 6203 Transportation and Supply Chain Systems
- ECE 6557 Manufacturing Systems Design
- ME 6222 Manufacturing Processes and Systems
- ME 6223 Automated Manufacturing Process Planning
- ME6225 Metrology and Measurement Systems
- ME 6754 Engineering Database Management Systems

It is recommended that students complete the domain and methods core courses before they sit for the comprehensive examination.

A student is not admitted to candidacy until all of the stated course requirements in the Program of Study have been completed.

**DOCTOR OF PHILOSOPHY WITH A MAJOR IN INDUSTRIAL ENGINEERING  
APPLIED STATISTICS TRACK**

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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**

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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 OPERATIONS RESEARCH**

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The PhD 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**

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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 MS IE or MS OR 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.



## WOODRUFF SCHOOL OF MECHANICAL ENGINEERING

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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](http://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 mechanical engineering and nuclear and radiological engineering and graduate degrees in mechanical engineering, nuclear and radiological engineering, medical physics, bioengineering, robotics, 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.

## SCHOOL FACILITIES

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The Woodruff School is housed in a multibuilding classroom/research complex. Included in this complex are modern classrooms and 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; MEMS; and tribology. The Nuclear and Radiological Engineering Program has special facilities for the study of computational reactor physics; fast reactors; fusion; medical physics; and radiation detection.

Special facilities in the Woodruff School include laboratories dedicated for undergraduate use; the Integrated Acoustic Laboratory (anechoic chamber); a high-bay area for research and testing; an underwater acoustic tank; a wind tunnel; and a clean room for MEMS fabrication. Laboratories include: Active Control Lab; Active Materials and Devices Lab; Advanced Assembly Process Technology Lab; Advanced Intelligent Mechatronics Research Lab; Biothermal Sciences Lab; Cardiovascular Fluid Mechanics Lab; Cartilage Mechanics and Mechanobiology Lab; Cellular and Molecular Biomechanics Lab; Computational Hydrodynamics and Biofluids Lab; Computer-Aided Simulation of Packaging Reliability, Data Center Thermal Management; Dynamics Properties Research Lab; Engineering Information Systems Lab; Environmentally Conscious Design and Manufacture Lab; Fluid Mechanics Research Lab, Composites Manufacturing Research Lab, Intelligent Machine Dynamics Lab, Mechanical Properties Research Lab, Medical Devices Lab; Microelectronics Thermal Management; Microthermal Systems Lab; Nanoscale Thermal Measurement and Manufacturing; Precision Machining Research Consortium, Rapid Prototyping and Manufacture; Robotics Mechanisms Lab; Systems Realization Lab, Sustainable Thermal Systems Lab, Tribology and Rheology; and the Vascular and Biofluids Lab. Centers include: Center for Polymer Processing; Center for Surface Engineering and Tribology; Composites Education and Research Center; Fluid Power and Motion Control; Georgia Tech/Emory Center for the Engineering of Living Tissues; Technology Center Product Lifecycle Management Center of Excellence; Manufacturing Research Center

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; numerous high-speed computing clusters; and facilities for analyzing environmental samples by nuclear techniques. Laboratories include: AREVA Radiation Detection Lab; Microchannel Test Facility; Neutron Reference Field Lab; Plasma-facing Components Thermal-hydraulic Test Facility; Southern Nuclear Radiation Physics Lab; and the Thermoluminescent Detector Lab.

## ACCREDITATION

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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

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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 it might 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. The course appears on the transcript. In all cases, the student must find a faculty member to work with. Each special problem and research course requires a written final report, which is to be submitted to the faculty advisor for grading. All special problems courses taken for credit receive a letter grade and appear on the transcript. Funding opportunities are available through the President's Undergraduate Research Awards.

For more information on undergraduate research at Georgia Tech, visit [www.undergradresearch.gatech.edu](http://www.undergradresearch.gatech.edu) and for specific ME/NRE program information, visit [www.me.gatech.edu](http://www.me.gatech.edu).

### PROGRAM DESCRIPTION

The undergraduate curriculum in mechanical engineering (ME) 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 (BS ME).

In addition to the Institute's academic requirements for graduation with a bachelor's degree, the following are required for a BS 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 and COE classes must be a 2.0 or higher.

### PROGRAM EDUCATIONAL OBJECTIVES

The faculty of the Woodruff School strives to continuously improve our undergraduate programs in mechanical engineering. The educational objectives reflect the needs, and have been reviewed by, among others, the Advisory Board of the Woodruff School, the faculty, and the students.

- Our graduates will be successfully employed in ME-related fields or other career paths, including industry, academe, government, and non-governmental organizations.
- Our graduates will be global collaborators, leading and participating in culturally diverse teams.
- Our graduates will continue professional development by obtaining continuing education credits, professional registration or certifications, or post-graduate credits or degrees.

## PROGRAM OBJECTIVES

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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****2009 - 2010 DEGREE REQUIREMENTS**

SCHOOL OF MECHANICAL ENGINEERING

Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
ME 3322 THERMODYNAMICS	3
ME 3340 FLUID MECHANICS	3
COE 3001 MECHANICS OF DEFORMABLE BODIES	3
ECON 2100 or 2101 or 2105 or 2106	3
ECE 3741 INSTRUMENTATION & ELECTRONICS LAB	1
SOCIAL SCIENCE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
ME 3057 EXPERIMENTAL METHODOLOGY & TECHNICAL WRITING	3
ME 3180 MACHINE DESIGN or ME 4315 ENERGY SYSTEMS ANALYSIS AND DESIGN	3
ME 4210 MANUFACTURING PROCESSES & ENGINEERING	3
MECHANICAL ENGINEERING ELECTIVE	3
FREE ELECTIVE	3

<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>
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<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>14</b>

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

\* Social Science or humanities is required depending on the ethics class selection. 12 hours of social science electives and 12 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

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### WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

### HUMANITIES AND SOCIAL SCIENCES

12 credit hours of humanities and 12 credit hours of social sciences are required.

The 12 hours of humanities are comprised of 6 hours of English composition classes and 6 hours of humanities electives. The English composition classes are satisfied by ENG 1101 and ENG 1102.

The 12 hours of social sciences include 3 hours of economics, 3 hours of work in history and the constitutions of the United States and Georgia, and 6 hours of social science electives. The 3 hours of economics is satisfied by either ECON 2100 (Economic Analysis and Policy Problems), ECON 2101 (The Global Economy), ECON 2105 (Principles of Macroeconomics), or ECON 2106 (Principles of Microeconomics). The 3 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 6 hours of social science electives and the 6 hours of humanities electives must include 3 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 6 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 3.2 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.

Students will be allowed to count 6 hours (two classes) of the following minors towards the ME program's ME technical electives, upon successful completion of the minor. If a student does not successfully complete the minor, the student will have to take two approved ME technical electives (i.e., approved ME 3000-level or ME 4000-level courses).

- Aerospace Engineering
- Biology
- Biomedical Engineering
- Computing Science

- Earth and Atmospheric Sciences
- Materials Science and Engineering
- Mathematics
- Nuclear and Radiological Engineering

### **SCIENCE ELECTIVES**

The 3 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**

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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. Over the years, 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 three 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 sophomores or juniors 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 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. For more information about the Cooperative Program, go to [www.coop.gatech.edu](http://www.coop.gatech.edu).

Students can also complete work assignments in a foreign country as part of the International Cooperative Program (Work Abroad 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 Work Abroad Program, go to [www.workabroad.gatech.edu](http://www.workabroad.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 with an option for more work. Students must have completed at least 30 hours of coursework at Georgia Tech before they can participate in the program. For more details, see [www.upi.gatech.edu](http://www.upi.gatech.edu).

In addition, there is a Work Abroad Program ([www.workabroad.gatech.edu](http://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](http://www.profpractice.gatech.edu).

## **BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING - INTERNATIONAL PLAN**

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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 26 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 BS 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 26 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](http://www.oie.gatech.edu).

## **BACHELOR OF SCIENCE NUCLEAR AND RADIOLOGICAL ENGINEERING**

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The program educational objectives of the Nuclear and Radiological Engineering (NRE) undergraduate program are:

**NRE graduates will:**

- have a successful career in nuclear and radiological engineering or other fields
- conduct themselves with the highest professional and ethical principles; and
- engage in life-long learning through continuing education, professional development activities, and other career appropriate options.

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 BS 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**

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The program educational objectives of the Nuclear and Radiological Engineering undergraduate program are:

### **NRE graduates will**

- Have a successful career in nuclear and radiological engineering or other fields
- Conduct themselves with the highest professional and ethical principles
- Engage in life-long learning through continuing education, professional development activities, and other career appropriate options.

**BS IN NUCLEAR AND RADIOLOGICAL ENGINEERING****2009 - 2010 DEGREE REQUIREMENTS**

SCHOOL OF MECHANICAL ENGINEERING

Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
NRE 4214 REACTOR ENGR	3
NRE 4328 RADIATION SOURCES AND APPLICATIONS	3
NRE 4204 NUCLEAR REACTOR PHYSICS	4
ETHICS ELECTIVE	3
TECHNICAL ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
SOCIAL SCIENCE ELECTIVE or HUMANITIES ELECTIVE(S) *	3
NRE 4232 NUCLEAR & RADIOLOGICAL ENGINEERING DESIGN	4
TECHNICAL ELECTIVES	6
NRE 4206 RADIATION PHYSICS LAB	2
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

\* Social Science or humanities is required depending on the ethics class selection. 12 hours of social science electives and 12 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**

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### **WELLNESS REQUIREMENT**

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

### **HUMANITIES, SOCIAL SCIENCES, AND MODERN LANGUAGES**

12 credit hours of humanities and 12 credit hours of social sciences are required.

The 12 hours of humanities are comprised of 6 hours of English composition classes and 6 hours of electives. The English composition classes are satisfied by ENG 1101 and 1102 (English Composition 1 and 2).

The 12 hours of social sciences include 3 hours of economics, 3 hours of work in history and the constitutions of the United States and Georgia, and 6 hours of social science electives. The 3 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 3 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 6 hours of social science electives and the 6 hours of humanities electives must include 3 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

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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](http://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 30 hours of coursework at Georgia Tech before they can participate in the program. For more details, see: [www.upi.gatech.edu](http://www.upi.gatech.edu).

In addition, there is a **Work Abroad Program** ([www.workabroad.gatech.edu](http://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](http://www.profpractice.gatech.edu).

## THE BS/MS PROGRAM

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The Woodruff School offers a BS/MS program for those students who demonstrate an interest in and ability for additional education beyond the BS 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 30 semester credit hours at Georgia Tech, but before the completion of seventy-five semester credit hours, including transfer and advanced placement credits. Students who have more than 75 credit hours will be considered for the program on a case-by-case basis.

Participants in the BS/MS Program in the Woodruff School can obtain a master's degree in mechanical engineering, nuclear and radiological engineering, medical physics, paper science and engineering, or bioengineering. There are two options to consider:

- The Non-Thesis Option is similar to your undergraduate degree in that you simply take classes according to the MS degree requirements. There is no funding available in this case. With proper planning, the MS non-thesis degree could be completed in one year. Well-motivated students can complete the MS in medical physics in one-and-a-half years.
- The Thesis Option involves working with a faculty member on a project in one of the traditional or cutting-edge research areas in the Woodruff School. This will give you hands-on experience in working with a faculty mentor; the opportunity to work in a laboratory or a research environment; and the change to perform theoretical and experimental work. These events will foster your career interests and expand your selection of possible employers. You will have a graduate research assistantship and receive a stipend and a tuition waiver. The time to graduation depends on your thesis project, your advisor, and your work ethic.

During the first year of your graduate studies, you will be encouraged to continue for the PhD. In many cases, you might be working on an interesting topic of study as part of your master's degree research that could provide the basis for doctoral research.

## MINOR IN ENGINEERING AND MANAGEMENT

The Engineering and Management Minor is offered by the Colleges of Engineering and Management. It is a course of study that enables undergraduate students in engineering and management to learn one another's language through innovative coursework in their respective fields and interdisciplinary team projects focused on solving real-world problems presented by corporate affiliates. Admission to most of the classes also requires that students be active members in the Technology and Management program. Top students with at least 30 to 59 hours of college credit from engineering and management apply for this program in January of each year. Approximately forty students are accepted each year and enter the program in the fall semester to begin a prescribed two-year, 22-credit course of study while satisfying requirements for a bachelor's degree in their engineering or management major. Application and course descriptions are available at: <http://mgt.gatech.edu>. Once enrolled in the Technology and Management program, the requirements for the minor are the successful completion of 22 credit hours defined as follows:

1. For engineering majors – MGT 3300, MGT 3000, MGT 3078, MGT 3743, MGT 3744, MGT 4741, MGT 4742
2. For management majors – COE 3002, ME 3141, ME 2110, ME 3743, ME 3744, ME 4741, ME 4742

Semester	Engineering	Business	Together
Fall Junior Year I	Marketing Management MGT 3300	Introduction to Microelectronics and Nanotechnology COE 3002	Analysis of Emerging Technologies MGT or ME 3743*
Spring Junior Year	Financial and Managerial Accounting MGT 3000	Cutting-Edge Engineering Seminar ME 3141	Managing Product, Service and Technology Development MGT or ME 3744*
Fall Senior Year	Finance and Investments MGT 3078	Creative Decisions and Design ME 2110	Integrative Management Development - Capstone Preparation MGT or ME 4741*
Spring Senior Year			Integrated Capstone Project MGT or ME 4742* (4 hrs)

## **MINOR IN NUCLEAR AND RADIOLOGICAL ENGINEERING**

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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 12 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

### 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 (MS 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. 6 hours of credit for graduate courses taken as an undergraduate at Georgia Tech and used for credit toward the BS ME may be included in the MS 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 BS/MS PROGRAM

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The Woodruff School offers a BS/MS program for those students who demonstrate an interest in and ability for additional education beyond the BS 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 30 semester credit hours at Georgia Tech, but before the completion of seventy-five semester credit hours, including transfer and advanced placement credits. Students who have more than 75 credit hours will be considered for the program on a case-by-case basis.

Participants in the BS/MS Program in the Woodruff School can obtain a master's degree in mechanical engineering, nuclear and radiological engineering, medical physics, paper science and engineering, or bioengineering. There are two options to consider:

- The Non-Thesis Option is similar to your undergraduate degree in that you simply take classes according to the MS degree requirements. There is no funding available in this case. With proper planning, the MS non-thesis degree could be completed in one year. Well-motivated students can complete the MS in medical physics in one-and-a-half years.
- The Thesis Option involves working with a faculty member on a project in one of the traditional or cutting-edge research areas in the Woodruff School. This will give you hands-on experience in working with a faculty mentor; the opportunity to work in a laboratory or a research environment; and the change to perform theoretical and experimental work. These events will foster your career interests and expand your selection of possible employers. You will have a graduate research assistantship and receive a stipend and a tuition waiver. The time to graduation depends on your thesis project, your advisor, and your work ethic.

During the first year of your graduate studies, you will be encouraged to continue for the PhD. In many cases, you might be working on an interesting topic of study as part of your master's degree research that could provide the basis for doctoral research.



## **MASTER OF SCIENCE IN BIOENGINEERING**

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The Woodruff School participates in Georgia Tech's interdisciplinary bioengineering graduate program, offering both the MS and the PhD 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 multidisciplinary and integrated. For more information, see [www.bioengineering.gatech.edu](http://www.bioengineering.gatech.edu).

## **MASTER OF SCIENCE IN MECHANICAL ENGINEERING**

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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, Georgia Tech Savannah, via video and online course offerings, or by attending classes at the Atlanta campus.

## **MASTER OF SCIENCE IN MEDICAL PHYSICS**

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The graduate program in medical physics leads to the degree of Master of Science in Medical Physics (MS MP) and a Doctor of Philosophy as an option under the PhD 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 MS program, a distance learning program leading to the MS MP 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.

3 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 MS MP 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**

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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**

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The Master's (MS PS) and PhD 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 MS or PhD degree.

## **MASTER OF SCIENCE (UNDESIGNATED)**

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The undesignated master's degree (MS) 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**

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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 (MS ME) and medical physics (MS MP) by utilizing the distance-learning mode.

## **DUAL DEGREE PROGRAM IN MANAGEMENT**

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Through the dual-degree program, qualified graduate students wishing to pursue an MBA 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 MBA alone. For example, the MBA program is normally sixty hours. For students pursuing a graduate degree in mechanical engineering, the length of the MBA program is reduced to 39 hours, with the area of concentration being the coursework in the mechanical engineering program. Students in the dual-degree program take approximately 30 hours of required management core courses, plus 9 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)**

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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 (MS ME) 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 MS ME 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 MS ME 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**

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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**

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The Woodruff School participates in Georgia Tech's interdisciplinary bioengineering graduate program, offering both the MS and the PhD 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 multidisciplinary and integrated. For more information, see [www.bioengineering.gatech.edu](http://www.bioengineering.gatech.edu).

## **DOCTOR OF PHILOSOPHY WITH A MAJOR IN MECHANICAL ENGINEERING**

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The doctoral program is designed with great latitude to capitalize on variations in experience and interests of individual students. The PhD 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  
MEDICAL PHYSICS OPTION**

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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 NUCLEAR AND RADIOLOGICAL ENGINEERING**

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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 PAPER SCIENCE AND ENGINEERING**

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The Master's (MS PS) and PhD 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 MS or PhD degree.

## **DOCTOR OF PHILOSOPHY WITH A MAJOR IN ROBOTICS**

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Students pursuing a PhD in Robotics must take 36 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 PhD program in robotics through that home school.



## **SCHOOL OF POLYMER, TEXTILE AND FIBER ENGINEERING**

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Established in 1897

Location: Manufacturing Related Disciplines Complex I

Telephone: 404.894.2490

Fax: 404.894.8780

Web site: [www.ptfe.gatech.edu](http://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.

## FACILITIES

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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.

## **BS POLYMER AND FIBER ENGINEERING - ACCREDITATION**

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The BS 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

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### 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 BS/MS 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.

## **BACHELOR OF SCIENCE IN POLYMER AND FIBER ENGINEERING**

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The BS 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 eight 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 BS/MS 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 seven 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 BS/MS degree program.

## **PROGRAM EDUCATIONAL OBJECTIVES**

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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

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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  
POLYMER TRACK**

**2009 - 2010 DEGREE REQUIREMENTS**

SCHOOL OF POLYMER, TEXTILE AND FIBER ENGINEERING

Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
APPROVED ELECTIVES	4
PTFE 4140 POLYMER SOLUTIONS & SURFACES	3



PTFE 4141 POLYMER CHARACTERIZATION	4
PTFE 4110 POLYMER & FIBER ENGINEERING DESIGN I	3
<b>TOTAL SEMESTER HOURS =</b>	<b>14</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
PTFE 4210 POLYMER & FIBER ENGINEERING DESIGN II	3
PTFE 4761 INDUSTRIAL CONTROLS & MANUFACTURING	3
ETHICS ELECTIVE	3
APPROVED ELECTIVES	4
SOCIAL SCIENCE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

**TOTAL PROGRAM HOURS = 127 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

**BACHELOR OF SCIENCE IN POLYMER AND FIBER ENGINEERING  
FIBER TRACK**

**2009 - 2010 DEGREE REQUIREMENTS**

SCHOOL OF POLYMER, TEXTILE AND FIBER ENGINEERING

Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
MATH 2401 CALCULUS III	4
ME 3322 THERMODYNAMICS 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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

**TOTAL PROGRAM HOURS = 127 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

## **ELECTIVES**

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### **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 12 credit hours of humanities and 12 credit hours of social sciences are required. Humanities consists of ENGL 1101, ENGL 1102, a 3 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 6 hours of general social science.

### **ENGINEERING ETHICS ELECTIVE**

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), HTS 2084 (Technology and Society), or PTFE 4043 (Safety and Ethics). The PST ethics courses are humanities electives, while the INTA and HTS ethics courses are social science electives.

### **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. Students must indicate the courses that meet these requirements on their PTFE degree petition spreadsheet when they petition to graduate.

## **BS POLYMER AND FIBER ENGINEERING - COOPERATIVE PLAN**

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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/](http://www.profpractice.gatech.edu/)

## **MINOR AND CERTIFICATE PROGRAMS FOR NON-MAJORS**

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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 12 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](http://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 6 credit hours of specified courses and 6 hours of electives selected from a list of courses. The director of undergraduate affairs acts as advisor for all certificate and minor programs.

## **BS/MS POLYMER, TEXTILE AND FIBER ENGINEERING - FIVE-YEAR**

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Current undergraduate students may participate in the five-year BS/MS program offered by the School of Polymer, Textile and Fiber Engineering. Qualified students are allowed to use up to 6 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 30 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.

## **MASTER OF SCIENCE IN POLYMERS**

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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](http://www.ptfe.gatech.edu).



## **MASTER OF SCIENCE WITH A MAJOR IN IN POLYMER, TEXTILE AND FIBER ENGINEERING**

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The School of Polymer, Textile and Fiber Engineering offers a graduate program leading to a Master of Science degree with a major in Polymer, Textile and Fiber Engineering. Students with a bachelor's degree in engineering, chemistry, or science may be accepted into the MS program. Students in the MS program may take the thesis option or non-thesis option. The School participates in the Graduate Course Option Program.

The MS and PhD 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 PhD and MS program requirements, please refer to the PTFE Web site at [www.ptfe.gatech.edu](http://www.ptfe.gatech.edu).

## **BS/MS POLYMER, TEXTILE AND FIBER ENGINEERING - FIVE-YEAR**

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Current undergraduate students may participate in the five-year BS/MS program offered by the School of Polymer, Textile and Fiber Engineering. Qualified students are allowed to use up to 6 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 30 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**

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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 PhD 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 PhD and MS program requirements, please refer to the PTFE Web site at [www.ptfe.gatech.edu](http://www.ptfe.gatech.edu)

## **GEORGIA TECH-SAVANNAH**

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Established in 1998

Location: 210 Technology Circle

Savannah, GA 31407

Telephone: 912.966.7922

Fax: 912.966.7836

Web site: [www.gtsav.gatech.edu](http://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).

## **GEORGIA TECH-SAVANNAH ACCREDITATION STATEMENT**

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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)



## **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.



## **BACHELOR OF SCIENCE IN CIVIL ENGINEERING - REGIONAL ENGINEERING PROGRAM**

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The four-year curriculum leading to the Bachelor of Science in Civil Engineering (BS CE) 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 BS CE 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 BS CE 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 BS CE 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

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- 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**  
**2009 - 2010 DEGREE REQUIREMENTS**  
SCHOOL OF CIVIL AND ENVIRONMENTAL ENGINEERING  
Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
CEE 3055 or 4100 or 4200 or 4300 or 4405 or 4600 (Breadth Electives) *	12
CEE/MATH/ISYE 3770 STATISTICS & APPLICATIONS	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
CEE TECHNICAL ELECTIVES	9
APPROVED ELECTIVE	3
MSE 2001 or ECE 2025 or (ECE 3710 & 3741) (COE Technical Elective-Group B)	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
CEE TECHNICAL ELECTIVES	6
SOCIAL SCIENCE ELECTIVE (3000 or 4000 Level)	3

CEE 4090 CEE CAPSTONE DESIGN	3
APPROVED ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

**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**

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### **WELLNESS REQUIREMENT**

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

### **HUMANITIES/SOCIAL SCIENCES**

A total of 12 credit hours of humanities and 12 credit hours of social sciences are required. The humanities requirement consists of ENGL 1101, ENGL 1102, a 3 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 6 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 15 hours of elective credit that students may use to pursue a specific area of interest within civil engineering. A maximum of 6 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 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 6 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**

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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 Georgia Tech 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 30 hours of coursework at Georgia Tech before they can participate in the program. For more details, visit [www.gtip.gatech.edu/](http://www.gtip.gatech.edu/).

In addition, there is the Work Abroad Program ([www.workabroad.gatech.edu](http://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, visit [www.profpractice.gatech.edu](http://www.profpractice.gatech.edu).

## **BACHELOR OF SCIENCE IN CIVIL ENGINEERING (REP) - INTERNATIONAL PLAN**

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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 26 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](http://www.oie.gatech.edu/internationalplan).



## **BACHELOR OF SCIENCE IN CIVIL ENGINEERING (REP) - RESEARCH OPTION**

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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 BSC.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 BS CE 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 6 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 COMPUTER ENGINEERING - REGIONAL ENGINEERING PROGRAM**

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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 BS 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 BS CmpE degree, students may choose a computer engineering specialization within the BS EE degree program.

## PROGRAM OBJECTIVES

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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**  
**2009 - 2010 DEGREE REQUIREMENTS**  
SCHOOL OF ELECTRICAL AND COMPUTER ENGINEERING  
Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
MATH 1501 CALCULUS I	4
ENGL 1101 ENGLISH COMPOSITION I	3
CHEM 1310 GENERAL CHEMISTRY	4
CS 1371 COMPUTING FOR ENGINEERS	3
WELLNESS	2
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>18</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>18</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
ECE 4001 ENGINEERING PRACTICE AND PROFESSIONALISM	2
ECE / CS ELECTIVE	3
ENGINEERING ELECTIVE	3
APPROVED ELECTIVE	3
HUMANITIES ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>14</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
ECE 4007 ECE CULMINATING DESIGN PROJECT	4
ECE / CS ELECTIVES	7
SOCIAL SCIENCE ELECTIVE	3
APPROVED ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

**TOTAL PROGRAM HOURS = 130 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

## **ELECTIVES**

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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 12 hour humanities requirement. An additional 6 hours of Institute-approved humanities courses are required to fulfill the 12 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 6 hours of Institute-approved social science courses, satisfy the 12 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**

3 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**

3 hours: MATH 2602, MATH 3012, or course(s) approved by the School; course must be taken on a letter-grade basis.

### **ENGINEERING ELECTIVES**

6 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**

10 hours : 3000 level or above in ECE or CS, at least 6 hours at the 4000 level or above.

### **APPROVED (FREE)**

9 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**

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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**

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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 BS CmpE - International Plan degree requirements are identical to those for the regular BS CmpE . Please refer to the BS 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**

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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 BS CmpE-Research Option degree requirements are identical to those for the regular BS CmpE . Please refer to the BS 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 - 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, electrical energy, electromagnetics, and telecommunications. Additionally, students may elect to take advanced courses in other programs such as computer science, mathematics, physics, or management.

## PROGRAM OBJECTIVES

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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**  
**2009 - 2010 DEGREE REQUIREMENTS**  
SCHOOL OF ELECTRICAL AND COMPUTER ENGINEERING  
Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
MATH 1501 CALCULUS I	4
ENGL 1101 ENGLISH COMPOSITION I	3
CHEM 1310 GENERAL CHEMISTRY	4
CS 1371 COMPUTING FOR ENGINEERS	3
WELLNESS	2
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>18</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>18</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
ECE 3042 MICROELECTRONIC CIRCUITS LAB	2
ECE BREADTH ELECTIVES	9
APPROVED ELECTIVE	3
ENGINEERING ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
ECE 4001 ENGINEERING PRACTICE AND PROFESSIONALISM	2
ECE ELECTIVES	4
ENGINEERING ELECTIVE	3
APPROVED ELECTIVE	3
SOCIAL SCIENCE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
ECE 4007 ECE CULMINATING DESIGN PROJECT	4
ECE ELECTIVES	7
ENGINEERING ELECTIVE	2
APPROVED ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

**TOTAL PROGRAM HOURS = 130 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

## **ELECTIVES**

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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 12 hour humanities requirement. An additional 6 hours of Institute-approved humanities courses are required to fulfill the 12 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 6 hours of Institute-approved social science courses, satisfy the 12 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**

3 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, 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**

20 hours: 3000 level or above in ECE, at least 6 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)**

12 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**

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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**

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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 BS EE - International Plan degree requirements are identical to those for the regular BS EE. Please refer to the BS 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 BS EE - Research Option degree requirements are identical to those for the regular BS EE. Please refer to the BS 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.

## **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 current undergraduate curriculum in mechanical engineering is the same as 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.

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 EDUCATIONAL OBJECTIVES**

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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 in fall 2008 for the BSME Regional Engineering Program, after input from and consultation with various constituencies, are:

- A. Our graduates will be successfully employed in ME and other related fields in industry, academe, government, or nonprofit organizations.
- B. Our graduates will continue to learn and enhance their professional skills through activities such as participation in professional organizations and post-graduate studies.
- C. Our graduates will be competitive in creating and adding value to products, processes, and services attuned to a global economy.
- D. Our graduates will perform successfully in distributed and culturally diverse work environments.

**BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING**  
**REGIONAL ENGINEERING PROGRAM**  
**2009 - 2010 DEGREE REQUIREMENTS**  
SCHOOL OF MECHANICAL ENGINEERING  
Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
ME 3322 THERMODYNAMICS	3
ME 3340 FLUID MECHANICS	3
COE 3001 MECHANICS OF DEFORMABLE BODIES	3
ECON 2100 or 2101 or 2105 or 2106	3
ECE 3741 INSTRUMENTATION & ELECTRONICS LAB	1
SOCIAL SCIENCE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
ME 3057 EXPERIMENTAL METHODOLOGY & TECHNICAL WRITING	3
ME 3180 MACHINE DESIGN or ME 4315 ENERGY SYSTEMS ANALYSIS AND DESIGN	3
ME 4210 MANUFACTURING PROCESSES & ENGINEERING	3
MECHANICAL ENGINEERING ELECTIVE	3

FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>14</b>

**TOTAL PROGRAM HOURS = 124 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

\* Social Science or humanities is required depending on the ethics class selection. 12 hours of social science electives and 12 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

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### WELLNESS REQUIREMENT

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

### HUMANITIES AND SOCIAL SCIENCES

12 credit hours of humanities and 12 credit hours of social sciences are required.

The 12 hours of humanities are comprised of 6 hours of English composition classes and 6 hours of humanities electives. The English composition classes are satisfied by ENG 1101 and ENG 1102.

The 12 hours of social sciences include 3 hours of economics, 3 hours of work in history and the constitutions of the United States and Georgia, and 6 hours of social science electives. The 3 hours of economics is satisfied by either ECON 2100 (Economic Analysis and Policy Problems), ECON 2101 (The Global Economy), ECON 2105 (Principles of Macroeconomics), or ECON 2106 (Principles of Microeconomics). The 3 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 6 hours of social science electives and the 6 hours of humanities electives must include 3 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 6 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 3.2 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.

Students will be allowed to count 6 hours (two classes) of the following minors towards the ME program's ME technical electives, upon successful completion of the minor. If a student does not successfully complete the minor, the student will have to take two approved ME technical electives (i.e., approved ME 3000-level or ME 4000-level courses).

- Aerospace Engineering
- Biology
- Biomedical Engineering
- Computing Science

- Earth and Atmospheric Sciences
- Materials Science and Engineering
- Mathematics
- Nuclear and Radiological Engineering

### **SCIENCE ELECTIVES**

The 3 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**

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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. Over the years, 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 three 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 sophomores or juniors 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 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. For more information about the Cooperative Program, go to [www.coop.gatech.edu](http://www.coop.gatech.edu).

Students can also complete work assignments in a foreign country as part of the International Cooperative Program (Work Abroad 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 Work Abroad Program, go to [www.workabroad.gatech.edu](http://www.workabroad.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 with an option for more work. Students must have completed at least 30 hours of coursework at Georgia Tech before they can participate in the program. For more details, see [www.upi.gatech.edu](http://www.upi.gatech.edu).

In addition, there is a Work Abroad Program ([www.workabroad.gatech.edu](http://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](http://www.profpractice.gatech.edu).



## **BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING (REP) - INTERNATIONAL PLAN**

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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 26 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 BS 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 26 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](http://www.oie.gatech.edu).

## **GEORGIA TECH-SAVANNAH CAMPUS MASTER'S PROGRAMS**

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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 30 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.

## **GEORGIA TECH-SAVANNAH CAMPUS DOCTORAL PROGRAMS**

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The PhD 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.

## UNDECLARED ENGINEERING STUDENTS - GENERAL INFORMATION

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College of Engineering

Dean's Office

Location: Tech Tower, Third Floor

Web site: [www.coe.gatech.edu/academics/undeclared.php](http://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

<b>SUGGESTED 1ST YEAR SCHEDULE - FIRST SEMESTER</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>SUGGESTED 1ST YEAR SCHEDULE - SECOND SEMESTER</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

## **IVAN ALLEN COLLEGE**

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Established in 1990

Location: 781 Marietta Street

Telephone: 404.385.1493

Fax: 404.894.8573

Web site: [www.iac.gatech.edu](http://www.iac.gatech.edu)

Ivan Allen Student Services Web site: [www.iac.gatech.edu/students](http://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.

# IVAN ALLEN COLLEGE OF LIBERAL ARTS

## SCHOOL OF ECONOMICS

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Bachelor of Science in Economics

[Additional Options:](#)

International Plan

Research Option

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

Doctor of Philosophy with a Major in Economics

## SCHOOL OF HISTORY, TECHNOLOGY, & SOCIETY

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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

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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

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Bachelor of Science in Computational Media (Interdisciplinary with COC & Ivan Allen College)

[Additional Options:](#)

International Plan

Research Option

BS/MS Computational Media & Digital Media - Five-year

Bachelor of Science in Science, Technology, and Culture

[Additional Options:](#)

Biomedicine & Culture Option

Gender Studies Option

International Plan

Media Option

Research Option

BS/MS L.C.C. - Five-year

BS/MS L.C.C. - Five-year

BS/MS Computational Media & Digital Media - 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**

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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**

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Bachelor of Science in Public Policy

BS/MS PUB.P. - Five-year

BS/MS PUB.P. - Five-year

Master of Science in Public Policy

Doctor of Philosophy with a Major in Public Policy

## **RESERVE OFFICERS' TRAINING CORPS (ROTC)**

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Air Force Reserve Officers' Training Corps (ROTC)

Army Reserve Officers' Training Corps (ROTC)

Navy Reserve Officers' Training Corps (ROTC)



## SCHOOL OF ECONOMICS

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Established in 1990

Location: The Habersham Building

781 Marietta Street

Telephone: 404.894.4919

Fax: 404.894.1890

Web site: [www.econ.gatech.edu](http://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 Languages (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 PhD programs in management, public policy, industrial and systems engineering, and city and regional planning.

## **BACHELOR OF SCIENCE IN ECONOMICS**

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The program of study provides a thorough grounding in science, the humanities, and mathematics as well as the tools of economic analysis and decision making. 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****2009 - 2010 DEGREE REQUIREMENTS**

SCHOOL OF ECONOMICS

Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
ECON 2105 PRINCIPLES OF MACROECONOMICS	3
ECON 3161 ECONOMETRIC ANALYSIS	3
HUMANITIES ELECTIVE	3
INTERNATIONAL AFFAIRS ELECTIVE	3
SOCIAL SCIENCE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
ECON 3110 ADVANCED MICROECONOMIC ANALYSIS	3
ECON 4160 ECONOMIC FORECASTING	3
NON MAJOR CLUSTER ELECTIVE	3
SOCIAL SCIENCE ELECTIVES	6
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
ECON 3120 ADVANCED MACROECONOMIC ANALYSIS	3
ECONOMICS ELECTIVE	3
NON MAJOR CLUSTER ELECTIVE	3
FREE ELECTIVES	6
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
ECONOMICS ELECTIVE	3
NON MAJOR CLUSTER ELECTIVE	3
FREE ELECTIVES	9
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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

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### 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
- CEE 1770 Introduction to Engineering Graphics and Visualization
- 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
- ECE 2030 Introduction to Computer Engineering
- ME 1770 Introduction to Engineering Graphics and Visualization
- ME 2016 Computing Techniques
- MGT 2200 Information Technology

### 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.

It is strongly recommend that economics majors complete the MATH 1501/1502, sequence as it will better prepare them for upper level economics 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 eight hours of courses chosen from the following list:

<b>Course</b>	<b>Class Title</b>	<b>Credit Hours</b>
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

Additionally, Economics and Global Economics and Modern Languages students must complete a lower level course (one thousand or two thousand level) from a school in the Colleges of Engineering or Sciences with the exceptions of Psychology or Applied Psychology.

## **SOCIAL SCIENCES ELECTIVES**

All students must complete 12 hours of electives in the social sciences, including 3 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 9 hours from the following list:

### **ARCHITECTURE AND CITY PLANNING**

ARCH 4331, 4335; CP 4010, 4020, 4030

### **ECONOMICS**

All ECON courses except 3160, 3200, 4170, 4910, 4990

### **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

### **PSYCHOLOGY**

PSYC 1101, 2015, 2020, 2103, 2210, 2220, 2230, 2240, 2260, 2300, 2400, 3060, 4070, 4770

## **HUMANITIES ELECTIVES**

Students are required to complete 6 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 12 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**

You may take ONLY Free Electives on a Pass/Fail basis.

Students must complete free electives (normally bearing 20 hours of credit), bringing the number of credit hours received up to 122. EIA students are required to take 10 hours of free elective credit rather than the 20 hours required for ECON and GEML students.

## **BACHELOR OF SCIENCE IN ECONOMICS - INTERNATIONAL PLAN**

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All degree programs offered by the School of Economics including the BS 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.
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 a 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 26 weeks in a foreign culture enrolled in school and/or participating in an internship experience.



## **BACHELOR OF SCIENCE IN ECONOMICS - RESEARCH OPTION**

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The School of Economics also participates in the Research Option plan offered by the Undergraduate Research Opportunities Program (UROP). The Research Option offers students the opportunity for in-depth research experience working under the guidance of a faculty mentor. Requirements for participation in the Research Option include completing 9 hours of undergraduate research, at least 6 of which are on the same topic, writing a research proposal, taking the class LCC 4700, Writing an Undergraduate Thesis, and completing the thesis. Research may be either for pay or credit. For more details, please visit the Research Option webpage [http://undergradresearch.gatech.edu/research\\_option/index.php](http://undergradresearch.gatech.edu/research_option/index.php).

## **BACHELOR OF SCIENCE IN ECONOMICS AND INTERNATIONAL AFFAIRS**

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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

## 2009 - 2010 DEGREE REQUIREMENTS

SCHOOL OF ECONOMICS

Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
ECON 2105 PRINCIPLES OF MACROECONOMICS	3
LAB SCIENCE II	4
INTA 3110 U.S. FOREIGN POLICY	3
INTA ELECTIVE	3
MODERN LANGUAGE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
CS 1315 INTRODUCTION TO MEDIA COMPUTATION or 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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
ECON 3120 ADVANCED MACROECONOMIC ANALYSIS	3
ECONOMICS ELECTIVE	3
FREE ELECTIVE	3
NON MAJOR CLUSTER ELECTIVE*	3
TECHNICAL REQUIREMENT	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
ECON 4350 INTERNATIONAL ECONOMICS	3
ECONINTA 4740 SEMINAR IN POLITICAL ECONOMY	3
INTA 3301 INTERNATIONAL POLITICAL ECONOMY	3
FREE ELECTIVE	3
NON MAJOR CLUSTER ELECTIVE*	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
ECONINTA 4741 THESIS IN POLITICAL ECONOMY	3
ECONOMICS ELECTIVE	3
FREE ELECTIVES	4
INTA ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>13</b>

**TOTAL PROGRAM HOURS = 120 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

**\* MUST BE APPROVED BY DEPARTMENT**

## ELECTIVES AND REQUIREMENTS

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### 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
- CEE 1770 Introduction to Engineering Graphics and Visualization
- 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
- ECE 2030 Introduction to Computer Engineering
- ME 1770 Introduction to Engineering Graphics and Visualization
- ME 2016 Computing Techniques
- MGT 2200 Information Technology

### 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.

It is strongly recommend that economics majors complete the MATH 1501/1502, sequence as it will better prepare them for upper level economics 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 eight hours of courses chosen from the following list:

<b>Course</b>	<b>Class Title</b>	<b>Credit Hours</b>
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

Additionally, Economics and Global Economics and Modern Languages students must complete a lower level course (one thousand or two thousand level) from a school in the Colleges of Engineering or Sciences with the exceptions of Psychology or Applied Psychology.

## **SOCIAL SCIENCES ELECTIVES**

All students must complete 12 hours of electives in the social sciences, including 3 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 9 hours from the following list:

### **ARCHITECTURE AND CITY PLANNING**

ARCH 4331, 4335; CP 4010, 4020, 4030

### **ECONOMICS**

All ECON courses except 3160, 3200, 4170, 4910, 4990

### **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

### **PSYCHOLOGY**

PSYC 1101, 2015, 2020, 2103, 2210, 2220, 2230, 2240, 2260, 2300, 2400, 3060, 4070, 4770

## **HUMANITIES ELECTIVES**

Students are required to complete 6 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 12 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**

You may take ONLY Free Electives on a Pass/Fail basis.

Students must complete free electives (normally bearing 20 hours of credit), bringing the number of credit hours received up to 122. EIA students are required to take 10 hours of free elective credit rather than the 20 hours required for ECON and GEML students.

## **BACHELOR OF SCIENCE IN ECONOMICS AND INTA - INTERNATIONAL PLAN**

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The BS 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 BS 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 26 week in a foreign culture enrolled School and/or participating in an internship experience



## **BACHELOR OF SCIENCE IN GLOBAL ECONOMICS AND MODERN LANGUAGES**

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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 BS 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 26 week in a foreign culture enrolled School and/or participating in an internship experience.

**BS IN GLOBAL ECONOMICS AND MODERN LANGUAGES****2009 - 2010 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

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
ECON 2105 PRINCIPLES OF MACROECONOMICS	3
LAB SCIENCE (BIOL, CHEM, EAS, PHYS)	4
MODERN LANGUAGE	6
SOCIAL SCIENCE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
ECON 3110 ADVANCED MICROECONOMIC ANALYSIS	3
ECON 3161 ECONOMETRIC ANALYSIS	3
MODERN LANGUAGE	6
SOCIAL SCIENCE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
ECON 3120 ADVANCED MACROECONOMIC ANALYSIS	3
ECON 3150 ECONOMIC & FINANCIAL MODELING	3
ECONOMICS ELECTIVE	3
FREE ELECTIVES	5
MODERN LANGUAGE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
ECON 4160 FORECASTING	3
MODERN LANGUAGE or FREE ELECTIVES	9
NON MAJOR CLUSTER ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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

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### 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
- CEE 1770 Introduction to Engineering Graphics and Visualization
- 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
- ECE 2030 Introduction to Computer Engineering
- ME 1770 Introduction to Engineering Graphics and Visualization
- ME 2016 Computing Techniques
- MGT 2200 Information Technology

### 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.

It is strongly recommend that economics majors complete the MATH 1501/1502, sequence as it will better prepare them for upper level economics 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 eight hours of courses chosen from the following list:

<b>Course</b>	<b>Class Title</b>	<b>Credit Hours</b>
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

Additionally, Economics and Global Economics and Modern Languages students must complete a lower level course (one thousand or two thousand level) from a school in the Colleges of Engineering or Sciences with the exceptions of Psychology or Applied Psychology.

## **SOCIAL SCIENCES ELECTIVES**

All students must complete 12 hours of electives in the social sciences, including 3 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 9 hours from the following list:

### **ARCHITECTURE AND CITY PLANNING**

ARCH 4331, 4335; CP 4010, 4020, 4030

### **ECONOMICS**

All ECON courses except 3160, 3200, 4170, 4910, 4990

### **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

### **PSYCHOLOGY**

PSYC 1101, 2015, 2020, 2103, 2210, 2220, 2230, 2240, 2260, 2300, 2400, 3060, 4070, 4770

## **HUMANITIES ELECTIVES**

Students are required to complete 6 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 12 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**

You may take ONLY Free Electives on a Pass/Fail basis.

Students must complete free electives (normally bearing 20 hours of credit), bringing the number of credit hours received up to 122. EIA students are required to take 10 hours of free elective credit rather than the 20 hours required for ECON and GEML students.

## BACHELOR OF SCIENCE IN GLOBAL ECONOMICS & MODERN LANGUAGES - INTERNATIONAL PLAN

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The degree requirements for the Global Economics and Modern Languages (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**

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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.

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**

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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 9 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

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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 33 semester credit hours of coursework with:

1. at least 12 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.

## DOCTOR OF PHILOSOPHY WITH A MAJOR IN ECONOMICS

The School of Economics will start its PhD program with a major in Economics in August 2010. The program is unique in its focus on the common globalization and innovation issues that interconnect environmental economics, industrial organization and international economics. It emphasizes the economic forces that generate the impetus for individuals to compete globally and analyzes the interrelated effects that these forces have on the environment, international trade, and the behavior of firms in a variety of industrial sectors in the U.S. In the new millennium, globalization and creative activity, as fundamental precursors and outputs of industrial activities, have important implications for environmental, trade, and industrial policies. Policy changes in one arena (e.g. trade) may have significant effects in other areas (e.g. environment, antitrust). There is an increasing demand for PhD economists who have the training and skill sets to carefully think through these issues. Our doctoral program will prepare students to meet this increasing demand, qualifying them for positions in academia, private and public sectors.

Our curriculum features 27 credit hours of first year core courses, at least 21 credit hours of fields, electives and workshop, at least 18 credit hours of departmental seminars and at least 33 credit hours of dissertation research (see Table below). Thus, the minimum number of credit hours to be fulfilled is 99. Students receive rigorous training in microeconomic theory and quantitative methods during their first year of study. Our first year core coursework also features a two-course sequence in the economics of innovation. This cluster is designed to teach students the key microeconomic and macroeconomic foundations of innovation. In Microeconomics of Innovation, students will be taught the microeconomic theoretical concepts, techniques and reasoning that underlie innovation processes.

Table: Planned Curriculum and Sample Schedule for the PhD Program – All courses 3 credit hours

Fall	Spring
<b>First Year</b>	
Mathematics for Economists (July-August)	Microeconomic Theory II
Microeconomic Theory I	Econometrics II
Econometrics I	Microeconomics of Innovation
Game Theory	Macroeconomics of Innovation
Elective I	
<b>Second Year</b>	
Major Economics Field, Course I	Major Economics Field, Course II
Minor Economics Field, Course I	Minor Economics Field, Course II
Empirical Research Methods	Elective II
Seminar I	Seminar II
<b>Third Year</b>	
Research Dev. & Presentation Workshop	Dissertation Research
Dissertation Research	Seminar IV
Seminar III	
<b>Fourth Year</b>	
Dissertation Research	Dissertation Research
Seminar V	Seminar VI

In Macroeconomics of Innovation, students will learn the macroeconomic factors that lead to technological change, the roles played by technological innovation and knowledge spillovers as promoters of economic growth, and the scope for fiscal and monetary policies to foment research and development and hence economic growth.

With the exception of the two-course sequence in the economics of innovation, our core courses are standard. Mathematics for Economists introduces students to the core coursework. This is an intensive three-week course, offered to students during July-August, ending in the week before the start of the fall semester. The main goal of this course is to

provide students with the necessary quantitative skills to perform well in the subsequent core coursework. Microeconomic Theory I and Microeconomic Theory II cover standard topics in microeconomics. Game Theory complements the knowledge in microeconomics and examines static and dynamic games of complete and incomplete information. In addition to Mathematics for Economists, students take three courses in quantitative methods, a two-course sequence in statistics and econometrics and a course in empirical research methods.

We offer three specialization fields, Environmental Economics, Industrial Organization and International Economics. Our fields build on our set of core courses, providing students with opportunities to explore research topics within three distinct but related areas while simultaneously preserving and enhancing our program's focus on globalization and innovation. Each field shares globalization and innovation as a "common language," since a substantial share of its content pertains to the importance played by globalization and innovation within the field. Each field provides an equal mix of theory and practice, consisting of two 3 hour courses.

Students are required to have a major and at least one minor in fields offered by the Department of Economics. Occasionally, the Department of Economics will offer elective courses that complement our field courses. In addition, students are allowed to take elective courses outside of Economics subject to the approval of the Director of Graduate Studies. A set of elective courses taken in another discipline will constitute a minor in that particular discipline if at least two courses are taken from this discipline.

The goals of the Research Development & Presentation Workshop are threefold. First, the workshop provides an extra incentive for students to start working early on the topic of their third year paper, since students present papers closely related to their third year papers to peers and the instructor. Second, the workshop provides each student with regular feedback from the instructor and peers on the student's ability to deliver lectures. Third, the workshop serves the purpose of enhancing the student's ability of writing a research paper. Students will not only present papers closely related to their own, but will also discuss papers presented by peers, evaluate their peers regarding presentation skills and present the first drafts of their third year papers at the end of the term.

School Seminars provide students with an opportunity to get involved in the research life of the Department. They also enable students to start acquiring key presentation skills. Each student is required to attend all School seminars each semester, starting in the fall semester of the second year. The Director of Graduate Studies will keep an attendance list, and students will have to submit weekly reports summarizing the papers presented. Absences will have to be justified in writing – copies of such documents are kept in the student's file together with other student records. Absences may affect the student's eligibility for funding or the amount of funding in the subsequent semester. At the end of each semester, the Director of Graduate Studies will evaluate the students' performances and issue "pass" or "no pass" grades. Those who receive pass grades will earn three credits. Each student must earn a minimum of 18 Seminar credit hours to graduate.

In addition to the School Seminar, students must also register each semester for Dissertation Research, starting in the fall semester of the third year. In such a semester, students must register for at least 6 hours of Dissertation Research. In every subsequent semester, students must register for at least 9 hours of Dissertation Research. Students must complete a minimum of 33 Dissertation Research credit hours to graduate.

## **SCHOOL OF HISTORY, TECHNOLOGY, AND SOCIETY**

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Established in 1990

Location: D. M. Smith Building

Telephone: 404.894.3196

Fax: 404.894.0535

Web site: [www.hts.gatech.edu](http://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 Georgia Tech. 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 minors in history, sociology, and women, science, and technology, as well as several certificate programs for students in other undergraduate majors. In addition, HTS participates in the International Plan and Research Option.

## **BACHELOR OF SCIENCE IN HISTORY, TECHNOLOGY, AND SOCIETY**

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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. Students in HTS may participate in both the International Plan and the Research Option, which enhance the undergraduate experience. 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****2009 - 2010 DEGREE REQUIREMENTS**

SCHOOL OF HISTORY, TECHNOLOGY, AND SOCIETY

## Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
HTS ELECTIVE (NON-US) *	3
HTS 2101 RESEARCH METHODS *	3
MODERN LANGUAGE HUMANITIES ELECTIVE	3
SOC 1101 INTRODUCTION TO SOCIOLOGY *	3
NON-MAJOR CLUSTER	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
ECON 2100 or 2101 or 2105 or 2106 *	3
HTS ELECTIVE (SCIENCE, TECHNOLOGY, & MEDICINE) *	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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
HTS ELECTIVE (SCIENCE, TECHNOLOGY, & MEDICINE) *	3
HTS ELECTIVES *	6
NON-MAJOR CLUSTER	3
FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
HTS ELECTIVE (SCIENCE, TECHNOLOGY, & MEDICINE) *	3
HTS ELECTIVES *	6
NON-MAJOR CLUSTER	3
FREE ELECTIVES	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
HTS ELECTIVES *	6
HTS SEMINAR *	4
FREE ELECTIVES	6
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
HTS ELECTIVE *	3
HTS SEMINAR *	4
FREE ELECTIVES	6
<b>TOTAL SEMESTER HOURS =</b>	<b>13</b>

**TOTAL PROGRAM HOURS = 120 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

\* All courses must be taken on a letter-grade basis, with a final grade of C or better.



## REQUIREMENTS AND ELECTIVES

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### 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 6 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 9 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 of 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

38 CREDIT HOURS

A minimum of a C grade is required in all HTS core classes.

Students acquire a grounding in history and sociology by completing the following sequence of courses: HTS 1001, HTS non-U.S., SOC 1101, HIST 2111 or 2112, and HTS 2101. In addition, students take three Science, Technology, or Medicine courses. They also take one economics course from the following: Econ 2100, 2101, 2105, or 2106. Students complete two HTS 4000-level research seminars in their junior and senior years.

21 CREDIT HOURS

### HTS (NON-US)

To fulfill the HTS non-U.S. requirement listed above, students can choose ONE from any of the following.

1031, 2036, 2037, 2061, 2062, 3028, 3029, 3030, 3031, 3032, 3033, 3035, 3036, 3038, 3039, 3041, 3043, 3045, 3051, 3061, 3062, 3063, 3064, 3069

### HTS SCIENCE, TECHNOLOGY, & MEDICINE

To fulfill the HTS Science, Technology, and Medicine requirement listed above, students can choose THREE from any of the following.

2081, 2082, 2084, 2100, 3001, 3007, 3020, 3021, 3082, 3083, 3084, 3085, 3086, 3087

### HTS ELECTIVES

21 CREDIT HOURS

HTS requires that students complete an additional 21 hours of HTS electives. Any HTS course can serve as an elective, except for those fulfilling HTS core requirements.

### **NON-MAJOR CLUSTER**

12 CREDIT HOURS

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 are usually, but not necessarily, offered by the same school. This cluster can serve as the basis for a certificate, minor, or second major.

### **FREE ELECTIVES**

18 CREDIT HOURS

Students are encouraged to use the remaining 18 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**

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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 (BS 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 non-major cluster and 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 26 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 26 week total, given the approval of the HTS undergraduate coordinator. Both IP tracks require a minimum of 12 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**

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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 6 hours of supervised individual undergraduate research.

## **MINOR AND CERTIFICATE PROGRAMS**

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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 five approved courses, three of which must be at the 3000 level or higher. Certificates require four approved courses, three of which must be at the 3000 level or higher. 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, visit the HTS Web site at [www.hts.gatech.edu/undergrad](http://www.hts.gatech.edu/undergrad).

## **MASTER OF SCIENCE IN HISTORY AND SOCIOLOGY OF TECHNOLOGY AND SCIENCE**

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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 30 hours (required of both MS and PhD candidates) consists of 9 hours of required fundamental courses, 12 hours of core electives within HTS, an advanced interdisciplinary seminar, and 6 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 PhD. 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 PhD dissertation and its successful defense by oral examination.

**DOCTOR OF PHILOSOPHY WITH A MAJOR IN HISTORY & SOCIOLOGY OF TECHNOLOGY & SCIENCE**

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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 30 hours (required of both MS and PhD candidates) consists of 9 hours of required fundamental courses, 12 hours of core electives within HTS, an advanced interdisciplinary seminar, and 6 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 PhD. 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 PhD dissertation and its successful defense by oral examination.

## THE SAM NUNN SCHOOL OF INTERNATIONAL AFFAIRS

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Established in 1990

Location: Habersham Building

781 Marietta Street

Telephone: 404.894.3195

Fax: 404.894.1900

Web site: [www.inta.gatech.edu](http://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.



## **UNDERGRADUATE PROGRAMS - GENERAL INFORMATION**

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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](http://www.inta.gatech.edu)

## **BACHELOR OF SCIENCE IN INTERNATIONAL AFFAIRS**

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The Bachelor of Science in International Affairs (BS 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 BS 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****2009 - 2010 DEGREE REQUIREMENTS**

SCHOOL OF INTERNATIONAL AFFAIRS

Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
CLUSTER ELECTIVE	3
FREE ELECTIVE	3
INTA 3203 COMPARATIVE POLITICS	3
INTA 3301 INTERNATIONAL POLITICAL ECONOMY	3
INTA ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
CLUSTER ELECTIVES	6
FREE ELECTIVE	3
INTA ELECTIVES	6
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
CLUSTER ELECTIVE	3

FREE ELECTIVES	7
INTA 4400 INTERNATIONAL STRATEGY & POLICY	3
<b>TOTAL SEMESTER HOURS =</b>	<b>13</b>

**TOTAL PROGRAM HOURS = 120 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

**\*(DEPARTMENTAL APPROVAL REQUIRED)**

## REQUIREMENTS AND ELECTIVES

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### 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, 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 6 hours of English, including ENGL 1101 and 1102. All Tech students are required to complete an additional 6 hours of humanities and fine arts, which INTA students satisfy through their mandatory four-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. INTA students satisfy a required 9 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
- HTS 3033 Medieval England 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 CHEM 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 these two options as their second technology requirement. (For instance, if a student takes CS 1301 as his other 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 2400 Introduction to Bioengineering Statistics
- CEE 1770 Introduction to Engineering Graphics and Visualization
- CP 4510 Fundamentals of Geographic Information Systems
- CS 1315 Introduction to Media Computation
- CS 1301 Introduction to Computing
- CS 1331 Introduction 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 we 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 BS INTA curriculum is interdisciplinary, and INTA students are required to complete a total of 18 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 12 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 12 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 15-hour, non-major cluster taught outside the School. The non-major cluster elective is satisfied either through 15 hours of coursework in one school or through 15 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. BS 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 9-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 in 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 Georgia State University), 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

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The Bachelor of Science in International Affairs (BS 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:

- technology, ethics, and scientific analysis;
- international security and diplomacy;
- comparative politics, cultures, and societies; and
- international political economy.

Graduates of the BS 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 26 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 approved INTA Elective courses.)

- 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 INTERNATIONAL AFFAIRS AND MODERN LANGUAGE**

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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 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](http://www.catalog.gatech.edu/colleges/cola/ml/ugrad/bsintaml/geninfo.php).

# BACHELOR OF SCIENCE IN INTERNATIONAL AFFAIRS AND MODERN LANGUAGE

## 2009 - 2010 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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

THIRD YEAR-FALL	HRS
ECON 2100 or 2105 or 2106	3
INTA 3110 U.S. FOREIGN POLICY	3
MODERN LANGUAGE	6
TECHNOLOGY REQUIREMENT **	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

THIRD YEAR-SPRING	HRS
CLUSTER ELECTIVE ***	3
INTA 3301 INTERNATIONAL POLITICAL ECONOMY	3
INTA 3203 COMPARATIVE POLITICS	3
MODERN LANGUAGE	6
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

FOURTH YEAR-FALL	HRS
CLUSTER ELECTIVES ***	6
FREE ELECTIVES or MODERN LANGUAGE	6
INTA 4400 INTERNATIONAL STRATEGY & POLICY	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
CLUSTER ELECTIVES ***	10
FREE ELECTIVE or MODERN LANGUAGE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>13</b>

**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

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### 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](http://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 C 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 6 hours of English, including ENGL 1101 and 1102. All Tech students are required to complete an additional 6 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 9 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 CHEM 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 these two options as their second technology requirement. (For instance, if a student takes 1301 as her first technology requirement, the student can take CS 1315 as his or her second technology requirement.)

For the 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 2400 Introduction to Bioengineering Statistics
- CEE 1770 Introduction to Engineering Graphics and Visualization
- 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
- 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/ML does not guarantee that these classes will be offered every semester nor does INTA/ML guarantee access to these classes since we 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 IAML 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
- HTS 3033 Medieval England 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 Germany 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 BS IAML curriculum is multidisciplinary, and IAML students are required to complete a total of 6 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 12 hour , non-major cluster taught outside the School. The non-major cluster elective is satisfied either through 12 hours of coursework in one school or through 12 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 12 hour 2 credits to graduate. BS IAML students typically have sixteen hours of free elective credit.





## **BS IN INTERNATIONAL AFFAIRS & MODERN LANGUAGE - INTERNATIONAL PLAN**

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In partnership with the School of Modern Languages, the Sam Nunn School offers the Bachelor of Science in International Affairs and Modern Language - 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/bsintamintl/geninfo.php](http://www.catalog.gatech.edu/colleges/cola/ml/ugrad/bsintamintl/geninfo.php).

## **BACHELOR OF SCIENCE IN ECONOMICS AND INTERNATIONAL AFFAIRS**

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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

## 2009 - 2010 DEGREE REQUIREMENTS

SCHOOL OF ECONOMICS

Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
ECON 2105 PRINCIPLES OF MACROECONOMICS	3
LAB SCIENCE II	4
INTA 3110 U.S. FOREIGN POLICY	3
INTA ELECTIVE	3
MODERN LANGUAGE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
CS 1315 INTRODUCTION TO MEDIA COMPUTATION or 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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
ECON 3120 ADVANCED MACROECONOMIC ANALYSIS	3
ECONOMICS ELECTIVE	3
FREE ELECTIVE	3
NON MAJOR CLUSTER ELECTIVE*	3
TECHNICAL REQUIREMENT	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
ECON 4350 INTERNATIONAL ECONOMICS	3
ECONINTA 4740 SEMINAR IN POLITICAL ECONOMY	3
INTA 3301 INTERNATIONAL POLITICAL ECONOMY	3
FREE ELECTIVE	3
NON MAJOR CLUSTER ELECTIVE*	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
ECONINTA 4741 THESIS IN POLITICAL ECONOMY	3
ECONOMICS ELECTIVE	3
FREE ELECTIVES	4
INTA ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>13</b>

**TOTAL PROGRAM HOURS = 120 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

**\* MUST BE APPROVED BY DEPARTMENT**

### 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).

## REQUIREMENTS AND ELECTIVES

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### 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 6 hours of English, including ENGL 1101 and 1102. All Tech students are required to complete an additional 6 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 9 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 BS EIA curriculum is multidisciplinary, and EIA students are required to complete a total of 12 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 6 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 6 hours of elective courses taught in the Sam Nunn School and 6 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 9 hours of coursework in one school or through 9 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. BS EIA students typically have 10 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.

## **MINOR PROGRAM**

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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.

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 3 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

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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 12 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**

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Under the Graduate Course Option, undergraduate students with a final grade point average of 3.5 or higher may count 6 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 36 hours - if completed within two years of completion of Bachelor's degree.

## **GRADUATE COURSE OPTION**

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Under the Graduate Course Option, undergraduate students with a final grade point average of 3.5 or higher may count 6 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 36 hours - if completed within two years of completion of Bachelor's degree.

## MASTER OF SCIENCE IN INTERNATIONAL AFFAIRS

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The Master of Science in International Affairs degree program is a program that is adaptable to the interests and needs of a student who intends to enter a professional career requiring advanced training in international affairs or 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 36 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 before graduating from the program, either through previous undergraduate work or during the Master's 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, either during undergraduate work or while in the Master's program.

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 MS IA program, visit [www.inta.gatech.edu/academic-programs](http://www.inta.gatech.edu/academic-programs)



/graduate/.

**DOCTORAL PROGRAM**

The PhD in International Affairs, Science and Technology program provides a unique 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. There is widespread recognition that a number of important problems in international affairs – such as how to control the proliferation of weapons of mass destruction, or how to promote economic growth in the developing world – cannot properly be understood without an appreciation of the scientific and technological issues involved. At the same time, it is evident that neither the development nor the impact of new technologies is confined within state or national boundaries. Scientific innovation increasingly depends on international collaboration, while the consequences of those innovations, for example in terms of their environmental impact, similarly demand international coordination to be monitored and regulated. Graduates of this research-oriented program will be well placed to embark on careers in academic research, or to move into the policy world where their dual expertise will be rare and highly valued.

**ADMISSION OVERVIEW**

Qualified persons regardless of race, religion, sex, or national origin are welcome to seek admission to the IAST program. The criteria used in determining each applicant’s eligibility for consideration shall include:

**PRE-MASTER’S LEVEL:**

- Completion of a BA or BS 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, an internet based TOEFL of at least 100.

**POST-MASTER'S LEVEL:**

- Completion of a MA or MS 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, an internet based TOEFL of

at least 100.

Admission decisions are based on a combination of factors, including academic degrees and records, the statement of purpose, letters of recommendation, test scores, and relevant work experience. 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. 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**

The PhD program is founded upon a broad, rigorous, and student-centered curriculum. All students must have completed the equivalent of the core courses for the Master of Science in International Affairs (see description of the MS program). Because students come from a wide range of backgrounds, they may petition to substitute or pass-out of certain core requirements based upon previous experiences and coursework and under the guidance and approval of the dissertation committee. However, reduction in credit is limited to a total of 9 hours. In addition, students in the PhD program must successfully complete three additional core courses that include:

- INTA 7010 Introduction to International Affairs Proseminar
- INTA 8000 Seminar in Science, Technology, and International Affairs
- INTA 8001 Seminar in Science, Technology, and International Affairs II

In addition, students must complete a minor concentration that focuses on an approved topic in the field of science, technology, and international affairs. This may be satisfied by completing 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. Students must also satisfy either the language or advanced methods requirement. The language requirement is satisfied through demonstrated competency (reading proficiency only) in one language other than English (equivalent of four semesters of college-level coursework or an equivalent exam). The advanced methods requirement may be satisfied through completion of 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.

### **BREAKDOWN OF HOURS REQUIRED FOR DEGREE:**

- Thesis Research (INTA 9000) 18 hours
- INTA 7010 (Proseminar) 3 hours
- INTA 8000/8001 (Seminar in Science, Tech, and INTA) 6 hours
- INTA Fundamental Coursework 18 hours
- Minor concentration 9 hours
- Advanced Methods 6 hours OR Language Requirement 0-12 hours
- For a total of 57-69 hours

Other requirements for the PhD include admission to candidacy for the degree through a qualification process that includes successful completion of two comprehensive examinations in specified fields of international affairs; submission of a Science, Technology, and International Affairs Field Exam Paper on an approved topic; and submission of a dissertation prospectus that must be approved and supervised by the dissertation committee composed of relevant experts in the fields and a member external to the school. Finally, students must complete and successfully defend a doctoral dissertation.



## SCHOOL OF LITERATURE, COMMUNICATION, AND CULTURE

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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](http://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 BS in Science, Technology, and Culture (STAC), which includes the options of Media Studies, Gender Studies, and Biomedicine and Culture, a BS in Computational Media jointly administered with the College of Computing, and an MS and a PhD 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 MS 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 PhD 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.

## **ADVANCED PLACEMENT**

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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**

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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**

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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

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The BS 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 36 semester hours of courses in computer science and 30 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 BS 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  
2009 - 2010 DEGREE REQUIREMENTS**

INTERDISCIPLINARY DEGREE WITH THE COLLEGE OF COMPUTING AND IVAN ALLEN COLLEGE

Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>13</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
CAPSTONE *	4
CS SPECIALTY COURSE (3000 OR 4000 LEVEL, FROM CS MEDIA THREAD OR CS PEOPLE THREAD) *	3
FREE ELECTIVES	8
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

**TOTAL PROGRAM HOURS = 120 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

\* All required CS and LCC courses must be taken on a letter-grade basis, with a final grade of C or better.

## REQUIREMENTS AND ELECTIVES

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### Computing Requirement

Students must complete CS 1315, CS 1301, CS 1371, 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

As part of the humanities requirement, students must complete either LCC 3206 or LCC 3314.

All students must take 28 hours of CS courses including the following groups:

1. CS 1331
2. CS 2261
3. CS 1050
4. CS 2340
5. CS 4001
6. 12 hours from the Media or People threads of CS. (CS 3240, 3451, 3510, 3640, 4230, 4455, 4460, 4465, 4470, 4480, 4496, 4550, 4590, 4770, 3750, 3790, 4605, 4625, 4660, 4665, 4670, 4690, 4793, 3300, 3600, 4235, 4400, 4440, 4635, 4699, 4731, 4803) (PSYC 3011, 3040, 4090, 4260).

All students must take 30 hours of LCC courses including the following groups:

1. LCC 2700 and 2720
2. LCC 2400, 2500, or 2600
3. 6 hours of Studio courses (LCC 2730, 3705, or 3710)
4. 9 hours of LCC Specialty courses in one of the following categories:
  - Film: LCC 3252, 3254, 3256, 3352, 3853, 4500
  - Technology and Culture: LCC 3302, 3304, 3306, 3308, 3310, 3316, 3318, 3362, 3833, 4100.
  - Performance Studies: LCC 3262, 3362, 3863, 4600.
  - Narrative: LCC 3202, 3208, 3212, 3214, 3216, 3218, 3220, 3222, 3226, 3228.
5. 3 hours of Advanced Studio courses (LCC 4699, 4720, 4725, 4730, 4731, 4732).
6. 3 hours of an LCC elective (any LCC course 2000 level or higher).

### Mathematics

The mathematics requirement may be satisfied by Math 1501, 1502, and 2605.

### Science

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.

### Freshman Composition/Humanities/Fine Arts

Students are required to complete 3 hours in humanities or fine arts, 3 hours of either LCC 3206, or 3314, and 6 hours in freshman composition (ENGL 1101 and 1102), for a total of 12 hours.

### **Social Sciences**

Students are required to complete 12 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) three additional social science courses.

### **Senior Capstone**

Each student must complete a senior capstone course of 4 hours. A student must have a signed contract with the academic advisor in order to receive permission to register for a capstone course.

### **Free Electives**

Each student must accumulate at least 122 hours of credit toward the Bachelor of Science in Computational Media. Therefore, in addition to the listed requirements, a student must take 11 hours of elective courses either within or outside LCC or CS to complete 122 hours.

## **BACHELOR OF SCIENCE IN COMPUTATIONAL MEDIA - INTERNATIONAL PLAN**

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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 36 hours of courses in CS and 30 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**

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The CM Research Plan follows the Institute model to allow students to incorporate research experiences into the major program of study. Students will complete 9 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 36 hours of courses in CS and 30 hours of courses in LCC (in addition to the basic humanities requirement). Students will also:

1. complete 9 hours of undergraduate research; and
2. complete LCC 4700 Writing the Undergraduate Thesis.

**BACHELOR OF SCIENCE IN SCIENCE, TECHNOLOGY, AND CULTURE**

<b>Requirements of the BS in Science, Technology, and Culture:</b>	
<b>Basic Distribution</b>	59 hours
<b>Major Hours</b>	45 hours
<b>Non-major Cluster</b>	9 hours
<b>Free Electives</b>	9 hours
<b>TOTAL</b>	122 hours

<b>Basic Distribution/Core Requirements</b>	
<b>Freshman Composition</b>	6 hours
<b>Mathematics</b>	8 hours
<b>Laboratory Science</b>	8 hours
<b>Computing</b>	3 hours
<b>Science or Computing</b>	8 hours
<b>Humanities and Fine Arts</b>	6 hours
<b>Social Sciences</b>	12 hours <ul style="list-style-type: none"> <li>• HIST 2111, HIST 2112, POL 1101, PUBP 3000, or INTA 1200</li> <li>• an internationally oriented course from an approved list</li> <li>• two additional social science courses</li> </ul>
<b>Modern Language at the 2000 level or higher</b>	3 hours
<b>Philosophy of Science (PST 3115 or 3127)</b>	3 hours
<b>Wellness</b>	2 hours



**BACHELOR OF SCIENCE IN SCIENCE, TECHNOLOGY, AND CULTURE  
2009 - 2010 DEGREE REQUIREMENTS**

SCHOOL OF LITERATURE, COMMUNICATION, AND CULTURE

Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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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
<b>TOTAL SEMESTER HOURS =</b>	<b>12</b>

**TOTAL PROGRAM HOURS = 120 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

## REQUIREMENTS AND ELECTIVES

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### 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- 3 hours

Philosophy of Science (PST 3115 or 3127)- 3 hours

### Designated Courses in the STAC Major

All students must take 42 hours of STAC courses including the following groups:

1. LCC 2100
2. 6 hours of STAC historical courses (LCC 3102, 3104, 3106, 3108, 3110, 3112, 3114, 3116, 3118)
3. 9 hours of STAC literary/cultural courses (LCC 3502, 3504, 3506, 3508, 3510, 3512, 3514, 3516, LCC 3518, 3202, 3204, 3206, 3208, 3210, 3212, 3214, 3216, 3218, 3220, 3222, 3224, 3226, 3252, 3254, 3256, 3262, 4200, 4600)
4. 9 hours of STAC issues courses (LCC 3302, 3304, 3306, 3308, 3310, 3314, 3316, 3318, 3352, 3362)
5. 9 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 6 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 6 hours in humanities or fine arts in addition to 6 hours in freshman composition (ENGL 1101 and 1102), for a total of 12 hours.

### Social Sciences

Students are required to complete 12 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 9 hours.

## **BACHELOR OF SCIENCE IN STaC - BIOMEDICINE AND CULTURE OPTION**

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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 BS. In addition, they must also:

1. Select their 9 hours of STaC literary/cultural courses from among LCC 3206, 3208, 3210, 3212, 3224, 3252, 3256, and 3262,
2. Include in their 9 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 - GENDER STUDIES OPTION**

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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 - INTERNATIONAL PLAN**

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The STAC International Plan follows the Institute model to develop a global competence connected to the student's major program of study. It thus integrates international studies and experiences with work in a broad range of cultural and media studies, preparing graduates to study, critique, and create cultural texts within an international professional environment. All students who successfully complete this option will receive the "International Plan" designation on their transcripts.

While following the basic STAC program of instruction, requiring a total of 122 hours of coursework, students following the International Plan will modify their program as follows. They will:

- take three Social Science courses, one each from the following categories: international relations, global economics, and a course on a specific country or region;
- spend two terms abroad engaged in any combination of study abroad, research, or internship;
- complete 12 hours of language instruction (by dedicating 6 hours of humanities electives, 3 hours of free electives, and 3 hours of the STAC language requirement to language study); and
- complete a STAC capstone course that links international studies with the major.

While all of the STAC degree options provide students with 9 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.

## **BACHELOR OF SCIENCE IN STAC - MEDIA STUDIES OPTION**

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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, 3412, 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 SCIENCE, TECHNOLOGY, & CULTURE RESEARCH OPTION (ALL TRACKS)**

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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 6 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 3 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 9 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 BS/MS COMPUTATIONAL MEDIA AND DIGITAL MEDIA**

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Students who desire to pursue the five-year BS/MS combination in CM and DM must apply to the School after completing at least 75 hours of work towards the CM degree. Applicants should have shown a cumulative grade point average (GPA) of at least 3.5.

Students admitted to the five-year program will take a total of 12 hours of graduate course work during their final undergraduate year. 6 hours of that work, in DM courses, will count toward the CM Advanced Studio and Capstone requirements 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 their fifth year, students will take a total of 24 hours, including either LCC 6800 (Project) or LCC 7000 (Thesis), and with no more than three courses taken outside of the DM program.

## **FIVE-YEAR BS/MS DEGREE PROGRAM**

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Students who wish to pursue the five-year BS/MS 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 12 hours of graduate coursework during their final undergraduate year. 6 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

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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

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Georgia Tech's MS in Digital Media (DM) is a graduate program of humanities-based professional education for the digital age. MS 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 MS 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 MS 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 PhD work in computer science or the humanities.

The MS DM program accepts roughly twenty-five full-time students each fall term. MS 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.

## 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 36 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 (9 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 9 hours of the Flexible Core must be taken outside your specialization. A maximum of 3 hours of CS 8903 may count toward the Flexible Core.

### COMPUTING

COA/CS 6763, Design of Environments  
COA 8901, Special Proble Network Music  
COA 8903, Special Proble Project Studio in Music Technology  
COA 8903, Special Proble 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 Proble Computer Music Composition  
COA 8903, Special Proble 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 Assistive Technologies

## **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](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 3 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 6 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 BS/MS DEGREE PROGRAM**

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Students who wish to pursue the five-year BS/MS 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 12 hours of graduate coursework during their final undergraduate year. 6 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

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The Digital Media PhD 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 (9 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 PhD 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](http://www.idt.gatech.edu/phd/phD_exam_list.php).

## **PHD 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:** PhD students who choose to can participate in the established internship program of the MS program, which customarily takes place between the first and second year.

## **SCHOOL OF MODERN LANGUAGES**

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Established in 1904

Location: Swann Building

Telephone: 404.894.7327

Fax: 404.894.0955

Web site: [www.modlangs.gatech.edu](http://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.

## **GRADUATE COURSE OPTION**

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Under the Graduate Course Option, undergraduate students with a final grade point average of 3.5 or higher may count 6 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 36 hours if they chose to further their study in International Affairs; likewise, qualified GEML students could complete the MS in Economics with thirty additional hours in ECON courses.

## STUDY ABROAD

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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

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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](http://www.modlangs.gatech.edu) for more information.

## **SUGGESTED PLACEMENT**

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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](http://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](http://www.modlangs.gatech.edu) for more information.



## HUMANITIES CREDITS

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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

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Modern Languages will grant 6 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 INTERNATIONAL AFFAIRS AND MODERN LANGUAGE**

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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 Language (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 multilingual 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 LANGUAGE

## 2009 - 2010 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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

THIRD YEAR-FALL	HRS
ECON 2100 or 2105 or 2106	3
INTA 3110 U.S. FOREIGN POLICY	3
MODERN LANGUAGE	6
TECHNOLOGY REQUIREMENT **	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

THIRD YEAR-SPRING	HRS
CLUSTER ELECTIVE ***	3
INTA 3301 INTERNATIONAL POLITICAL ECONOMY	3
INTA 3203 COMPARATIVE POLITICS	3
MODERN LANGUAGE	6
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

FOURTH YEAR-FALL	HRS
CLUSTER ELECTIVES ***	6
FREE ELECTIVES or MODERN LANGUAGE	6
INTA 4400 INTERNATIONAL STRATEGY & POLICY	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
CLUSTER ELECTIVES ***	10
FREE ELECTIVE or MODERN LANGUAGE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>13</b>

**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

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### 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](http://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 C 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 6 hours of English, including ENGL 1101 and 1102. All Tech students are required to complete an additional 6 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 9 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 CHEM 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 these two options as their second technology requirement. (For instance, if a student takes 1301 as her first technology requirement, the student can take CS 1315 as his or her second technology requirement.)

For the 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 2400 Introduction to Bioengineering Statistics
- CEE 1770 Introduction to Engineering Graphics and Visualization
- 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
- 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/ML does not guarantee that these classes will be offered every semester nor does INTA/ML guarantee access to these classes since we 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 IAML 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
- HTS 3033 Medieval England 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 Germany 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 BS IAML curriculum is multidisciplinary, and IAML students are required to complete a total of 6 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 12 hour, non-major cluster taught outside the School. The non-major cluster elective is satisfied either through 12 hours of coursework in one school or through 12 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 12 hour 2 credits to graduate. BS IAML students typically have sixteen hours of free elective credit.





## **BACHELOR OF SCIENCE IN INTERNATIONAL AFFAIRS AND MODERN LANGUAGE - INT'L PLAN**

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The degree requirements for the International Affairs and Modern Language (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.)

## **BACHELOR OF SCIENCE IN GLOBAL ECONOMICS AND MODERN LANGUAGES**

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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 Language (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.

**BS IN GLOBAL ECONOMICS AND MODERN LANGUAGES****2009 - 2010 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

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
ECON 2105 PRINCIPLES OF MACROECONOMICS	3
LAB SCIENCE (BIOL, CHEM, EAS, PHYS)	4
MODERN LANGUAGE	6
SOCIAL SCIENCE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
ECON 3110 ADVANCED MICROECONOMIC ANALYSIS	3
ECON 3161 ECONOMETRIC ANALYSIS	3
MODERN LANGUAGE	6
SOCIAL SCIENCE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
ECON 3120 ADVANCED MACROECONOMIC ANALYSIS	3
ECON 3150 ECONOMIC & FINANCIAL MODELING	3
ECONOMICS ELECTIVE	3
FREE ELECTIVES	5
MODERN LANGUAGE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
ECON 4160 FORECASTING	3
MODERN LANGUAGE or FREE ELECTIVES	9
NON MAJOR CLUSTER ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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)**

## REQUIREMENTS AND ELECTIVES

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### 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](http://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 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 C 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 3 hours of electives chosen from engineering, science, or mathematics, for a total of eleven hours.

### SOCIAL SCIENCES ELECTIVES

All students must complete 12 hours of electives in the social sciences, including 3 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 9 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 6 hours of English, including ENGL 1101 and 1102. All Tech students are required to complete an additional 6 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 3 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 3 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 GLOBAL ECONOMICS & MODERN LANGUAGES - INTERNATIONAL PLAN

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The degree requirements for the Global Economics and Modern Languages (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.



## MINOR PROGRAMS

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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 15 credit hours of language electives in a single language beyond the 2002 course.
  - Beyond the 2001 course for CHIN/JAPN/Russian Studies
  - Beyond the 2002 course for FREN/GRMN/SPAN
  - 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)
  - At least 9 hours must be taken at the 3000 level or above
2. A maximum of 9 semester hours of transfer credit is allowed in each minor. 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.

Students wishing to pursue one or more of these minors should declare the minor by filling out the minor change form with the Director of Undergraduate Studies in Modern Languages

## CERTIFICATE PROGRAMS

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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 6 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 12 credit hours. The courses that the School will accept for the 12 hours of the certificate are as follows:

- LING 2001 Introduction to Linguistics I
- LING 3010 Language Evolution
- LING 4002 Current Trends in Linguistics
- SPAN 3170 Spanish Phonetics and Phonology
- SPAN 4170 Spanish Applied Linguistics
- PSYC 2760 Human Language Processing
- PSYC 3011 Cognitive Psychology
- PSYC 3790 Introduction to Cognitive Science
- PSYC 4200 Advanced Topics in Cognitive Psychology

One LING 3813/4813 course may also count towards the certificate; in addition, 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.

The Linguistics Certificate in Language Processing is a joint collaboration between the School of Modern Languages and the College of Computing (Interactive Computing Division and Artificial Intelligence). The twelve-credit certificate is designed with computer science majors in mind who have an interest in linguistics and natural language processing. The requirements of the certificate may be fulfilled by completing the following courses:

Required Course (3 credits):

- LING 2001 – Study of Language – Introductory course that consists of a survey of fields in linguistics: phonetics/phonology, morphology/syntax, semantics/pragmatics, language variation, and computational linguistics/natural language processing.

Electives Chosen from the Open Course List/Thread\* (9 credits)

- CS 3240 – Languages and Computation
- CS 3600 – Introduction to Artificial Intelligence
- CS/PSYC 3790 – Introduction to Cognitive Psychology
- CS 3801/LING 3813/4813 Special Topics – Students can only count 3 credits of towards the certificate.
- CS 4634 – Knowledge-based AI
- CS 4641 – Machine Learning
- CS 4650 – Natural Language Understanding
- CS 4625 – Intelligent and Interactive Systems
- CS 4610 – Knowledge Systems

CS 8803 – Natural Language Processing – This is a graduate-level course that only some pre-approved undergraduates can take (with prior approval of the NLP professor).

LING 3/4XXX –Linguistics Elective

\*Other courses listed under the AI thread or in Linguistics may also count with prior approval from the linguistics advisor. Some of the CS courses may have prerequisites established by the College of Computing. Consult the Georgia Tech catalog and the College of Computing Web site (AI Thread).

## SCHOOL OF PUBLIC POLICY

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Established in 1990

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Fax: 404.385.0504

Web site: [www.spp.gatech.edu](http://www.spp.gatech.edu)

### GENERAL INFORMATION

The School of Public Policy is a research intensive, globally engaged school offering BS, MS and PhD degrees to those intrigued by complex problem-solving in the public interest around issues of research and technology, the environment, economic development and governance of information technology.

The School houses one of the world's top programs in the field of science and technology (S&T) policy. We are a university partner in the European Union's network of excellence in technology and innovation policy ("PRIME"), and we host a major international conference on S&T policy that brings participants from every continent. Because nearly every policy area is intertwined with S&T issues -- the environment, communications, transportation, biotechnology and health, urban development, workforce and education, -- the School is at the center of a wide range of important international, national, and state policy questions.

Our faculty members are research oriented, with over \$10 million in research underway. Our degrees are analytically oriented, developing skills increasingly in demand in the policy world as data and powerful software becomes more readily available and policy challenges grow more complex. Because our degree programs are smaller than most, there are opportunities at all levels for students to become involved in research, from the fast growing numbers of undergraduate students helping on faculty research projects to the opportunities many of our PhD students have to publish scholarly papers.

Our School emphasizes professional level analysis of the ethical and philosophical dimensions of policy. Our philosophers help you consider not just how things have been and how they are, but how they ought to be. We are unusual among policy schools in having an active research program at the intersection of philosophy, ethics and policy.

In our School, you will be taught by award winning teachers. You can experience policy development in projects, studios and internships that use our location in the vibrant, state capital - Atlanta - as a source of real world policy problems and contacts. You will find opportunities for international engagement, with research conducted jointly partners around the world, internationally oriented faculty and students, and opportunities for international exchange in our graduate programs. We offer a unique and forward-looking environment. We hope you will join us.

## **BACHELOR OF SCIENCE IN PUBLIC POLICY**

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The Bachelor of Science in Public Policy (BS 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 BS 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 BS PP graduates.

**BACHELOR OF SCIENCE IN PUBLIC POLICY****2009 - 2010 DEGREE REQUIREMENTS**

SCHOOL OF PUBLIC POLICY

Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>14</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
PUBP 2010 POLITICAL PROCESSES	3
PST 2020 PHILOSOPHICAL ANALYSIS	3
ECON 2106 PRINCIPLES OF MICROECONOMICS	3
MAJOR CLUSTER PICK #1 COURSE #1	3
SOCIAL SCIENCE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
PUBP 2030 ORGANIZATIONS AND POLICY	3
SCIENCE / ENGINEERING ELECTIVE	4
HUMANITIES ELECTIVE	3
MAJOR CLUSTER PICK #1 COURSE #2	3
FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
PUBP 3020 APPLIED POLITICAL ECONOMY	3
PUBP 3120 STATISTICAL ANALYSIS FOR PUBLIC POLICY	3
SCIENCE / ENGINEERING ELECTIVE	4
MAJOR CLUSTER PICK #2 COURSE #1	3
FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
PUBP 3030 POLICY ANALYSIS	3
PUBP 3130 RESEARCH METHODS	3
HUMANITIES ELECTIVE	3
MAJOR CLUSTER PICK #1 COURSE #3	3
FREE MAJOR CLUSTER ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
MAJOR CLUSTER PICK #2 COURSE #2	3
FREE ELECTIVE	3
PUBP 4010 POLICY TASK FORCE I	3
PUBP 4651 PUBLIC POLICY INTERNSHIP	3
SOCIAL SCIENCE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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MAJOR CLUSTER PICK #2 COURSE #3	3
FREE ELECTIVE	6
SOCIAL SCIENCE ELECTIVE	3
PUBP 4020 POLICY TASK FORCE II	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

**TOTAL PROGRAM HOURS = 120 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

## REQUIREMENTS AND ELECTIVES

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### 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  
PUBP 2010 Political Processes  
PST 2020 Philosophical Analysis of Policy Choices  
PUBP 2030 Organizations and Policy  
ECON 2106 Microeconomics  
PUBP 3020 Applied Political Economy  
PUBP 3030 Policy Analysis  
PUBP 3120 Statistical Analysis for Public Policy  
PUBP 3130 Research Methods and Problem Solving  
PUBP 4010 Policy Task Force I  
PUBP 4020 Policy Task Force II  
PUBP 2651 OR 4651 Public Policy Internship

A C or better is required in all BS PP core courses. No core courses may be taken on a pass/fail basis.

### Major Clusters

Students must complete two three-course clusters in substantive areas of public policy or specified policy-relevant disciplines. Courses can be listed under more than one cluster, but students cannot apply the same course to two clusters. With preapproval, a student can count one of the following toward a cluster: research for credit, internship for credit (in addition to the core internship requirement), or a special topics course. Transfer credit and study abroad courses (except courses taught by School of Public Policy faculty) cannot be applied to the cluster requirement. Students cannot create custom clusters. The following currently are public policy clusters:

#### 1. ENVIRONMENTAL AND ENERGY POLICY CLUSTER

- PST 4176 Environmental Ethics
- PUBP 3315 Environmental Policy & Politics
- PUBP 3600 Sustainability, Technology, & Policy
- PUBP 4338 Environmental Impact Assessment
- PUBP 47xx Energy Policy & Technology
- PUBP 6300 Earth Systems
- PUBP 6310 Environmental Issues
- PUBP 6312 Economics of Environmental Policy
- PUBP 6314 Policy Tools for Environmental Mgt
- PUBP 6320 Sustainable Systems
- PUBP 6326 Environmental Values & Policy Goals
- PUBP 6330 Environmental Law



- PUBP 6760 Negotiation & Conflict Management

## 2. **SCIENCE AND TECHNOLOGY POLICY CLUSTER**

- PUBP 4214 Gender, Science, Technology & Pub Policy
- PST 3127 Science, Technology & Human Values
- PUBP 3502 Info Technology/Commun/Telecom Policy
- PUBP 4111 Internet & Public Policy
- PUBP 4410 Science, Technology, & Public Policy
- PUBP 4414 Technology, Innovation & Policy
- PUBP 4416 Critical Issues in Science & Technology
- PUBP 4756 Technology Forecasting
- PUBP 6402 Research Policy & Management
- PUBP 6415 Technology, Regions, & Policy
- PUBP 6417 Critical Perspectives on Science & Tech
- PUBP 6421 Large-Scale Sociotechnical Systems
- PUBP 6501 Information Policy & Management
- PUBP 6740 Innovation & the State
- PUBP 6741 Geography of Innovation
- PUBP 6753 Comparative Science & Technology Policy
- PUBP 6777 Analysis of Emerging Technologies

## 3. **SOCIAL AND URBAN POLICY CLUSTER**

- PUBP 3201 Introduction to Social Policy
- PUBP 3214 African American Politics
- PUBP 4200 Social Policy Issues
- PUBP 4211 Urban Policy
- PUBP 4212 Women & Public Policy
- PUBP 4214 Gender, Science, Tech, & Public Policy
- PUBP 6604 Urban Policy Analysis & Planning
- PUBP 6606 Urban Development Policy

## 4. **PHILOSOPHY CLUSTER**

- PST 3127 Science, Technology, & Human Values
- PST 1101 Philosophical Analysis
- PST 2050 Philosophy & Political Theory (PST 3xxx)
- PST 3102 History of Ancient Philosophy
- PST 3103 Modern Philosophy
- PST 3105 Ethical Theories
- PST 3109 Ethics & Tech Profession
- PST 3113 Logic & Critical Thinking
- PST 3115 Philosophy of Science
- PST 3790 Introduction to Cognitive Science
- PST 4110 Theories of Knowledge
- PST 4112 Philosophy of Asian Thought
- PST 4174 Perspectives in Science & Technology

- PST 4176 Environmental Ethics
- PST 4752 Phil Issues in Computation
- PST 4790 Seminar in Cognitive Science
- PST 4791 Integrative Project in Cognitive Science
- PST 4792 Design Project in Cognitive Science
- PUBP 6010 Ethics, Epistemology, & Public Policy

#### 5. **POLITICS AND POLICY CLUSTER**

- POL 2101 State & Local Government
- PUBP 3000 US Constitutional Issues
- PUBP 3016 Judicial Process
- PUBP 3214 African-American Politics
- PUBP 3315 Environmental Policy & Politics
- PUBP 4120 Survey Research Methods
- PUBP 4226 Business & Government
- PUBP 4514 Mass Communications Policy
- PUBP 4951 Georgia Internship Program
- PUBP 4952 Legislative Intern Program

#### **Elective Courses in the Major**

In addition to the courses that students select that count toward the two policy clusters, students will select one additional course in policy as an elective.

#### **Senior Seminar/Thesis**

In their senior year, BSPP students will participate in a two-semester capstone Policy Task Force sequence (core course) in which students formulate, analyze, and recommend policy options working in teams. When the project is provided by an agency an outside evaluator will provide oversight and feedback to project teams and evaluate the final reports. Faculty will provide regular feedback and assessments of student and team performance. Each student will be responsible for a substantive project paper that will be presented and defended before the group, the instructor, and the outside evaluator and then will be integrated into a team report.

#### **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 12 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 6 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 seventeen hours of free electives.



The School of Public Policy offers a five-year BS/MS program for students enrolled in the undergraduate program who demonstrate an interest in and ability for additional education beyond the BS degree.

Students in the BS/MS program will remain undergraduates until they meet requirements for the undergraduate degree, at which point they will receive their BS degree and be changed to graduate status. Students will be eligible to apply for the program after completion of 30 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 BS 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, which allows students completing both the bachelor's and master's in the same discipline to use up to 6 credit hours of graduate-level coursework in the major discipline for both degrees.

**THE GRADUATE-LEVEL CREDITS REQUIRED IN THE FIVE-YEAR BS/MS PROGRAM ARE USUALLY AS FOLLOWS:**

- Core-22 hours
- Electives-12 hours
- Research paper- 3 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 3130 and will count for both programs]
- PUBP 6114 Applied Policy Methods and Data Analysis
- 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 BS PP program director for further information.



## **LAW, SCIENCE, AND TECHNOLOGY - MINORS AND CERTIFICATES**

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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](http://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). For additional requirements or any other information, see the pre-law section of the Web site [www.spp.gatech.edu](http://www.spp.gatech.edu); or contact the pre-law program director (contact information listed at Web site ).

## **PHILOSOPHY OF SCIENCE AND TECHNOLOGY - MINORS AND CERTIFICATES**

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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](http://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 12 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.



## **POLITICAL SCIENCE - MINORS AND CERTIFICATES**

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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](http://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 12 hours of coursework (at least 9 hours at the 3000 level), chosen in consultation with the faculty coordinator. The minor in political science requires 18 hours of coursework (at least 12 hours at the 3000 level), also chosen with the advice of the faculty coordinator.

## **PUBLIC POLICY - MINORS AND CERTIFICATES**

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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](http://www.spp.gatech.edu)

There are many interfaces between the realm of public policy and nearly every program of study at Georgia Tech. Engineering, the sciences, management, architecture, computing, and the liberal arts are impacted by – and affect – the decisions made by governments. The minor and certificate in Public Policy allow Georgia Tech students to develop the multidisciplinary thinking skills that are needed for strategic decision making in business and technical professions as well as law and public policy.

The minor consists of 15 hours of coursework (at least 12 semester hours at the 3000 level or higher). The certificate program consists of 12 hours of coursework.

Students pursuing the minor should have their program of study approved in writing by the public policy minor supervisor before enrolling in a course they intend to count toward the minor. A student may seek prior permission from the School of Public Policy to allow 3 hours of upper-division coursework in public policy taught outside the School to count toward the completion of the minor. Contact the School for the current public policy minor supervisor.

1. No more than 6 semester hours of Special Topics courses may be included in a minor program. No more than 3 semester hours of pre-approved public policy internship credit may be applied to the public policy minor.
2. 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. If a student is using a course to fulfill the social science requirement in the student's major, that course cannot be counted toward the Public Policy 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.
3. A course may not be counted toward more than one minor.
4. All courses counting toward the minor must be completed in residence at Georgia Tech, be taken on a letter-grade basis, and be completed with an overall grade point average of at least 2.00.

## **WOMEN, SCIENCE, AND TECHNOLOGY - MINORS AND CERTIFICATES**

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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 three (3) 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  
HTS 3051 Women and Gender in the Middle East  
HTS 3083 Technology and American Society

### **LITERATURE, COMMUNICATION, AND CULTURE**

LCC 2100 Introduction to Science, Technology, and Culture  
LCC 2200 Introduction to Gender Studies  
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

INTA 4803/8803 Gender in International Relations

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.



The School of Public Policy offers a five-year BS/MS program for students enrolled in the undergraduate program who demonstrate an interest in and ability for additional education beyond the BS degree.

Students in the BS/MS program will remain undergraduates until they meet requirements for the undergraduate degree, at which point they will receive their BS degree and be changed to graduate status. Students will be eligible to apply for the program after completion of 30 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 BS 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, which allows students completing both the bachelor's and master's in the same discipline to use up to 6 credit hours of graduate-level coursework in the major discipline for both degrees.

**THE GRADUATE-LEVEL CREDITS REQUIRED IN THE FIVE-YEAR BS/MS PROGRAM ARE USUALLY AS FOLLOWS:**

- Core-22 hours
- Electives-12 hours
- Research paper- 3 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 3130 and will count for both programs]
- PUBP 6114 Applied Policy Methods and Data Analysis
- 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 BS PP program director for further information.



## MASTER OF SCIENCE IN PUBLIC POLICY

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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 and energy policy, information and telecommunication policy, and regional economic development policy.

The MS in Public Policy requires forty-six credit hours of study, including either: a) 3 hours devoted to producing a professional policy research paper or team research project or b) 9 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 6 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.

For the MSPP, students are encouraged to pursue one or more concentrations. A concentration consists of at least three 3-credit courses, of which at least one is the School of Public Policy. Students can pursue concentrations within groups already developed by the faculty (see above). Or, students can pursue an individualized concentration, with the written approval of the proposed concentration program of study by their advisor.





## DOCTOR OF PHILOSOPHY WITH A MAJOR IN PUBLIC POLICY

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The PhD in Public Policy is a research-oriented program that prepares students for advanced professional work or for academic careers. Georgia Tech houses two PhD 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 MS 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 and energy 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 PhD level that majors are required to complete. The minor concentration is a three-course area of study, preferably taken outside the School of Public Policy.

Other requirements for the PhD 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 (9 credit hours).

In summary, the credits required for the PhD are usually as follows:

Core 18 hours (twenty-one for the joint program)
Major 12 hours
Minor 9 hours
Qualifiers 3 hours (written exam)
Colloquium 3 hours (oral exam: presentation of dissertation proposal)
Dissertation 9 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 PhD students receive financial assistance, chiefly through sponsored research projects and teaching assistantships.

## GRADUATE CERTIFICATE IN PUBLIC POLICY

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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.

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](http://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**

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### **Commanding Officer and Professor (sophomores)**

Col. Sheri Andino

### **Commandant of Cadets and Assistant Professor (seniors)**

Maj. Steve Headley

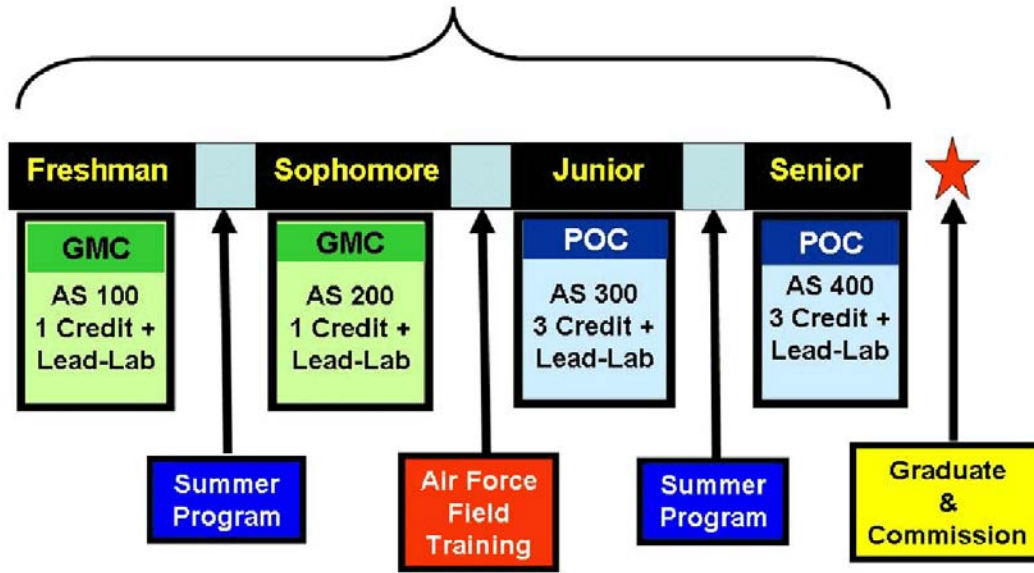
### **Unit Admission Officer and Assistant Professor (freshmen)**

Capt. Manolita Figueroa

### **Education Officer and Assistant Professor (juniors)**

VACANT

*Overview of a cadet's four year college career*



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**

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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**

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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](http://www.atlantahighered.org)

## **GENERAL MILITARY COURSE (GMC)**

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Courses are offered during fall and spring semesters with two credit hours awarded for each freshman and sophomore course, and 3 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)**

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Courses are offered during fall and spring semesters with 3 credit hours for each junior and senior course. Classes normally meet 3 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**

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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

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Established in 1917

151 6th Street

Location: Building 033

Telephone: 404.894.4760 or 404.894.9938

Web site: [www.armyrotc.gatech.edu](http://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

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### **Professor and Head**

Lt.Col. Nathaniel Farmer

### **Assistant Professors**

Capt. Mike Norris, Capt. Marcus O'Neal, MSG Arthur Obee, MSG Michael Ward, MSG James Rippey

## THE BASIC COURSE CURRICULUM

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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 3 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

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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. 12 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)**

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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**

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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**

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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](http://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

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Established in 1926  
O'Keefe 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 Navy 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.

The NROTC Program was established to develop midshipmen mentally, morally and physically and to imbue them with the highest ideals of duty, and loyalty, and with the core values of honor, courage and commitment in order to commission college graduates as naval officers who possess a basic professional background, are motivated toward careers in the naval service, and have a potential for future development in mind and character so as to assume the highest responsibilities of command, citizenship and government.

## **FACULTY**

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### **Commanding Officer and Professor of Naval Science**

CAPT Wayne Radloff, USN

### **Executive Officer/Assistant Professor of Naval Science**

Lt. Col. Ronald Peterson, USMC

### **Marine Officer Instructor/ Assistant Professor of Naval Science**

Captain Tedd Shimp, USMC

### **Assistant Marine Instructor**

Gy. Sgt. Hobbs, USMC

### **Aviation Officer/ Assistant Professor of Naval Science**

LT Marshall Hopper, USN

### **Surface Warfare Officer/ Assistant Professor of Naval Science**

LT Damien Lipke, USN

### **Submarine Officer/ Assistant Professor of Naval Science**

LT Charles Hurd, USN



## **COLLEGE PROGRAM STUDENTS**

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Non-scholarship students may seek a naval commission through the NROTC College Program. Interested students may apply at the NROTC unit in the O'Keefe building 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.

## SCHOLARSHIP STUDENTS

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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.

## **TWO-YEAR SCHOLARSHIP PROGRAM**

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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

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### 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 4 hours in basic ROTC courses and 6 hours in advanced ROTC courses toward meeting the free elective requirements for any degree.

## **COLLEGE OF MANAGEMENT**

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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 (MBA) 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, MBA-MOT and MBA-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 PhD in Management. Students admitted to the graduate management programs are admitted only on a degree-seeking basis. The College is accredited by AACSB International - The Association to Advance Collegiate Schools of Business.

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**

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

## **BACHELOR OF SCIENCE IN MANAGEMENT**

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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****2009 - 2010 DEGREE REQUIREMENTS**

COLLEGE OF MANAGEMENT

Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>14</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
MGT 3300 MARKETING MANAGEMENT I	3
MGT 3501 OPERATIONS MANAGEMENT	3
MGT 3660 INTERNATIONAL BUSINESS	3
MANAGEMENT ELECTIVE	3
NON MANAGEMENT ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
MANAGEMENT ELECTIVE	12
NON MANAGEMENT ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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)



## **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 12 hours of humanities, including 6 hours of required courses, ENGL 1101 and ENGL 1102, from Core Area A. In addition, they are required to complete 6 hours of humanities selected from Core Area C. Humanities electives transferred from other institutions may be used to fulfill this 12 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 9 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 18 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 12 hours of social science electives. Within these 12 hours, students are required to complete the United States and Georgia history and constitution requirement with 3 semester hours selected from HIST 2111, HIST 2112 , POL 1101, PUBP 3000, or INTA 1200. Students must then complete 6 hours of ECON 2105 and ECON 2106. For the final 3 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**

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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.

## **CHANGE OF MAJOR POLICY**

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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.

## MINOR IN ENGINEERING AND MANAGEMENT

The Engineering and Management Minor is offered by the Colleges of Engineering and Management. It is a course of study that enables undergraduate students in engineering and management to learn one another's language through innovative coursework in their respective fields and interdisciplinary team projects focused on solving real-world problems presented by corporate affiliates. Admission to most of the classes also requires that students be active members in the Technology and Management program. Top students with at least 30 to 59 hours of college credit from engineering and management apply for this program in January of each year. Approximately forty students are accepted each year and enter the program in the fall semester to begin a prescribed two-year, 22-credit course of study while satisfying requirements for a bachelor's degree in their engineering or management major. Application and course descriptions are available at: <http://mgt.gatech.edu>. Once enrolled in the Technology and Management program, the requirements for the minor are the successful completion of 22 credit hours defined as follows:

1. For engineering majors – MGT 3300, MGT 3000, MGT 3078, MGT 3743, MGT 3744, MGT 4741, MGT 4742
2. For management majors – COE 3002, ME 3141, ME 2110, ME 3743, ME 3744, ME 4741, ME 4742

Semester	Engineering	Business	Together
Fall Junior Year I	Marketing Management MGT 3300	Introduction to Microelectronics and Nanotechnology COE 3002	Analysis of Emerging Technologies MGT or ME 3743*
Spring Junior Year	Financial and Managerial Accounting MGT 3000	Cutting-Edge Engineering Seminar ME 3141	Managing Product, Service and Technology Development MGT or ME 3744*
Fall Senior Year	Finance and Investments MGT 3078	Creative Decisions and Design ME 2110	Integrative Management Development - Capstone Preparation MGT or ME 4741*
Spring Senior Year			Integrated Capstone Project MGT or ME 4742* (4 hrs)

## CERTIFICATE PROGRAMS

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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



## TRANSFER CREDIT POLICY FOR UNDERGRADUATE STUDENTS

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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 36 credit hours required for the degree are earned in residence at Georgia Tech and approved by the major school."

## MASTER OF BUSINESS ADMINISTRATION (MBA)

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The MBA program provides a professional management education for students with baccalaureate degrees in any discipline. Calculus is the only prerequisite. The MBA 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 MBA 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, MBA students are exposed to the social, environmental, political, and international factors shaping the global marketplace. Some of the primary advantages of the MBA program include a close community that promotes enriched student-faculty relationships; classmates with diverse educational and work experiences; small 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 MBA students work in summer internships with companies ranging from major employers to small entrepreneurial ventures. Summer internships enhance permanent employment opportunities.

The MBA program requires 54 hours; 30 semester hours are core classes. The core courses develop a common body of knowledge essential to all MBA 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.

MBA elective areas include accounting, entrepreneurship, finance, information technology, international business, marketing, operations management, organizational behavior, and strategic management.

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 MBA 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](http://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 MBA 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 MBA Admissions Committee prior to enrollment.

## **MBA DUAL-DEGREE OPTION**

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Through the Dual Degree option, qualified graduate students wishing to pursue a full-time MBA 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 MBA degree alone. For example, the MBA program is normally 54 hours. For students interested in pursuing or currently pursuing another graduate degree at Georgia Tech, the length of the MBA program is reduced to 39 hours, with the area of concentration being the coursework in the other Tech graduate program. Dual degree students take 30 semester hours of required management core courses, plus 9 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. Applicants to the dual degree program must complete applications for and be admitted to both programs.

Applications and viewbooks are available online at [www.mgt.gatech.edu/mba](http://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

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The Master of Science degree in Quantitative and Computational Finance (MS QCF) 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](mailto:Shijie.deng@isye.gatech.edu)

404.894.6519

Web site: [www.qcf.gatech.edu](http://www.qcf.gatech.edu)

## **MASTER OF BUSINESS ADMINISTRATION - GLOBAL BUSINESS**

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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 MBA - Global Business (Global Executive MBA) 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 MBA - Global Business program will prepare you to effectively lead your business in a global environment of increasing complexity and technological sophistication.

### **RIGOROUS CURRICULUM**

The MBA - Global Business program enhances traditional MBA coursework to include international perspectives on finance, operations, economics, technology, and marketing. The core MBA 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 MBA - 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 MBA - Global Business degree is a specialized MBA 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](mailto:GlobalEMBA@gatech.edu).

**CONTACT INFORMATION**

MBA-Global Business  
Georgia Tech College of Management  
800 West Peachtree Street  
Atlanta, GA 30308  
Phone: 404.385.2254  
Fax: 404.894.1464  
MBA – Global Business Web site

## **MASTER OF BUSINESS ADMINISTRATION IN MANAGEMENT OF TECHNOLOGY**

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The curriculum of this MBA 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 MBA–Management of Technology (Executive MBA in Management of Technology) degree requires 50 semester credit hours of study consisting of a fixed sequence of courses over a seventeen-month period. A new class begins each fall semester. The program begins with a weeklong residency on campus followed by classes on a convenient every other weekend basis (Friday evening and all day Saturday). Another weeklong campus residency begins the second part of the curriculum. The program concludes with a ten to 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 MBA–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 April 1. After that date, applications will be reviewed on a space-

available basis. Taking the 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](mailto:emba-mot@gatech.edu).

## **CONTACT INFORMATION**

MBA – 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  
MBA – Management of Technology Web site



## DOCTOR OF PHILOSOPHY WITH A MAJOR IN MANAGEMENT

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The PhD 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 PhD 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](http://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

## COLLEGE OF SCIENCES

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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](http://www.cos.gatech.edu)  
[www.cos.gatech.edu/ugrad.htm](http://www.cos.gatech.edu/ugrad.htm)  
Graduate: [www.cos.gatech.edu/grad.htm](http://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 BS, MS, and PhD degree programs. Applied Physiology offers the MS degree in prosthetics and orthotics and the PhD 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**

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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 PhD 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).

## COLLEGE OF SCIENCES

### SCHOOL OF APPLIED PHYSIOLOGY

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Master of Science in Prosthetics and Orthotics  
Doctor of Philosophy with a major in Applied Physiology

### SCHOOL OF BIOLOGY

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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

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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

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Bachelor of Science in Earth and Atmospheric Science

**Additional Options:**

Business Option  
International Plan

BS/MS E.A.S. - Five-year

BS/MS 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

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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

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### SCHOOL OF PHYSICS

Bachelor of Science in Applied Physics

[Additional Options:](#)

Business Option

Bachelor of Science in Physics

[Additional Options:](#)

Business Option

Research Option

Master of Science in Physics

Doctor of Philosophy with a Major in Physics

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### 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 - Cognitive Aging

Doctor of Philosophy with a Major in Psychology - Cognitive and Brain Sciences

Doctor of Philosophy with a Major in Psychology - Engineering 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**

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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**

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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](http://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, Kogler, Millard-Stafford, Nichols, Prilutsky, Shinohara, Sprigle, Wheaton) to the molecular/cellular levels (Balog, Burkholder). 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 master's and doctoral degree programs. A focused Master of Science in Prosthetics and Orthotics (MSPO) program offers cutting-edge instruction coupled with sound clinical training and a foundation in movement science. The accredited MSPO program graduated its first class in 2004. The PhD program in Applied Physiology, approved by the Board of Regents, began its first class in 2005, offering research tracks in muscle physiology, ryanodine receptor function, exercise metabolism, locomotion neuromechanics and prosthetics/orthotics. 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**

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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](http://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



## **CERTIFICATE PROGRAM IN APPLIED PHYSIOLOGY**

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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 allied health (physical therapy, occupational therapy, rehabilitation), health sciences, and human physiology. 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**

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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 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 3 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

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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**

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The School of Applied Physiology offers a multidisciplinary and integrative PhD 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 (15 hours), courses in an approved minor concentration (9 hours), 6 hours in a specialized focus area and 12 hours of dissertation research for a total of 42 hours.

## SCHOOL OF BIOLOGY - GENERAL INFORMATION

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Established in 1960

Location: Cherry Emerson Building

Telephone: 404.894.3700

Fax: 404.894.0519

Web site: [www.biology.gatech.edu/](http://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 MS and PhD 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.

## **BACHELOR OF SCIENCE IN BIOLOGY**

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The undergraduate curriculum for the Bachelor of Science in Biology degree is designed to prepare students for employment in academia, government or industry; for graduate studies in the biological sciences; or for admission to medical, dental, or veterinary schools. The theme of the curriculum is systems biology, employing a systems approach in solving biological problems. All students participate in research through undergraduate research courses. The School also offers the International Plan, Business Option, and a minor in biology.

**BACHELOR OF SCIENCE IN BIOLOGY  
2009 - 2010 DEGREE REQUIREMENTS**

SCHOOL OF BIOLOGY  
Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
ENGL 1101 ENGLISH COMPOSITION I	3
MATH 1501 CALCULUS I	4
BIOL 1510 BIOLOGICAL PRINCIPLES or BIOL 1511 HONORS BIOLOGICAL PRINCIPLES	4
CHEM 1310 GENERAL CHEMISTRY	4
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
ENGL 1102 ENGLISH COMPOSITION II	3
MATH 1502 CALCULUS II	4
BIOL 1520 INTRODUCTION TO ORGANISMAL BIOLOGY or BIOL 1521 HONORS INTRODUCTION TO ORGANISMAL BIOLOGY *	4
CHEM 1311 INORGANIC CHEMISTRY I	3
CHEM 1312 INORGANIC CHEMISTRY LAB I	1
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
BIOL 2335 GENERAL ECOLOGY or BIOL 2354 HONORS GENETICS	3
BIOL 2336 ECOLOGY LAB OR BIOL 2355 HONORS GENETICS LAB **	1
PHYS 2211 INTRODUCTORY PHYSICS I	4
CHEM 2311 ORGANIC CHEMISTRY I	3
FREE ELECTIVE	3
WELLNESS	2
<b>TOTAL SEMESTER HOURS =</b>	<b>15 / 16</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
BIOL 2344 GENETICS or BIOL 2337 HONORS ECOLOGY	3
BIOL 2345 GENETICS LAB OR 2338 HONORS ECOLOGY LAB **	1
CHEM 2312 ORGANIC CHEMISTRY II	3
CHEM 2380 SYNTHESIS LAB I	2
COMPUTING REQUIREMENT	3
QUANTITATIVE BIOLOGY REQUIREMENT***	3
<b>TOTAL SEMESTER HOURS =</b>	<b>14 / 15</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
BIOL 3340 CELL BIOLOGY or BIOL 3600 INTRODUCTION TO EVOLUTION	3
BIOL 3341 CELL BIOLOGY LAB **	1
BIOLOGY ELECTIVES	3
FREE ELECTIVE	2
PHYS 2212 INTRODUCTORY PHYSICS II	4
SOCIAL SCIENCE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15 / 16</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
BIOL 3340 CELL BIOLOGY or BIOL 3600 INTRODUCTION TO EVOLUTION	3
BIOL 3341 CELL BIOLOGY LAB **	1
BIOLOGY ELECTIVES	6
HIST 2111 or 2112 or POL 1101 or PUBP 3000 or INTA 1200	3
HUMANITIES ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15 / 16</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
SENIOR RESEARCH EXPERIENCE ****	3
BIOLOGY ELECTIVES	6
FREE ELECTIVE	3
SOCIAL SCIENCE ELECTIVE	3

BIOL 4450 SENIOR SEMINAR	1
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
BIOLOGY ELECTIVES	6
FREE ELECTIVE	3
SOCIAL SCIENCE ELECTIVE	3
HUMANITIES ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

**TOTAL PROGRAM HOURS = 120 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

\*4 credit hours of Biology elective may be substituted for BIOL 1520 if a score of 5 was achieved on the AP Biology test

\*\* Only 2 of the following core labs are required: BIOL 2336/2338, BIOL 2345/2355, BIOL 3341

\*\*\* Quantitative Biology Requirement: choose one of the following: BIOL 2400 Mathematical Models in Biology, BIOL 4150 Genomics & Applied Bioinformatics, BIOL 4401 Experimental Design & Biostatistics, BIOL 4422 Theoretical Ecology, BIOL 4755 Mathematical Biology, MATH 3215 Probability & Statistics, MATH 3770 Statistics & Applications

\*\*\*\* Senior Research Experience: choose one of the following: BIOL 4590 Research Project Lab, BIOL 4690 Independent Research Project, BIOL 4910 Honors Research Thesis.



## **ELECTIVES**

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### **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 12 hour humanities requirement. An additional 6 hours of Institute-approved humanities courses are required to fulfill the 12 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 9 hours of Institute-approved social science courses, satisfies the 12 hour social sciences requirement.

### **BIOLOGY ELECTIVES:**

Twenty-one additional credit hours selected from BIOL 3XXX level and higher courses are required. A maximum of 6 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**

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The curriculum and suggested course schedule for the BS in Biology – Business Option are similar to the BS 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 15 hours of biology electives, and eight hours of free electives.

## **BACHELOR OF SCIENCE IN BIOLOGY - INTERNATIONAL PLAN**

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Georgia Tech has recently introduced an International Plan through the Office of International Education ([www.oie.gatech.edu/](http://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 26 weeks) in residence abroad. Georgia Tech biology courses are taught in Australia/New Zealand ( [www.oie.gatech.edu/sa/programs/](http://www.oie.gatech.edu/sa/programs/)) and Spain ([www.oie.gatech.edu/sa/programs/](http://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/](http://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**

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This plan enables students to do 9 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 6 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; 3 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 6 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**

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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 fifteen semester hours in biology, of which 9 hours must be at the 3000 level or higher. Further information is available from the School's undergraduate coordinator.

## **GRADUATE PROGRAMS**

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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**

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This is a three-semester-focused professional master's degree program combining 37 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 MS Bioinformatics program.

## **MASTER OF SCIENCE IN BIOLOGY**

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The requirements for the MS degree are a research thesis and 30 semester hours of coursework, which includes 12 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**

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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 MS 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 12 hours of coursework relevant to the CSE discipline that includes one applications area; this must include at least 6 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 MS thesis (thesis option) that is defended to the student’s thesis committee who is responsible for overseeing the student’s research. 6 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.

### **PARTICIPATING SCHOOLS**

College of Computing  
School of Biology  
School of Biomedical Engineering  
School of Chemistry and Biochemistry  
School of Industrial and Systems Engineering  
School of Mathematics

### **OBJECTIVE OF THE PROGRAM**

The mission of the Georgia Tech Bioinformatics PhD 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 PhD 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/graduate-programs/bioinformatics/new/bioinformatics\\_phd.php](http://www.biology.gatech.edu/graduate-programs/bioinformatics/new/bioinformatics_phd.php).

## **DOCTOR OF PHILOSOPHY WITH A MAJOR IN BIOLOGY**

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Each PhD 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 40, including 12 research credit hours and 9 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 PhD 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.

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 PhD 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 (12 hours), a computation specialization (9 hours), and an application specialization (9 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 9 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 9 hours of courses that increase depth of understanding in an application field; these need not be computation-focused courses. At least 9 hours of PhD 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**

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Established in 1906

Location: Molecular Science & Engineering Building

Telephone: 404.894.4002

Fax: 404.894.7452

Web site: [www.chemistry.gatech.edu](http://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 with a Major in Chemistry, Computational Science and Engineering, Bioinformatics, and Paper Science and Engineering.

## **BACHELOR OF SCIENCE IN BIOCHEMISTRY**

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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****2009 - 2010 DEGREE REQUIREMENTS**

SCHOOL OF CHEMISTRY AND BIOCHEMISTRY

Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
ENGL 1102 ENGLISH COMPOSITION II	3
MATH 1502 CALCULUS II	4
BIOL 1510 BIOLOGICAL PRINCIPLES	4
CHEM 1311 INORGANIC CHEMISTRY I	3
CHEM 1312 INORGANIC CHEMISTRY LAB I	1
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
CHEM 2211 INTRODUCTION TO QUANTITATIVE ANALYSIS	3
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
CHEM 3411 PHYSICAL CHEMISTRY I	3
CHEM 4511 BIOCHEMISTRY I	3
CHEM 3371 ORGANIC CHEMISTRY LABORATORY	2
BIOLOGY ELECTIVE	3
SOCIAL SCIENCE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>14</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
CHEM 4512 BIOCHEMISTRY II	3
CHEM 4581 BIOCHEMISTRY LAB I	3
HUMANITIES ELECTIVE	3
BIOLOGY ELECTIVE	3
SOCIAL SCIENCE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
CHEM 4582 BIOCHEMISTRY LABORATORY II	3
CHEM 4521 BIOPHYSICAL CHEMISTRY	3
BIOLOGY ELECTIVE	3
FREE ELECTIVES	5
<b>TOTAL SEMESTER HOURS =</b>	<b>14</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
CHEM 4601 CHEMISTRY SEMINAR	2

CHEM 3211 ANALYTICAL CHEMISTRY	5
FREE ELECTIVES	9
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

**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 12 hour humanities requirement. An additional 6 hours of Institute-approved humanities courses are required to fulfill the 12 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 9 hours of Institute-approved social science courses, satisfies the 12 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, 4015, 4340, 4401, 4418, 4440, 4464, 4570, 4608, CHEM 4803 (with permission of UG coordinator).

## **BACHELOR OF SCIENCE IN BIOCHEMISTRY - INTERNATIONAL PLAN**

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The BS in Chemistry (International Plan) and BS 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 BS in Chemistry or BS in Biochemistry, students should visit: <http://www.internationalplan.gatech.edu>.

## **BACHELOR OF SCIENCE IN BIOCHEMISTRY RESEARCH OPTION**

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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](http://undergradresearch.gatech.edu/research_option/index.php). Successful completion of the Research Options requires participation by the student in 9 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

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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 BS 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 BS in Biochemistry degree) is a superb preparation for medical school. All Chemistry degrees are certified by the ACS.

**BACHELOR OF SCIENCE IN CHEMISTRY****2009 - 2010 DEGREE REQUIREMENTS**

SCHOOL OF CHEMISTRY AND BIOCHEMISTRY

Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
ENGL 1102 ENGLISH COMPOSITION II	3
MATH 1502 CALCULUS II	4
BIOL 1510 BIOLOGICAL PRINCIPLES	4
CHEM 1311 INORGANIC CHEMISTRY I	3
CHEM 1312 INORGANIC CHEMISTRY LAB I	1
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
CHEM 2211 INTRODUCTION TO QUANTITATIVE ANALYSIS - check title	3
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
CHEM 3411 PHYSICAL CHEMISTRY I	3
CHEM 3111 INORGANIC CHEMISTRY II	3
CHEM 3380 SYNTHESIS LAB II	3
SOCIAL SCIENCE ELECTIVE	3
HUMANITIES ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
CHEM 3412 PHYSICAL CHEMISTRY II	3
CHEM 3481 PHYSICAL CHEMISTRY LAB I	2
CHEM 3211 ANALYTICAL CHEMISTRY	5
SOCIAL SCIENCE ELECTIVE	3
FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
CHEM 4684 ADVANCED CHEMISTRY LAB	4
CHEM 3511 or 4511 or 4512 (Biochemistry)	3
CHEM ELECTIVE	3
TECHNICAL ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>13</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
CHEM ELECTIVE	3

TECHNICAL ELECTIVE	3
FREE ELECTIVES	9
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

**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 12 hour humanities requirement. An additional 6 hours of Institute-approved humanities courses are required to fulfill the 12 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 9 hours of Institute-approved social science courses, satisfies the 12 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 3 hours toward the technical elective requirement may be chosen from CHEM 4699.

## **BACHELOR OF SCIENCE IN CHEMISTRY - BIOCHEMISTRY OPTION**

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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**

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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**

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The BS in Chemistry (International Plan) and BS 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 BS in Chemistry or BS in Biochemistry, students should visit: <http://www.internationalplan.gatech.edu>.

## **BACHELOR OF SCIENCE IN CHEMISTRY - MATERIALS OPTION**

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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**

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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**

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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](http://undergradresearch.gatech.edu/research_option/index.php). Successful completion of the Research Options requires participation by the student in 9 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)

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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 12 hours in a coherent program with at least 9 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

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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](http://www.chemistry.gatech.edu).

## **MASTER OF SCIENCE IN CHEMISTRY**

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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 MS 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 MS degree (non-thesis option) is thirty credit hours of approved coursework beyond the bachelor's degree. The MS 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**

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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 MS 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 12 hours of coursework relevant to the CSE discipline that includes one applications area; this must include at least 6 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 MS thesis (thesis option) that is defended to the student’s thesis committee who is responsible for overseeing the student’s research. 6 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

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The Institute of Paper Science and Technology supports the master's and PhD 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 MS and PhD 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 MS or PhD 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](http://www.ipst.gatech.edu/degree_progs/index.html).

### **PARTICIPATING SCHOOLS**

College of Computing  
School of Biology  
School of Biomedical Engineering  
School of Chemistry and Biochemistry  
School of Industrial and Systems Engineering  
School of Mathematics

### **OBJECTIVE OF THE PROGRAM**

The mission of the Georgia Tech Bioinformatics PhD 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 PhD 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/graduate-programs/bioinformatics/new/bioinformatics\\_phd.php](http://www.biology.gatech.edu/graduate-programs/bioinformatics/new/bioinformatics_phd.php).

## **DOCTOR OF PHILOSOPHY WITH A MAJOR IN CHEMISTRY**

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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 PhD 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 PhD 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 PhD is demonstrated by completion of published work.

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 PhD 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 (12 hours), a computation specialization (9 hours), and an application specialization (9 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 9 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 9 hours of courses that increase depth of understanding in an application field; these need not be computation-focused courses. At least 9 hours of PhD 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**

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The Institute of Paper Science and Technology supports the Master's and PhD 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 MS and PhD 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 MS or PhD 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](http://www.ipst.gatech.edu/degree_progs/index.html).

## **CERTIFICATE PROGRAM IN REMOTE SENSING**

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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**

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Established in 1970

Location: 311 Ferst Drive

Telephone: 404.894.3893

Web site: [www.eas.gatech.edu](http://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.



## **BACHELOR OF SCIENCE IN EARTH AND ATMOSPHERIC SCIENCES - GENERAL INFORMATION**

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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 (27 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, MATH 2401, MATH 2403, PHYS 2211, PHYS 2212, CHEM 1310, CHEM 1311, CHEM 1312, BIOL 1510 or 1520, and CS 1371.

# BACHELOR OF SCIENCE IN EARTH AND ATMOSPHERIC SCIENCES

## 2009 - 2010 DEGREE REQUIREMENTS

SCHOOL OF EARTH AND ATMOSPHERIC SCIENCES

Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>14</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
MATH 2401 CALCULUS III ***	4
PHYS 2211 INTRODUCTORY PHYSICS I ***	4
EAS 2600 EARTH PROCESSES	4
TECHNICAL ELECTIVE **	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
EAS CORE ELECTIVES *	4
TECHNICAL ELECTIVE **	3
HUMANITIES ELECTIVE	3
FREE ELECTIVES	3
SOCIAL SCIENCE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
EAS CAPSTONE ****	3
EAS 4651 PRACTICAL INTERNSHIP or EAS 4699 UNDERGRADUATE RESEARCH	3
TECHNICAL ELECTIVE **	3
SOCIAL SCIENCE ELECTIVE	3
FREE ELECTIVES	4
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
EAS CAPSTONE ****	4

TECHNICAL ELECTIVE **	3
HUMANITIES ELECTIVE	3
FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>13</b>

**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 4740/4641

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 will be required in all prerequisite courses: MATH 1501,1502, 2401, and 2403, Physics 2211 and 2212, Chemistry 1310, 1311 and 1312, CS 1371, and Biology 1510 or 1520.

\*\*\*\* CHOOSE 2:

1. EAS 4610 EARTH SYSTEM MODELING
2. EAS 4420 ENVIRONMENTAL FIELD METHODS
3. EAS 4480 ENVIRONMENTAL DATA ANALYSIS

## **ELECTIVES**

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### **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 15 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, Research (up to 3 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 12 hour humanities requirement. An additional 6 hours of Institute-approved humanities courses are required to fulfill the 12 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 9 hours of Institute-approved social science courses, satisfies the 12 hour social sciences requirement.

## **BACHELOR OF SCIENCE IN EARTH AND ATMOSPHERIC SCIENCES - BUSINESS OPTION**

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The School of Earth and Atmospheric Sciences offers a Business Option that allows a student to get a business background. This gives them more skills to pursue an entrepreneurial interest as well as an additional knowledge base to use in their future goals. Students electing this option complete the degree requirements for the Earth and Atmospheric Science program, except that:

1. two of their social science electives must be
  - a. PSYC 2220 Industrial/Organizational Psychology (3)
  - b. ECON 2106 Principles of Microeconomics (3)
2. two courses of the following courses replace 6 hours of Technical Electives:
  - a. MGT 3000 Financial and Managerial Accounting (3)
  - b. MGT 3300 Marketing Management I (3)
  - c. MGT 3150 Principles of Management (3)

For further information, consult the EAS Undergraduate Coordinator.

## **BACHELOR OF SCIENCE IN EARTH AND ATMOSPHERIC SCIENCES - INTERNATIONAL PLAN**

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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 26 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/](http://www.internationalplan.gatech.edu/)
4. Complete a capstone course that combines their global experience with their EAS degree.

## **BS/MS EARTH AND ATMOSPHERIC SCIENCES - FIVE-YEAR**

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EAS offers a five-year BS/MS Program. EAS majors may apply to the BS/MS program after completing at least 30 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 6 credit hours of graduate-level coursework in the major discipline for both degrees.

To apply, complete the BS/MS application form, a biographical statement, and two letters of recommendation.

For more information, visit our Web site.

## **MINOR IN EARTH AND ATMOSPHERIC SCIENCES**

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The School of Earth and Atmospheric Sciences offers a minor with six different tracks. These specific tracks are designed to give non-majors a background in the environmental and global change issues that face the world. This background both allows a broader exposure and gives a strategic background for many careers. The six tracks are:

1. Climate Change
2. Earth System Physics
3. Environmental Chemistry
4. Environmental Science
5. Meteorology
6. Ocean Sciences



## **CERTIFICATE PROGRAMS**

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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 the EAS Undergraduate Coordinator

## **BS/MS EARTH AND ATMOSPHERIC SCIENCES - FIVE-YEAR**

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EAS offers a five-year BS/MS Program. EAS majors may apply to the BS/MS program after completing at least 30 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 6 credit hours of graduate-level coursework in the major discipline for both degrees.

To apply, complete the BS/MS 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**

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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 3 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**

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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 3 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**

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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.

## CERTIFICATES

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### 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:

Dr. Robert Braun

Dr. Manos Tentzeris

Earth and Atmospheric Sciences : Dr. Irina Sokolik

Civil and Environmental Engineering: Dr. Michael Bergin

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 12 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

#### Area 2: Electives

**AE 6353: Orbital Mechanics** - 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. AE 6353 is a pre-requisite for AE 6354. View Update

**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

**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 member in 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**

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Established in 1952

Location: Skiles Building

Telephone: 404.894.2700

Fax: 404.894.4409

Web site: [www.math.gatech.edu](http://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.

## **UNDERGRADUATE PROGRAMS**

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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**

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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 maintaining 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 2 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 9 hours are allowed under this option.

**BACHELOR OF SCIENCE IN APPLIED MATHEMATICS****2009 - 2010 DEGREE REQUIREMENTS**

SCHOOL OF MATHEMATICS

Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
MATH 2401 CALCULUS III	4
MATH 2406 ABSTRACT VECTOR SPACES	3
PHYS 2211 INTRODUCTORY PHYSICS I	4
HUMANITIES ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>14</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
MATH 2403 DIFFERENTIAL EQUATIONS	4
PHYS 2212 INTRODUCTORY PHYSICS II	4
HUMANITIES ELECTIVE	3
SOCIAL SCIENCE ELECTIVE	6
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
MATH 3012 APPLIED COMBINATORICS	3
MATH 3215 PROBABILITY & STATISTICS	3
ENGINEERING or SCIENCE ELECTIVE (3000 Level)	3
MATH ELECTIVES (3000 Level or Higher)	3
FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
MATH 4317 ANALYSIS I	3
MATH 4640 NUMERICAL ANALYSIS I	3
MATH ELECTIVES (3000 Level or Higher)	3
ENGINEERING or SCIENCE ELECTIVE (3000 Level)	3
FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
MATH 4107 ABSTRACT ALGEBRA I	3
MATH 4318 ANALYSIS II	3
MATH ELECTIVE	3
PHYS ELECTIVE (3000 Level)	3
FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
MATH 4320 COMPLEX ANALYSIS	3
MATH ELECTIVE	6

FREE ELECTIVES

5

**TOTAL SEMESTER HOURS =**

**14**

**TOTAL PROGRAM HOURS = 120 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

## **ELECTIVES**

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### **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 6 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**

6 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 9 credit hours of social sciences are required.

## **BACHELOR OF SCIENCE IN APPLIED MATHEMATICS - BUSINESS OPTION**

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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 6 hours of engineering or science electives in the Applied Mathematics program; and
- MGT 3150 Principles of Management (3) replaces 3 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**

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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**

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For the BS in Applied Mathematics - Research Option, a student conducts supervised research with a faculty advisor over two or three semesters and completes 9 hours of either MATH 2698/4698 (research for pay) or MATH 2699/4699 (research for credit). In addition, during his or her thesis writing 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. 6 hours of MATH 4699 may be used as Mathematics Electives for the BS 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](http://undergradresearch.gatech.edu/research_option).

## BACHELOR OF SCIENCE IN DISCRETE MATHEMATICS

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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 15 hours of mathematics, 9-10 hours of computer science, and 6 hours of industrial and systems engineering. The program requires 9 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 12-13 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 MATH 4022, 4107, and 4317. Students may count no more than 2 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 9 hours are allowed under this option.

**BACHELOR OF SCIENCE IN DISCRETE MATHEMATICS****2009 - 2010 DEGREE REQUIREMENTS**

SCHOOL OF MATHEMATICS

Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
MATH 2401 CALCULUS III	4
MATH 2406 ABSTRACT VECTOR SPACES	3
PHYS 2211 INTRODUCTORY PHYSICS I	4
HUMANITIES ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>14</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
MATH 2602 LINEAR & DISCRETE MATHEMATICS	4
PHYS 2212 INTRODUCTORY PHYSICS II	4
HUMANITIES ELECTIVE	3
SOCIAL SCIENCE ELECTIVE	6
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
MATH 3215 PROBABILITY & STATISTICS	3
MATH 3012 APPLIED COMBINATORICS	3
CS 3510 DESIGN & ANALYSIS OF ALGORITHMS	3
CS 2335 (3) & FREE ELECTIVES (4) OR CS 2110 (4) & FREE ELECTIVES (3)	7
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
MATH 4317 ANALYSIS I	3
ISYE 3133 ENGINEERING OPTIMIZATION	3
CS 4510 AUTOMATA & COMPLEXITY THEORY	3
SOCIAL SCIENCE ELECTIVE	3
TECHNICAL ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
MATH 4080 SENIOR PROJECT I	2
MATH 4107 ABSTRACT ALGEBRA I	3
MATH 4022 INTRODUCTION TO GRAPH THEORY	3
TECHNICAL ELECTIVE	3
FREE ELECTIVES	3
<b>TOTAL SEMESTER HOURS =</b>	<b>14</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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**

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### **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 9 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**

6 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 9 credit hours of social sciences are required.

## **BACHELOR OF SCIENCE IN DISCRETE MATHEMATICS - BUSINESS OPTION**

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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:

- 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 6 of the 9 hours of technical electives in the Discrete Mathematics program; and
- MGT 3150 Principles of Management (3) replaces 3 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 DISCRETE MATHEMATICS - BUSINESS AND RESEARCH OPTIONS**

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A student may elect to complete both the Business Option and the Research Option.

BS Discrete Mathematics-Business Option

and

BS 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**

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For the BS in Discrete Mathematics - Research Option, a student conducts supervised research with a faculty advisor over 2-3 semesters and completes 9 hours of either MATH 2698/4698 (research for pay) or MATH 2699/4699 (research for credit). In addition, during his or her thesis writing 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 BS 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](http://undergradresearch.gatech.edu/research_option).



## **MINOR IN MATHEMATICS**

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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 9 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 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. 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**

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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 MS 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 12 hours of coursework relevant to the CSE discipline that includes one applications area; this must include at least 6 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 MS thesis (thesis option) that is defended to the student’s thesis committee who is responsible for overseeing the student’s research. 6 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

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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 12 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 18 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 18 hours of coursework at the 6000 level or higher in Mathematics, with a grade of *B* or better, and the remaining 12 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**

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The Master of Science degree program in Quantitative and Computational Finance (MS QCF) 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 MS QCF 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 MS QCF 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 MS QCF 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 MS QCF 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.

### **MS IN QUANTITATIVE AND COMPUTATIONAL FINANCE CURRICULUM REQUIREMENTS**

#### **REQUIRED CORE COURSES (18 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

#### **3 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: 36**

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**

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The School of Mathematics offers the degree of Master of Science in Statistics (MS S) in cooperation with the School of Industrial and Systems Engineering. It is available for applicants having the BS 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 30 semester hours of coursework. There is no thesis option.

## **DOCTOR OF PHILOSOPHY WITH A MAJOR IN ALGORITHMS, COMBINATORICS, OPTIMIZATION**

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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.

### **PARTICIPATING SCHOOLS**

College of Computing  
School of Biology  
School of Biomedical Engineering  
School of Chemistry and Biochemistry  
School of Industrial and Systems Engineering  
School of Mathematics

### **OBJECTIVE OF THE PROGRAM**

The mission of the Georgia Tech Bioinformatics PhD 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 PhD 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/graduate-programs/bioinformatics/new/bioinformatics\\_phd.php](http://www.biology.gatech.edu/graduate-programs/bioinformatics/new/bioinformatics_phd.php).



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 PhD 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 (12 hours), a computation specialization (9 hours), and an application specialization (9 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 9 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 9 hours of courses that increase depth of understanding in an application field; these need not be computation-focused courses. At least 9 hours of PhD 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**

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The doctoral program in Mathematics requires fifty-one hours of coursework, with grades of C or better, beyond the undergraduate degree. At least 36 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 9 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 6 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

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Established in 1939

Location: Howey Building

Telephone: 404.894.5201

Fax: 404.894.9958

Web site: [www.physics.gatech.edu](http://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 PhD 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](http://www.physics.gatech.edu).

## BACHELOR OF SCIENCE IN PHYSICS

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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**  
**2009 - 2010 DEGREE REQUIREMENTS**

SCHOOL OF PHYSICS  
 Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>14</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
MATH 2401 CALCULUS III	4
PHYS 2212 INTRODUCTORY PHYSICS II	4
SOCIAL SCIENCE ELECTIVES	6
HUMANITIES ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
PHYS 3143 QUANTUM MECHANICS I	3
PHYS 3122 ELECTROSTATICS & MAGNETOSTATICS	3
PHYSICS or TECHNICAL ELECTIVES	6
FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
PHYS 3141 THERMODYNAMICS	3
PHYS 3123 ELECTRODYNAMICS	3
PHYSICS or TECHNICAL ELECTIVE	3
FREE ELECTIVES	6
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
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, 6 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 12 hour humanities requirement. An additional 6 hours of Institute-approved humanities courses are required to fulfill the 12 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 9 hours of Institute-approved social science courses, satisfies the 12 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**

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Students pursuing a BS in Physics or Applied Physics as a terminal degree may find the Business Option advantageous. This option uses 6 hours of social science credits for PSYC 2220 and ECON 2106 and 9 hours of free electives for MGT 3000, MGT 3300, and MGT 3150. Students using another 3 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

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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

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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**  
**2009 - 2010 DEGREE REQUIREMENTS**

SCHOOL OF PHYSICS  
 Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>14</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
MATH 2401 CALCULUS III	4
PHYS 2212 INTRODUCTORY PHYSICS II	4
SOCIAL SCIENCE ELECTIVES	6
HUMANITIES ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
PHYS 3143 QUANTUM MECH I	3
PHYS 3122 ELECTROSTATICS & MAGNETOSTATICS	3
PHYSICS or TECHNICAL ELECTIVE	3
FREE ELECTIVES	5
<b>TOTAL SEMESTER HOURS =</b>	<b>14</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
PHYS 3141 THERMODYNAMICS	3
PHYS 3123 ELECTRODYNAMICS	3
PHYSICS or TECHNICAL ELECTIVE	3
PHYS 3266 COMPUTATIONAL PHYSICS	4
FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
PHYS 4206 ELECTRONICS II	5
PHYSICS or TECHNICAL ELECTIVES	5

PHYS 4602 SENIOR SEMINAR II	1
FREE ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>14</b>

**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, 6 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 12 hour humanities requirement. An additional 6 hours of Institute-approved humanities courses are required to fulfill the 12 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 9 hours of Institute-approved social science courses, satisfies the 12 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**

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Students pursuing a BS in Physics or Applied Physics as a terminal degree may find the Business Option advantageous. This option uses 6 hours of social science credits for PSYC 2220 and ECON 2106 and 9 hours of free electives for MGT 3000, MGT 3300, and MGT 3150. Students using another 3 hours of free electives, may replace MGT 3150 with a combination of MGT 3062 and either MGT 3076, MGT 4191, or MGT 4670.

## **CERTIFICATE IN ASTROPHYSICS**

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For the Astrophysics Certificate, the following lists the required and optional courses.

### **REQUIRED:**

- Phys 2021 [3] The Solar System OR
- Phys 2022 [3] Stars, Galaxies, and the Universe
- Phys 3021 [3] Stellar Astrophysics

### **OPTIONAL AT LEAST TWO MUST BE TAKEN :**

- Phys 4261 [3] Atomic Physics
- Phys 4801 [3-6] Special Topic – if approved by the Chair
- Phys 4699 [3] Special Problems – if approved by the Chair

### **COURSES OFFERED AT GEORGIA STATE**

- Astro 3500 [4] Fundamentals of Astronomy and Astrophysics
- Astro 4000 [3] Fundamentals of Astrophysics

## **MASTER OF SCIENCE IN PHYSICS**

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The Master of Science in Physics degree requires 30 hours of physics course credit. These hours must include 6 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 6 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

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The PhD 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 PhD 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 9 credit hours in a minor course of study in a scientific subfield different from the subfield of his or her PhD 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 PhD research and present a public, oral defense of the dissertation to a Thesis Exam Committee.

## **SCHOOL OF PSYCHOLOGY**

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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](http://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 in Psychology and Doctor of Philosophy with a major 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.

## **BACHELOR OF SCIENCE IN PSYCHOLOGY**

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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 BS 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

## 2009 - 2010 DEGREE REQUIREMENTS

SCHOOL OF PSYCHOLOGY

Suggested Schedule

<b>FIRST YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>FIRST YEAR-SPRING</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>16</b>

<b>SECOND YEAR-FALL</b>	<b>HRS</b>
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
<b>TOTAL SEMESTER HOURS =</b>	<b>17</b>

<b>SECOND YEAR-SPRING</b>	<b>HRS</b>
(CHEM 1311 AND CHEM 1312 ) or PHYS 2211 or PHYS 2212	4
PSYCHOLOGY ELECTIVE	3
PSYC 2020 PSYCHOLOGICAL STATISTICS	4
HUMANITIES ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>14</b>

<b>THIRD YEAR-FALL</b>	<b>HRS</b>
CS 1301 INTRODUCTION TO COMPUTING	3
PSYC 3011 COGNITIVE PSYCHOLOGY	4
PSYC 3020 BIOPSYCHOLOGY	3
FREE ELECTIVES	5
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>THIRD YEAR-SPRING</b>	<b>HRS</b>
PSYC 3031 EXPERIMENTAL ANALYSIS OF BEHAVIOR	4
PSYC 3041 HUMAN SENSATION AND PERCEPTION	4
PSYCHOLOGY ELECTIVE	3
SOCIAL SCIENCE ELECTIVE	2
FREE ELECTIVE	2
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

### \* NON THESIS OPTION \*

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
FREE ELECTIVES	9
PSYC ELECTIVES	6
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
PSYC 4031 APPLIED EXPERIMENTAL PSYCHOLOGY	4

FREE ELECTIVES	9
<b>TOTAL SEMESTER HOURS =</b>	<b>13</b>

**\*THESIS OPTION \***

<b>FOURTH YEAR-FALL</b>	<b>HRS</b>
PSYC 4600 SENIOR THESIS I	3
FREE ELECTIVES	9
PSYC ELECTIVE	3
<b>TOTAL SEMESTER HOURS =</b>	<b>15</b>

<b>FOURTH YEAR-SPRING</b>	<b>HRS</b>
PSYC 4601 SENIOR THESIS II	4
FREE ELECTIVES	9
<b>TOTAL SEMESTER HOURS =</b>	<b>13</b>

**TOTAL PROGRAM HOURS = 120 SEMESTER HOURS PLUS WELLNESS (2 HOURS)**

## **ELECTIVES**

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### **WELLNESS REQUIREMENT**

All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

### **HUMANITIES/FINE ARTS**

12 hours, ENGL 1101 and 1102, apply toward satisfaction of the 12 hour humanities requirement. An additional 6 hours of Institute-approved humanities courses are required to fulfill the 12 hour humanities requirement.

### **SOCIAL SCIENCE**

12 hours, including 3 hours of Constitution and History; PSYC 1101 and PSYC 2015 count toward the 12 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 ( 3 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 listed 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 3 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 3 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)**

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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 BS 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**

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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 BS 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**

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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.

## **CERTIFICATES**

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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

## MINOR IN PSYCHOLOGY

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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

## GRADUATE INFORMATION

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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**

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The Master of Science in Human-Computer Interaction (MS HCI) 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 MS HCI 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 MS HCI 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**

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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 PhD. Most students require two to three calendar years to complete the master's degree.



The Cognitive and Brain Science specialty area for the Psychology PhD program trains students to develop a thorough understanding of diverse aspects of cognition. Students learn about theories of cognitive phenomena and about the neurobiological bases of cognition and behavior. Students study the major methods used to measure various components of cognition. These components include attention, sensation and perception, working memory, episodic memory, cognitive control, language, metacognition, spatial cognition, and problem solving. Faculty research interests include these areas of cognition as they exist in humans, as well as aspects of comparative psychology (animal behavior and cognition). Some faculty members' research interests include human cognitive neuroscience, measuring brain activity during cognition with electrophysiological or imaging techniques in persons with or without neurological dysfunction. The program is closely connected to faculty with interests in the Cognitive Aging program, including an emphasis on understanding effects of aging on cognitive mechanisms and how aging influences neural functioning and cognition

The Cognitive Aging specialty area in the Psychology PhD program emphasizes training students about cognition in adulthood. Students gain an understanding of the biological, psychological, and social aspects of aging as they relate to cognitive development over the adult life span. Areas of interest of the faculty include age differences and age changes in basic cognitive mechanisms (such as working memory, episodic memory, attention, speed of processing, and language), higher-order cognition (including adult intellectual development), and practical and contextual aspects of cognition (such as knowledge acquisition, skill development, everyday problem solving, metacognition, emotion regulation, and social cognition). The program is closely connected to faculty with interests in human factors and aging (in the Engineering Psychology program), cognitive neuroscience of aging (in the Cognitive and Brain Sciences program), and aging issues in work and careers (in the Industrial/Organizational Psychology program).

**DOCTOR OF PHILOSOPHY WITH A MAJOR IN PSYCHOLOGY - ENGINEERING PSYCHOLOGY**

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The Engineering Psychology PhD 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 - INDUSTRIAL/ORGANIZATIONAL  
PSYC**

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The Industrial/Organizational Psychology (I/O) PhD 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**

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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

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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)

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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)**

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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)**

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- 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 3062	JAPN 3693	LCC 3314	PST 4815
ARBC 1813	FREN 3121	JAPN 3813	LCC 3316	RUSS 1002
ARBC 1814	FREN 3691	JAPN 3XXX	LCC 3318	RUSS 1813
ARBC 2001	FREN 3692	JAPN 4113	LCC 3352	RUSS 1814
ARBC 2002	FREN 3693	JAPN 4123	LCC 3362	RUSS 2001
ARBC 2813	FREN 3694	JAPN 4133	LCC 3502	RUSS 2002
ARBC 3813	FREN 3813	JAPN 4163	LCC 3504	RUSS 2813
ARBC 4813	FREN 3XXX	JAPN 4500	LCC 3506	RUSS 2XXX
ARCH 2111	FREN 4001	JAPN 4743	LCC 3508	RUSS 3001
ARCH 2112	FREN 4061	JAPN 4750	LCC 3510	RUSS 3002
ARCH 2115	FREN 4062	JAPN 4813	LCC 3512	RUSS 3222
ARCH 4109	FREN 4101	JAPN 4XXX	LCC 3514	RUSS 3691
ARCH 4110	FREN 4102	KOR 1002	LCC 3516	RUSS 3692
ARCH 4113	FREN 4241	KOR 1813	LCC 3518	RUSS 3698
ARCH 4114	FREN 4242	KOR 1814	LCC 3823	RUSS 3803
ARCH 4117	FREN 4500	KOR 2001	LCC 3833	RUSS 3813
ARCH 4118	FREN 4813	KOR 2002	LCC 3843	RUSS 3823
ARCH 4119	FREN 4XXX	KOR 2813	LCC 3853	RUSS 3XXX
ARCH 4120	GRMN 1002	KOR 2XXX	LCC 3863	RUSS 4813
ARCH 4124	GRMN 1813	KOR 3001	LCC 4204	RUSS 4XXX
ARCH 4128	GRMN 2001	KOR 3813	LCC 4811	SPAN 1002
ARCH 4151	GRMN 2002	KOR 3XXX	LCC 4812	SPAN 1102
ARCH 4305	GRMN 2813	KOR 4813	LCC 4813	SPAN 1813
CHIN 1002	GRMN 2XXX	KOR 4XXX	LCC 4814	SPAN 2001
CHIN 1012	GRMN 3010	LATN 2XXX	LCC 4815	SPAN 2002
CHIN 1813	GRMN 3011	LCC 2100	LING 1813	SPAN 2690
CHIN 1814	GRMN 3024	LCC 2200	LING 1XXX	SPAN 2813
CHIN 2001	GRMN 3025	LCC 2300	LING 2001	SPAN 2XXX
CHIN 2002	GRMN 3034	LCC 2400	LING 2813	SPAN 3050
CHIN 2011	GRMN 3035	LCC 2500	LING 3010	SPAN 3061
CHIN 2012	GRMN 3036	LCC 2600	LING 3813	SPAN 3062
CHIN 2813	GRMN 3071	LCC 2813	LING 4002	SPAN 3101
CHIN 2XXX	GRMN 3072	LCC 2823	LING 4065	SPAN 3102
CHIN 3003	GRMN 3695	LCC 3102	LING 4813	SPAN 3111
CHIN 3004	GRMN 3696	LCC 3104	ML 2813	SPAN 3112
CHIN 3006	GRMN 3697	LCC 3106	ML 4813	SPAN 3122
CHIN 3021	GRMN 3813	LCC 3108	MUSI 2600	SPAN 3170
CHIN 3022	GRMN 3XXX	LCC 3110	MUSI 3450	SPAN 3211
CHIN 3691	GRMN 4010	LCC 3112	MUSI 3500	SPAN 3235
CHIN 3692	GRMN 4012	LCC 3114	MUSI 3600	SPAN 3241
CHIN 3813	GRMN 4023	LCC 3116	MUSI 3610	SPAN 3242
CHIN 3XXX	GRMN 4024	LCC 3118	MUSI 3630	SPAN 3400
CHIN 4001	GRMN 4025	LCC 3202	MUSI 3620	SPAN 3691
CHIN 4002	GRMN 4026	LCC 3204	MUSI 4450	SPAN 3692
CHIN 4813	GRMN 4061	LCC 3206	MUSI 4801	SPAN 3693
CHIN 4XXX	GRMN 4062	LCC 3208	MUSI 4802	SPAN 3694
COA 2241	GRMN 4065	LCC 3210	MUSI 4803	SPAN 3813
COA 2242	GRMN 4500	LCC 3212	MUSI 4813	SPAN 3XXX
COA 3114	GRMN 4813	LCC 3214	MUSI 4823	SPAN 4061
COA 3115	GRMN 4XXX	LCC 3216	MUSI 4833	SPAN 4062
COA 3116	HUM 1XXX	LCC 3218	PST 1101	SPAN 4065
CP 4040	HUM 21XX	LCC 3219	PST 2020	SPAN 4070
CS 4752	HUM 2XXX	LCC 3220	PST 2050	SPAN 4071
ENGL 1101	HUM 3XXX	LCC 3222	PST 3102	SPAN 4101
ENGL 1102	HUM 4XXX	LCC 3225	PST 3103	SPAN 4150
FREN 1002	ID 2202	LCC 3226	PST 3105	SPAN 4160



## CORE AREA D - SCIENCE, MATHEMATICS, AND TECHNOLOGY (12 HOURS)

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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

Required of all other majors.  
Select one of 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)**

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The social science requirement (Core Area E) is satisfied by completion of the United States/Georgia history and constitution legislative requirement with 3 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 2084	HTS 3085	INTA 3103	PSYC 2270
ARCH 4137	HTS 2085	HTS 3086	INTA 3104	PSYC 2300
ARCH 4335	HTS 2100	HTS 3087	INTA 3110	PSYC 2400
ARCH 4770	HTS 2101	HTS 3102	INTA 3111	PSYC 2760
CP 4010	HTS 2803	HTS 3803	INTA 3120	PSYC 3012
CP 4020	HTS 2813	HTS 3813	INTA 3121	PSYC 3060
CP 4030	HTS 2823	HTS 3823	INTA 3130	PSYC 4770
ECON 1XXX	HTS 2XXX	HTS 3XXX	INTA 3131	PUBP 2010
ECON 2100	HTS 3001	HTS 4001	INTA 3203	PUBP 2012
ECON 2101	HTS 3002	HTS 4002	INTA 3220	PUBP 2030
ECON 2105	HTS 3003	HTS 4003	INTA 3221	PUBP 3000
ECON 2106	HTS 3005	HTS 4004	INTA 3230	PUBP 3016
ECON 2XXX	HTS 3006	HTS 4005	INTA 3231	PUBP 3020
ECON 4160	HTS 3007	HTS 4011	INTA 3240	PUBP 3030
ECON 4232	HTS 3008	HTS 4012	INTA 3241	PUBP 3120
ECON 4311	HTS 3009	HTS 4013	INTA 3301	PUBP 3130
ECON 4340	HTS 3011	HTS 4014	INTA 3303	PUBP 3201
ECON 4350	HTS 3012	HTS 4015	INTA 3304	PUBP 3214
ECON 4351	HTS 3015	HTS 4031	INTA 3321	PUBP 3315
ECON 4355	HTS 3016	HTS 4032	INTA 3330	PUBP 3600
ECON 4357	HTS 3017	HTS 4033	INTA 3331	PUBP 3610
ECON 4411	HTS 3018	HTS 4034	INTA 3803	PUBP 4010
ECON 4421	HTS 3019	HTS 4035	INTA 3813	PUBP 4020
ECON 4430	HTS 3020	HTS 4061	INTA 4011	PUBP 4111
ECON 4440	HTS 3021	HTS 4062	INTA 4040	PUBP 4120
ECON 4450	HTS 3023	HTS 4063	INTA 4050	PUBP 4130
ECON 4460	HTS 3024	HTS 4064	INTA 4060	PUBP 4200
ECON 4510	HTS 3025	HTS 4065	INTA 4101	PUBP 4211
ECON 4610	HTS 3026	HTS 4081	INTA 4121	PUBP 4212
ECON 4620	HTS 3028	HTS 4082	INTA 4230	PUBP 4214
ECON 4811	HTS 3029	HTS 4083	INTA 4240	PUBP 4226
ECON 4812	HTS 3030	HTS 4084	INTA 4241	PUBP 4260
ECON 4813	HTS 3031	HTS 4085	INTA 4330	PUBP 4338
ECON 4814	HTS 3032	HTS 4811	INTA 4331	PUBP 4410
ECON 4815	HTS 3033	HTS 4812	INTA 4332	PUBP 4414
HIST 2111	HTS 3035	HTS 4813	INTA 4333	PUBP 4416
HIST 2112	HTS 3036	HTS 4814	INTA 4340	PUBP 4514
HTS 1001	HTS 3038	HTS 4815	INTA 4803	PUBP 4600
HTS 1031	HTS 3039	HTS 4823	INTA 4811	PUBP 4609
HTS 1081	HTS 3041	HTS 4833	INTA 4812	PUBP 4803
HTS 1XXX	HTS 3043	HTS 4843	INTA 4813	PUBP 4811
HTS 2001	HTS 3045	HTS 4XXX	INTA 4814	PUBP 4812
HTS 2002	HTS 3051	INTA 1110	INTA 4815	PUBP 4813
HTS 2006	HTS 3061	INTA 1200	INTA 4823	PUBP 4814
HTS 2007	HTS 3062	INTA 2030	INTA 4833	PUBP 4815
HTS 2011	HTS 3063	INTA 2040	POL 1101	PUBP 4823
HTS 2013	HTS 3064	INTA 2100	POL 2101	PUBP 4833
HTS 2016	HTS 3066	INTA 2210	PSYC 1101	PUBP 4843
HTS 2036	HTS 3067	INTA 2220	PSYC 2015	SOC 1101
HTS 2037	HTS 3068	INTA 2230	PSYC 2020	SS 1XXX
HTS 2041	HTS 3069	INTA 3010	PSYC 2103	SS 2XXX
HTS 2061	HTS 3070	INTA 3020	PSYC 2210	SS 3XXX
HTS 2062	HTS 3082	INTA 3031	PSYC 2220	SS 4XXX
HTS 2081	HTS 3083	INTA 3101	PSYC 2230	
HTS 2082	HTS 3084	INTA 3102	PSYC 2240	

**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 (18 HOURS)**

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Area F requirements vary with degree and major.



## **CONSTITUTION AND HISTORY REQUIREMENTS**

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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**

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All undergraduate students attending Georgia Tech must satisfactorily complete a wellness requirement (HPS 1040 or equivalent).

## **ROTC CREDIT**

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Students may apply a maximum of 4 hours in basic ROTC courses and 6 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

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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**

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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.

## 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	2
	AP Score: 4 or 5 = MUSI 2600 & 3600	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.

**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 to the Bursar's office, and authorization by the Office of 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. Students will not be allowed to take an examination for advanced standing in a course for which the prerequisite(s) has not been met, except with the consent of the school offering the course.
6. 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.
7. Advanced standing is not allowed for laboratory or studio classes, except with the consent of the school offering the course.
8. Students may not use more than 9 credits of advanced standing to meet degree requirements.

## INTERNATIONAL BACCALAUREATE

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### NO INTERNATIONAL BACCALAUREATE DIPLOMA

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)

### INTERNATIONAL BACCALAUREATE DIPLOMA - HIGH LEVEL

Subject	Higher Level Exam Scores	Credit
Biology	4 or 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*	4	3 hours (1002)
	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)

### INTERNATIONAL BACCALAUREATE DIPLOMA - STANDARD LEVEL

Subject	Standard Level Exam Scores	Credit
Biology	6 or higher	4 hours (BIOL 1510)
English	6 or higher	3 hours (ENGL 1101)
European History	6 or higher	3 hours (HTS 1XXX)
Foreign Language*	6 or higher	3 hours (1002)
History of Americas	6 or higher	3 hours (HTS 1XXX)
Mathematics	6 or higher	3 hours (MATH 1XXX)

The following subjects are pending departmental review for International Baccalaureate diploma holders: Chemistry, Computer Science, Economics, Physics, and Psychology.

\* See Modern Foreign Language Credit.



## DEPARTMENTAL EXAMS

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### **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

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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 10 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.

Effective Summer Term, 2003, the Board of Regents made several changes regarding the Regents' Test. Additional changes were made in Spring 2007 and Summer 2008.

- The READING portion of the test can be satisfied with:
  - Regents' Test score of at least 61
  - SAT Verbal score of 510 or higher
  - ACT Reading score of 23 or higher
- The ESSAY portion of the test can be satisfied with:
  - Regents' Test score of at least 2
  - SAT II English Writing score of 650 or higher
  - SAT Reasoning, Writing Section score of 560 (effective Spring 2007)
  - SAT Critical Reading score of at least 510 and a SAT Writing score of at least 500 (effective Summer 2008)
  - ACT score of at least 24 on the ACT combined English/Writing exam (effective Summer 2008)
  - ACT score of at least 22 on the ACT combined English/Writing for students who also earned an ACT Reading score of at least 23 (effective summer 2008)
  - AP English Language and Composition score of 3 or higher
  - AP English Literature and Composition 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.

If you are a transfer student and believe you have test scores that would fulfill Regents' Test requirements, you will need to provide a copy of your test scores from the testing agency indicating that it was a national administration. Please bring your scores to room 104 of the Administration Building (Tech Tower) between the hours of 8:00 AM and 4:30 PM Monday through Friday.

## SAT II SUBJECT TESTS

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Subject	Score	Semester Course	Hours
Chemistry	720	CHEM 1310	4
English	750	ENGL 1101	3

## **UNDERGRADUATE STUDENTS TAKING GRADUATE COURSES**

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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 12 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.)

## **COLLEGE OF ARCHITECTURE**

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Bachelor of Science in Architecture  
Bachelor of Science in Building Construction  
Bachelor of Science in Industrial Design

## **COLLEGE OF COMPUTING**

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Bachelor of Science in Computational Media (Interdisciplinary with IAC )  
Bachelor of Science in Computer Science

## **COLLEGE OF ENGINEERING**

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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 Computer Engineering  
Bachelor of Science in Electrical Engineering  
Bachelor of Science in Environmental 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

## **COLLEGE OF MANAGEMENT**

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Bachelor of Science in Management

## **IVAN ALLEN COLLEGE OF LIBERAL ARTS**

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Bachelor of Science in Computational Media (Interdisciplinary with COC )  
Bachelor of Science in Economics  
Bachelor of Science in Economics and International Affairs  
Bachelor of Science in Global Economics and Modern Languages  
Bachelor of Science in History, Technology, and Society  
Bachelor of Science in International Affairs  
Bachelor of Science in International Affairs and Modern Language  
Bachelor of Science in Public Policy  
Bachelor of Science in Science, Technology, and Culture

## **COLLEGE OF SCIENCES**

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Bachelor of Science in Applied Mathematics  
Bachelor of Science in Applied Physics  
Bachelor of Science in Biochemistry  
Bachelor of Science in Biology  
Bachelor of Science in Chemistry  
Bachelor of Science in Discrete Mathematics  
Bachelor of Science in Earth and Atmospheric Science  
Bachelor of Science in Physics  
Bachelor of Science in Psychology

## **GRADUATE COURSE OPTION**

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Students completing both the bachelor's and master's in the same discipline at Georgia Tech may use up to 6 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.

**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 36 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 BS/MS DEGREE PROGRAMS**

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Many schools at Georgia Tech offer five-year BS/MS degree programs that, like the Graduate Course Option, allow eligible students to use up to 6 credit hours of graduate-level coursework in the major discipline for both degrees. The BS/MS programs typically include research and mentoring components and have their own GPA requirements. More information is available from participating major schools/colleges.



## **UNDERGRADUATE MINORS AT GEORGIA TECH**

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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.

- **AEROSPACE ENGINEERING**
- **ARCHITECTURAL HISTORY**
- **BIOLOGY**
- **BIOMEDICAL ENGINEERING**
- **CHINESE**
- **COMPUTER SCIENCE**
- **EARTH AND ATMOSPHERIC SCIENCES**
- **ECONOMICS**
- **ENGINEERING AND MANAGEMENT**
- **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 OF SCIENCE AND TECHNOLOGY**
- **POLITICAL SCIENCE**
- **POLYMER/FIBER ENTERPRISE MANAGEMENT**
- **PSYCHOLOGY**

- **PUBLIC POLICY**
- **RUSSIAN STUDIES**
- **SOCIOLOGY**
- **SPANISH**
- **WOMEN, SCIENCE, AND TECHNOLOGY**



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 fifteen semester hours, of which at least nine 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 15 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).

## GRADUATE STUDENT WORK LOADS

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Full-time students must be enrolled for at least 12 credit hours on a letter grade or pass/fail basis. As an exception, the advisor and school chair may allow up to 3 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 6 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 18 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 3 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 PhDs 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**

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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

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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 33 semester credit hours may receive up to 6 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 33 semester credit hours or more may receive up to 9 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**

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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**

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Master of Architecture  
Master of City and Regional Planning  
Master of Industrial Design  
Master of Science in Building Construction and Facility Management  
Master of Science in Music Technology  
Master of Science with a Major in Architecture

## **COLLEGE OF COMPUTING**

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Master of Science in Bioengineering  
Master of Science in Computational Science and Engineering  
Master of Science in Computer Science  
Master of Science in Human-Computer Interaction  
Master of Science in Information Security

## **COLLEGE OF ENGINEERING**

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Master of Science in Aerospace Engineering  
Master of Science in Bioengineering  
Master of Science in Chemical Engineering  
Master of Science in Civil Engineering  
Master of Science in Computational Science and Engineering  
Master of Science in Electrical and Computer Engineering  
Master of Science in Engineering Science and Mechanics  
Master of Science in Environmental Engineering  
Master of Science in Health Systems  
Master of Science in International Logistics  
Master of Science in Materials Science and Engineering  
Master of Science in Mechanical Engineering  
Master of Science in Medical Physics  
Master of Science in Nuclear Engineering  
Master of Science in Operations Research  
Master of Science in Paper Science and Engineering  
Master of Science in Polymer, Textile and Fiber Engineering  
Master of Science in Quantitative and Computational Finance  
Master of Science in Statistics  
Master of Science with a Major in Chemical Engineering  
Master of Science with a Major in Civil Engineering  
Master of Science with a Major in Environmental Engineering  
Master of Science with a Major in Materials Science and Engineering

## **COLLEGE OF MANAGEMENT**

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Master of Business Administration - Global Business  
Master of Business Administration in Management of Technology  
Master of Business Administration  
Master of Science degree in Quantitative and Computational Finance

## **IVAN ALLEN COLLEGE OF LIBERAL ARTS**

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Master of Science in History and Sociology of Technology and Science  
Master of Science in Human-Computer Interaction  
Master of Science in International Affairs  
Master of Science in Public Policy  
Master of Science with a Major in Economics

## **COLLEGE OF SCIENCES**

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Master of Science in Bioinformatics  
Master of Science in Biology  
Master of Science in Chemistry  
Master of Science in Computational Science and Engineering  
Master of Science in Earth and Atmospheric Science  
Master of Science in Human-Computer Interaction  
Master of Science in Mathematics  
Master of Science in Paper Science and Engineering  
Master of Science in Physics  
Master of Science in Prosthetics and Orthotics  
Master of Science in Psychology  
Master of Science in Quantitative and Computational Finance  
Master of Science in Statistics  
Master of Science with a Major in Earth and Atmospheric Science

## **GRADUATE COURSE OPTION**

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Students completing both the bachelor's and master's in the same discipline at Georgia Tech may use up to 6 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.

## Enrollment Requirements

### **ENROLLMENT REQUIREMENTS**

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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 3 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.

If a student has completed all degree requirements and will no longer require any of the Institute's facilities or faculty time, the student may request an enrollment waiver.

## PROGRAM OF STUDY

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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 3 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

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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 6 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](http://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**

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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 3 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**

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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**

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Doctor of Philosophy with a Major in Architecture  
Doctor of Philosophy with a Major in Architecture (Concentration: BC & Integrated Facility Management)  
Doctor of Philosophy with a Major in Architecture (Concentration: City and Regional Planning)  
Doctor of Philosophy with a Major in Architecture (Concentration: Industrial Design)

## **COLLEGE OF COMPUTING**

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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 Computational Science and Engineering  
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

## **COLLEGE OF ENGINEERING**

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Doctor of Philosophy with a Major in Aerospace Engineering  
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 Biomedical Engineering  
Doctor of Philosophy with a Major in Chemical Engineering  
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 Electrical and Computer Engineering  
Doctor of Philosophy with a Major in Engineering Science and Mechanics  
Doctor of Philosophy with a Major in Environmental Engineering  
Doctor of Philosophy with a Major in Industrial Engineering  
Doctor of Philosophy with a Major in Materials Science and Engineering  
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 Operations Research  
Doctor of Philosophy with a Major in Paper Science and Engineering  
Doctor of Philosophy with a Major in Polymer, Textile and Fiber Engineering  
Doctor of Philosophy with a Major in Robotics

## **COLLEGE OF MANAGEMENT**

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Doctor of Philosophy with a Major in Management

## **IVAN ALLEN COLLEGE OF LIBERAL ARTS**

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Doctor of Philosophy with a Major in Digital Media  
Doctor of Philosophy with a Major in Economics  
Doctor of Philosophy with a Major in History & Sociology of Technology & Science  
Doctor of Philosophy with a Major in International Affairs, Science, and Technology  
Doctor of Philosophy with a Major in Public Policy

## **COLLEGE OF SCIENCES**

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Doctor of Philosophy with a Major in Algorithms, Combinatorics, Optimization  
Doctor of Philosophy with a major in Applied Physiology  
Doctor of Philosophy with a Major in Bioinformatics  
Doctor of Philosophy with a Major in Biology  
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 Earth and Atmospheric Sciences

Doctor of Philosophy with a Major in Mathematics  
Doctor of Philosophy with a Major in Paper Science and Engineering  
Doctor of Philosophy with a Major in Physics  
Doctor of Philosophy with a Major in Psychology - Cognitive Aging  
Doctor of Philosophy with a Major in Psychology - Cognitive and Brain Sciences  
Doctor of Philosophy with a Major in Psychology - Engineering 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**

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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**

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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

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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**

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Students must complete all degree requirements within seven years from the end of the term in which they pass the comprehensive examination.

## THE DISSERTATION

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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](http://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

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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

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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

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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.

If a student has completed all degree requirements and will no longer require any of the Institute's facilities or faculty time, the student may request an enrollment waiver.

## **ADDITIONAL GRADUATION REQUIREMENTS**

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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 3 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**

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The student's school may require a reading knowledge of one or more foreign languages.

## **UNDERGRADUATE MINORS AT GEORGIA TECH**

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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.

- **AEROSPACE ENGINEERING**
- **ARCHITECTURAL HISTORY**
- **BIOLOGY**
- **BIOMEDICAL ENGINEERING**
- **CHINESE**
- **COMPUTER SCIENCE**
- **EARTH AND ATMOSPHERIC SCIENCES**
- **ECONOMICS**
- **ENGINEERING AND MANAGEMENT**
- **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 OF SCIENCE AND TECHNOLOGY**
- **POLITICAL SCIENCE**
- **POLYMER/FIBER ENTERPRISE MANAGEMENT**
- **PSYCHOLOGY**

- **PUBLIC POLICY**
- **RUSSIAN STUDIES**
- **SOCIOLOGY**
- **SPANISH**
- **WOMEN, SCIENCE, AND TECHNOLOGY**

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 fifteen semester hours, of which at least nine 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 15 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).

Approved Program of Study for Undergraduate Minors  
 Georgia Institute of Technology  
 Office of the Registrar  
 2009-2010  
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 15 semester hours, of which at least 12 semester hours are upper-division coursework (numbered 3000 or above). **Required courses include: AE 1350, 2020, 3310.**
- B. The remainder of the minor requirements can be fulfilled with any AE course with the following exceptions: A maximum of 3 hours of AE 3355/4355 may be applied to satisfy the Minor. Maximum of 1 hour of research credit (AE 2699/4699) may be used. No more than 3 semester hours of Special Topics courses may be included. No Special Problems or Internship coursework may be used. Students may not use AE 3515 to satisfy their Minor requirements if they use ME 3015 or ECE 3085 to satisfy their Major requirements.
- C. All courses counting towards 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. No more than one D grade is permitted in an AE Minor course; courses in which a D is earned may be repeated.

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  
 2009-2010  
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  
 2009-2010  
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 15 semester hours, of which at least 9 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  
 2009-2010  
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 15 semester hours, of which at least 9 semester hours are upper-division coursework (numbered 3000 or above). **Required courses include APPH/BIOL 3751 or BMED 3100 and BMED/CHBE/ECE/ME/MSE 1750 or BMED 1300 . In addition, please select from the following:**

**Biosciences Coursework (minimum of 3 hours required):**

Choose from the following:

APPH	4100, 4200, 4600;
BIOL	1510, 2344, 3340, 4478, 4570;
BIOL/BMED	4752;
CHEM	3511, 4511, 4512

**Biomedical Engineering Coursework (minimum of 6 hours required):**

Choose from the following:

BMED/ME	4757, 4758;
BMED	4400, 4477, 4500, 4783;
BMED/CHBE/CHEM	4765;
BMED/ECE	4783, 4784;
BMED/MSE	4751;
BMED/NRE/MP	4750;
BMED/CHBE/ECE/ME	4781
BMED/CHBE/ECE/ME	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
BMED 3100 or APPH/BIOL 3751	Systems Physiology or Human Anatomy and Physiology	3		
BMED 1300 or BMED/CHBE/ECE/ME/MSE 1750	Problems in BMED I or 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  
 2009-2010  
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  
 2009-2010

Minor in Earth and Atmospheric Sciences – Climate Change Track

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 with a Climate Change track is for students in majors outside of EAS who have an interest in understanding Climate Change and Issues surrounding it. Prerequisites required for some of the classes listed below. **This minor must comprise at least 15 semester hours, of which at least 9 semester hours are upper-division coursework (numbered 3000 or above).**

- A. **Required Courses:** EAS 2750, EAS 4410
- B. **Choose 9 credit hours electives with a minimum of 3 credit hours from each area below:**
  - a. **EAS Electives:** EAS 3620, 4110, 4350, 4740,
  - b. **Electives:** ECON 2101, ECON 4440, PUBP 3315

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
EAS 2750	Physics of the Weather	3		
EAS 4410	Climate and Global Change	3		

Student Signature:
Major School Signature:
Minor School Signature:

Approved Program of Study for Undergraduate Minors  
 Georgia Institute of Technology  
 Office of the Registrar  
 2009-2010

Minor in Earth and Atmospheric Sciences – Earth System Physics Track

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 with an Earth System Physics track is for students in majors outside of EAS interested in applying physical and mathematical principles to environmental problems. Prerequisites required for some of the classes listed below. **This minor must comprise at least 15 semester hours, of which at least 9 semester hours are upper-division coursework (numbered 3000 or above).**

- A. **Required Course:** EAS 3610, 4655
- B. **Electives: Choose 9 credit hours:** EAS 2750, 3603, 4410, 4430, 4450, 4470

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
EAS 3610	Introduction to Geophysics	3		
EAS 4655	Atmospheric Dynamics	3		

Student Signature:
Major School Signature:
Minor School Signature:

Approved Program of Study for Undergraduate Minors  
 Georgia Institute of Technology  
 Office of the Registrar  
 2009-2010

Minor in Earth and Atmospheric Sciences – Environmental Chemistry Track

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 with an Environmental Chemistry track is for students in majors outside of EAS that seek to understand and address environmental problems within the context of chemical systems. Prerequisites required for some of the classes listed below. **This minor must comprise at least 15 semester hours, of which at least 9 semester hours are upper-division coursework (numbered 3000 or above).**

- A. **Required Coursed:** EAS 3620, 4740
- B. **Electives: Choose 8 credit hours:** EAS 4420, 4610, 4620, 4795

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
EAS 3620	Geochemistry	4		
EAS 4740	Atmospheric Chemistry	3		

Student Signature:
Major School Signature:
Minor School Signature:

Approved Program of Study for Undergraduate Minors  
 Georgia Institute of Technology  
 Office of the Registrar  
 2009-2010

Minor in Earth and Atmospheric Sciences – Environmental Science Track

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 with an Environmental Science track is for students in majors outside of EAS who have an interest in understanding the Environment and Issues surrounding it. Prerequisites required for some of the classes listed below. **This minor must comprise at least 15 semester hours, of which at least 9 semester hours are upper-division coursework (numbered 3000 or above).**

- A. **Required Course:** EAS 1600 or 1601
- B. **Electives: Choose 11 credit hours:** EAS 2420, 2600, 2750, 3620, 4110, 4410, 4420, 4300, 4350, 4740

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
EAS 1600 or EAS1601	Introduction to Environmental Sciences How to Build a Habitable Planet	4		

Student Signature:
Major School Signature:
Minor School Signature:



Approved Program of Study for Undergraduate Minors  
 Georgia Institute of Technology  
 Office of the Registrar  
 2009-2010  
Minor in Earth and Atmospheric Sciences – Meteorology Track

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 with a Meteorology track is for students in majors outside of EAS majoring in science and engineering. Prerequisites required for some of the classes listed below. **This minor must comprise at least 15 semester hours, of which at least 9 semester hours are upper-division coursework (numbered 3000 or above).**

- A. **Required Course(s):** EAS 2551, 2750, 4655
- B. **Electives: Choose 8 credit hours:** EAS 3603, 4410, 4430, 4450, 4460, 4470, 4610

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
EAS 2551	Introduction to Meteorological Analysis	1		
EAS 2750	Physics of the Weather	3		
EAS 4655	Atmospheric Dynamics	3		

Student Signature:
Major School Signature:
Minor School Signature:

Approved Program of Study for Undergraduate Minors  
 Georgia Institute of Technology  
 Office of the Registrar  
 2009-2010

Minor in Earth and Atmospheric Sciences – Ocean Sciences Track

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 with an Ocean Sciences track is for students in majors outside of EAS majoring in Biology, Civil and Environmental Engineering, Chemistry and Biochemistry, and Chemical and Biomolecular Engineering. Prerequisites required for some of the classes listed below. **This minor must comprise at least 15 semester hours, of which at least 9 semester hours are upper-division coursework (numbered 3000 or above).**

- A. **EAS Required: Choose one course:** EAS 1600, 1601, or 2600
- B. **EAS Required:** EAS 4300
- C. **Electives: Choose 8 credit hours:** EAS 3620, 4350, 4410, 4420, 4610, BIOL 4221, 4417

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
EAS 1600 or EAS 1601 or EAS 2600	Introduction to Environmental Science or Habitable Planet or Earth Processes	4		
EAS 4300	Oceanography	3		

Student Signature:
Major School Signature:
Minor School Signature:

Approved Program of Study for Undergraduate Minors  
 Georgia Institute of Technology  
 Office of the Registrar  
 2009-2010  
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 15 semester hours, of which at least 9 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  
 2009-2010  
Minor in Engineering and 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>**

Once enrolled in the Technology and Management program, the requirements for the Engineering and Management minor are the successful completion of 22 credit hours defined as follows:

- **For Management majors** – COE 3002, ME 3141, ME 2110, ME 3743, ME 3744, ME 4741, ME 4742
- **For Engineering majors** – MGT 3300, MGT 3000, MGT 3078, MGT 3743, MGT 3744, MGT 4741, MGT 4742

This minor requires a minimum grade point average of 3.0.

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  
 2009-2010  
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**  
**2009-2010**  
**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 15 semester hours, of which at least 9 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  
 2009-2010  
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
INTA 1110	Introduction to International Relations	3		

Student Signature:
Major School Signature:
Minor School Signature:

Approved Program of Study for Undergraduate Minors  
 Georgia Institute of Technology  
 Office of the Registrar  
 2009-2010  
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](http://www.prelaw.gatech.edu/certminorrules_spring08.pdf).**

- A. The LST minor must comprise at least 15 semester hours, of which at least 12 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  
 2009-2010  
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, 4255, 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  
 2009-2010

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 15 credit hours of language electives in a single language beyond the 2002 course.
  - a. Beyond the 2001 course for CHIN/JAPN/Russian Studies
  - b. Beyond the 2002 course for FREN/GRMN/SPAN
  - 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)
  - d. At least 9 hours must be taken at the 3000 level or above
2. A maximum of 9 semester hours of transfer credit is allowed in each minor. 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..

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  
 2009-2010  
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  
 2009-2010  
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)

**III. History of the City; Landscape/Garden History:**

ARCH 4151, 4821 – 3 (with approval), CP 4010, 4020, 4040

**II. History of Industrial Design:**

ID 2202, 3801 -2 (with approval), 4204, 4205, 4803, 4804,4805

**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  
 2009-2010  
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
MUSI 2600	Music Theory I	2		
MUSI 3450	Survey-Music Technology	3		
MUSI 3600	Music Theory II	2		
MUSI 3610	Composers 1500-1800	2		
MUSI 3620	Composers 1800-Present	2		
MUSI 3710	Individual Applied Instruction	1		
MUSI 3720	Individual Applied Instruction	1		
MUSI 3730	Individual Applied Instruction	1		
	Music Technology Elective or upper division coursework	1		
	Ensemble Elective	3		

Student Signature:
Major School Signature:
Minor School Signature:

Approved Program of Study for Undergraduate Minors  
 Georgia Institute of Technology  
 Office of the Registrar  
 2009-2010

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  
 2009-2010  
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

Seminars in Performance (3 hours)  
LCC 4600

Focused Studies in Performance (3 hours)  
Select one: LCC 3262 or 3362 or 3863

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
LCC 2600	Introduction to Performance Studies	3		
LCC 4600	Seminar in 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  
 2009-2010

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: <a href="http://www.catalog.gatech.edu/academics/minorguide.php">http://www.catalog.gatech.edu/academics/minorguide.php</a>	

- 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  
 2009-2010  
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 15 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 5 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  
 2009-2010  
Minor in Philosophy of 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 15 semester hours, of which at least 12 semester hours are upper-division coursework (numbered 3000 or above). **Required courses include: PST 3103, 3115.**

Choose 3 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  
 2009-2010  
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  
 2009-2010  
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 15 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 15 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**  
**2009-2010**  
**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 15 semester hours, of which at least 9 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  
 2009-2010

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:
<b>In addition to the guidelines listed below, you are responsible for reviewing and following the general guidelines for minors: <a href="http://www.catalog.gatech.edu/academics/minorguide.php">http://www.catalog.gatech.edu/academics/minorguide.php</a></b>	

- I. The WST minor must comprise at least 15 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 4214, PUBP 4803
- B. Elective Courses – Choose three 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, 3051, 3082, 3083, 3084, 3086  
**Literature, Communication, and Culture** – LCC 2100, 2200, 3212, 3219, 3225, 3302, 3306, 3308, 3316, 3318  
**Public Policy** – PUBP 2012, 4410, 4416, 4200  
**International Affairs** – INTA 4803/8803  
**Modern Languages** – SPAN 3241, 3242  
**Economics** – ECON 2100, 2101, 2106 – 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.
- 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

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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

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The Fellowship Communication Program provides advice and instruction for all undergraduate and graduate students 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 on the Fellowship Communication Program Web and T-Square sites. 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 visit the Fellowship Communication Program Web site, attend Fellowship workshops, 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 Web sites 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 the 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, Truman, Udall, Goldwater).

### Helpful Information

- Starting from the Fellowship Communication Program Web site ([www.undergradstudies.gatech.edu/fellowship/](http://www.undergradstudies.gatech.edu/fellowship/)), explore the internet for scholarship opportunities that are of interest.
- Attend workshop sessions to learn about prestigious fellowships from advisors and representatives in person. Sign up for the Fellowship Communication Program T-Square site to receive announcements regarding upcoming workshop sessions as well as other time-sensitive information (impending application deadlines, new funding opportunities).
- Contact fellowship advisors and schedule meetings to discuss scholarship options one-on-one.



## GEORGIA TECH HONORS PROGRAM

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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 special topic courses
- 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 26 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., "BS in Electrical Engineering: International Plan."

For additional information about the International Plan visit [www.internationalplan.gatech.edu](http://www.internationalplan.gatech.edu).

### INTERNATIONAL RELATIONS-INTERNATIONAL PLAN ELECTIVES

Course	Course Title	HUM	SS	ETHICS
HTS 2037	20th Century Europe		x	
HTS 2062	Asia in the Modern World		x	
HTS 3012	Urban Sociology		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	
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 4012	German Identity	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		
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 3031	European Labor History		x	
HTS 3032	Europe Intellectual Hist		x	x
HTS 3033	Medieval England		x	
HTS 3035	Britain 1815 to 1914		x	

HTS 3036	Britain Since 1914		x	
HTS 3038	French Revolution		x	
HTS 3039	Modern France		x	
HTS 3041	Modern Spain		x	
HTS 3043	Modern Germany		x	
HTS 3045	Nazi Germany-Holocaust		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 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	
INTA 4743	Japan Society & Politics	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		
JAPN 4123	Tech&Bus Jpn Translation	x		
JAPN 4743	Japan Society & Politics	x		
LCC 3102	The Classical Tradition	x		
LCC 3104	Age-Scientific Discovery	x		
LCC 3106	Age of Sci Revolution	x		
LCC 3518	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	
HTS 3064	Sociology of Development		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**

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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.

## **THE OFFICE OF UNDERGRADUATE STUDIES**

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The Office of Undergraduate Studies includes the following:

Academic Advising

Academic Resources

Fellowship Communication Program

Transfer Student Ombudsperson

Undergraduate Research

## PREPROFESSIONAL PROGRAMS

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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

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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

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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. Students may also be interested in participating in the Student Advisory Board for Undergraduate Research (SABUR) or in Georgia Tech's new Undergraduate Research Journal, *The Tower*.

For information on how to participate, visit [www.undergradresearch.gatech.edu](http://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. Write a research proposal.
2. 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).
3. Take the class LCC 4700 "Writing an Undergraduate Thesis" during the thesis-writing semester.
4. 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](http://undergradresearch.gatech.edu/research_option).

## **TUTORING AND WORKSHOPS**

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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**

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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.

## **UNDERGRADUATE ACADEMIC COMMON MARKET**

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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](http://www.admiss.gatech.edu/acm) or call the Office of Undergraduate Admission at 404.894.4154.

## **GRADUATE ACADEMIC COMMON MARKET**

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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)**

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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](http://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, AND WORK ABROAD)**

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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 Georgia Tech 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 (four to 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 800 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.

The Georgia Tech Internship Program provides 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. There are also part-time internships available for those who wish to work while attending classes.

The Division of Professional Practice 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 Georgia Tech Internship programs.

For more information on any programs offered through the Division of Professional Practice, visit our Web site at [www.profpractice.gatech.edu](http://www.profpractice.gatech.edu) or write to:

Division of Professional Practice  
Georgia Institute of Technology  
Atlanta, Georgia 30332-0260

## GRADUATE COOPERATIVE PLAN

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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 choose 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](http://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](http://www.gradcoop.gatech.edu), or



## CROSS ENROLLMENT

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### 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 concurrent registration is 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

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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
- Computational Science and Engineering
- Electrical and Computer Engineering
- Environmental Engineering
- Industrial Engineering
- Mechanical Engineering
- Medical Physics
- 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 ninety courses each semester, except during the summer when there are a smaller number of courses available. Visit [www.dlpe.gatech.edu/dl](http://www.dlpe.gatech.edu/dl) 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 Street N.W.  
Atlanta, GA 30308-1031

## LANGUAGE INSTITUTE

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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 in

- The Intensive English Program, which offers core courses in writing, grammar, reading, and speaking/listening at seven levels of proficiency and elective courses 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, accent reduction, public speaking, and TOEFL preparation
- Summer short course program with courses including conversation, writing, speaking, accent reduction, American studies, and business communication
- Customized courses for corporate clients
- Online courses

More than 1,000 students attend programs offered by the Language Institute each year, giving 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 UCIEP 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](http://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

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Distance Learning and Professional Education coordinates the delivery of noncredit short courses and professional development programs to the public and 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 the following:

- Architecture
- Campus Recreation Programs
- Defense Technology
- Economic Development
- Engineering
  - Aerospace | Civil | Electrical & Computer
  - Engineering Review | Mechanical
  - Systems | Textile & Fiber
- English as a Second Language
- Environmental Management
- Executive Education
- Information Technology
- Lean Manufacturing
- OSHA Training
- Quality
- Supply Chain and Logistics

DLPE offers 31 certificate programs comprised of sequences of short courses in these subject areas.

For information, visit [www.dlpe.gatech.edu](http://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

## **FIVE-YEAR BS/MS DEGREE PROGRAMS**

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Many schools at Georgia Tech offer five-year BS/MS degree programs that, like the Graduate Course Option, allow eligible students to use up to 6 credit hours of graduate-level coursework in the major discipline for both degrees. The BS/MS programs typically include research and mentoring components and have their own GPA requirements. More information is available from participating major schools/colleges.

## GEORGIA TECH-LORRAINE

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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.

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. Courses are taught in English by Georgia Tech faculty. 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. Undergraduate and graduate courses are offered throughout the year.

Instructional programs leading to master's degrees and PhDs in electrical and computer engineering, mechanical engineering, and computer science are available to graduate students. In addition, double-degree programs that lead to both a Georgia Tech degree and a diploma from a European university have been developed.

Undergraduate courses are offered in engineering, humanities, management, and social sciences to any qualified student. Courses specifically designed to fulfill the student's major and International Plan requirements are offered on the Lorraine campus.

All instruction at GT-Lorraine is in English. French language courses are also available to enhance students' experience. Students may also elect to take some classes, usually taught in French, at partner institutions. They may also benefit from internships in industry.

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-Lorraine at 404.894.0076 or +33 387 20 3939. You may also e-mail GT-Lorraine below.

## **GEORGIA TECH-SAVANNAH**

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Established in 1998

Location: 210 Technology Circle

Savannah, GA 31407

Telephone: 912.966.7922

Fax: 912.966.7836

Web site: [www.gtsav.gatech.edu](http://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).

## GEORGIA TECH HONORS PROGRAM

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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 special topic courses
- a system of careful advising



## **INTERDISCIPLINARY PROGRAMS**

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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 below 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)**

Executive Director: Mark A. Clements, 404.894.4584

### **BROOK BYERS INSTITUTE FOR SUSTAINABLE SYSTEMS (ISS)**

Director: John C. Crittenden, contact through the School of Civil and Environmental Engineering

### **CENTER FOR BIOLOGICALLY INSPIRED DESIGN (CBID)**

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 NANOSTRUCTURE CHARACTERIZATION (CNC)**

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 Realf, 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)**

Interim Director: Ronald W. Rousseau, 404-894-2082

**INTERACTIVE MEDIA TECHNOLOGY CENTER (IMTC)**

Executive 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

**MRSEC: THE GEORGIA TECH CENTER FOR NEW ELECTRONIC MATERIALS**

Director: Dennis W. Hess, 404.894.5922

**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

**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 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 26 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., "BS in Electrical Engineering: International Plan."

For additional information about the International Plan visit [www.internationalplan.gatech.edu](http://www.internationalplan.gatech.edu).

### INTERNATIONAL RELATIONS-INTERNATIONAL PLAN ELECTIVES

Course	Course Title	HUM	SS	ETHICS
HTS 2037	20th Century Europe		x	
HTS 2062	Asia in the Modern World		x	
HTS 3012	Urban Sociology		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	
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 4012	German Identity	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		
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 3031	European Labor History		x	
HTS 3032	Europe Intellectual Hist		x	x
HTS 3033	Medieval England		x	
HTS 3035	Britain 1815 to 1914		x	

HTS 3036	Britain Since 1914		x	
HTS 3038	French Revolution		x	
HTS 3039	Modern France		x	
HTS 3041	Modern Spain		x	
HTS 3043	Modern Germany		x	
HTS 3045	Nazi Germany-Holocaust		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 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	
INTA 4743	Japan Society & Politics	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		
JAPN 4123	Tech&Bus Jpn Translation	x		
JAPN 4743	Japan Society & Politics	x		
LCC 3102	The Classical Tradition	x		
LCC 3104	Age-Scientific Discovery	x		
LCC 3106	Age of Sci Revolution	x		
LCC 3518	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	
HTS 3064	Sociology of Development		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**

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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](http://www.admiss.gatech.edu/jointenrollment).

## LEARNING SUPPORT POLICIES

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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 20 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**

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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

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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**

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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 November 1 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](http://www.psp.gatech.edu).

## ROTC

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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 4 hours in Basic ROTC courses and 6 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 PROGRAMS--LANGUAGE FOR BUSINESS AND TECHNOLOGY (LBAT)**

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The School of Modern Languages offers special summer immersion programs in China, France, Germany, Japan, Mexico, and Spain, and Russia. 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-program/> for more information.

## UNDERGRADUATE RESEARCH OPPORTUNITIES PROGRAM

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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. Students may also be interested in participating in the Student Advisory Board for Undergraduate Research (SABUR) or in Georgia Tech's new Undergraduate Research Journal, *The Tower*.

For information on how to participate, visit [www.undergradresearch.gatech.edu](http://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. Write a research proposal.
2. 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).
3. Take the class LCC 4700 "Writing an Undergraduate Thesis" during the thesis-writing semester.
4. 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](http://undergradresearch.gatech.edu/research_option).

## DUAL DEGREE PROGRAM

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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

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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 College & State University
- Georgia Perimeter College
- Georgia Southern University
- Gordon College
- 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**

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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](http://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](http://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](http://www.atdc.org).

## **GEORGIA TECH RESEARCH CORPORATION**

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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

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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 seventy-five 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 \$185 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; Washington D.C; Orlando, Florida; Jacksonville, Florida; San Diego, California; Tucson, Arizona; and Dallas, Texas.

In 2006, GTRI proudly opened its first international research institute – Georgia Tech-Ireland (GT-I). Located in Athlone, Ireland, its focus is on applied research in partnership with an entire country. GT-I bridges the gap between research and its industrial adoption, while facilitating and conducting research in the areas of digital media, radio frequency identification (RFID), healthcare 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. The newest offering is a Professional Master's Degree in Applied Systems Engineering, which was developed jointly by GTRI and the Georgia Tech College of Engineering. 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](http://www.gtri.gatech.edu)

## **INTERDISCIPLINARY PROGRAMS**

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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 below 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)**

Executive Director: Mark A. Clements, 404.894.4584

### **BROOK BYERS INSTITUTE FOR SUSTAINABLE SYSTEMS (ISS)**

Director: John C. Crittenden, contact through the School of Civil and Environmental Engineering

### **CENTER FOR BIOLOGICALLY INSPIRED DESIGN (CBID)**

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 NANOSTRUCTURE CHARACTERIZATION (CNC)**

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 Realf, 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)**

Interim Director: Ronald W. Rousseau, 404-894-2082

**INTERACTIVE MEDIA TECHNOLOGY CENTER (IMTC)**

Executive 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

**MRSEC: THE GEORGIA TECH CENTER FOR NEW ELECTRONIC MATERIALS**

Director: Dennis W. Hess, 404.894.5922

**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

**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

## **JOINT CNRS RESEARCH LABORATORY**

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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

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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.ornl.gov/orise/educ.htm](http://www.ornl.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.ornl.gov](http://www.ornl.gov)

## SKIDAWAY INSTITUTE OF OCEANOGRAPHY

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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**

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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>. 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

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All fees are payable by the deadline published on the Official School Calendar ([www.registrar.gatech.edu](http://www.registrar.gatech.edu)) and on the Bursar's Office Web page ([www.bursar.gatech.edu/calendar.php](http://www.bursar.gatech.edu/calendar.php)) 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 in 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 a 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**

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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 ([www.bursar.gatech.edu/calendar.php](http://www.bursar.gatech.edu/calendar.php)), his or her registration may be cancelled. The late payment fee is \$75.

## MANDATORY STUDENT FEES

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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](http://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

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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](http://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 12 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**

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### **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 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 the Office of Scholarships and Financial Aid. 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 Scholarships and Financial Aid 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 6 hours of courses for disbursement, students who are planning to enroll for fewer than 12 hours and who are unsure of the requirements are advised to seek clarification from the Office of Scholarships and Financial Aid .

## RETURNED CHECKS

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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**

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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 (with actual dates) can be found at [www.bursar.gatech.edu](http://www.bursar.gatech.edu).



## REFUND POLICY

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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 (12 hours). No further refunds will be given for individual classes dropped after the end of late registration.

## **CANCELLATION OF REGISTRATION**

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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

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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](http://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 twelve 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 twelve 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 twelve 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 twelve 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 twelve 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

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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):

- **Academic Common Market.** Students selected to participate in a program offered through the Academic Common Market;
- **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
- **University System Employees and Dependents.** Full-time employees of the University System, their spouses, and their dependent children;  
Download Application
- **Full-time School Employees.** Full-time employees in the public schools of Georgia or the Technical College System of Georgia, 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
- **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
- **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;
- **Nonresident Graduate Students** who hold teaching or research assistantships requiring at least one-third time service at the institution; Contact your major school
- **Georgia National Guard and U.S. Military Reservists.** Active members of the Georgia National Guard, stationed or assigned to Georgia or active members of a unit of the U.S. Military Reserves based in Georgia, and their spouses and their dependent children; Military personnel
- **International and Domestic Exchange Programs.** Any student who enrolls in a University System institution as a participant in an international or domestic direct exchange program that provides reciprocal benefits to University System students.; and [www.oie.gatech.edu](http://www.oie.gatech.edu)
- **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](http://www.finaid.gatech.edu)
- **Economic Advantage.** As of the first day of classes for the term, an economic advantage waiver may be granted to a U.S. citizen or U.S. legal permanent resident who is a dependent or independent student and can provide clear evidence that the student or the student's parent, spouse, or U.S. court-appointed legal 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. For U.S. citizens or U.S. legal permanent residents, 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 an independent non-citizen possessing a valid employment-related visa status

who can provide clear evidence of having relocated to the State of Georgia to accept fulltime, self-sustaining employment. Relocation to the state must be for employment reasons and not for the purpose of 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. Independent non-citizen students may continue to receive this waiver as long as they maintain a valid employment-related visa status and can demonstrate continued efforts to establish U.S. legal permanent residence and legal domicile in the State of Georgia.

A dependent non-citizen student who can provide clear evidence that the student's parent, spouse, or U.S. court-appointed legal guardian possesses a valid employment-related visa status and can provide clear evidence of having relocated to the State of Georgia to accept full-time, self-sustaining employment is also eligible to receive this waiver. Relocation to the state must be for employment reasons and not for the purpose of enrolling in an institution of higher education. These individuals must be able to show clear evidence of having taken legally permissible steps toward establishing legal permanent residence in the United States and the establishment of legal domicile in the State of Georgia. Non-citizen students currently receiving a waiver who are dependents of a parent, spouse, or U.S. court-appointed legal guardian possessing a valid employment-related visa status may continue to receive this waiver as long as they can demonstrate that their parent, spouse, or U.S. court-appointed legal guardian is maintaining full-time, self-sustaining employment in Georgia and is continuing efforts to pursue an adjustment of status to U.S. legal permanent resident and the establishment of legal domicile in the State of Georgia. (BR Minutes, October 2008.)

[Download Application](#)

- **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 also be granted to their spouses and dependent children. This waiver may be granted for not more than one year. (BR Minutes, October 2008)
- [Download Application](#)
- **Nonresident Student.** As of the first day of classes for the term, a nonresident student can be considered for this waiver under the following conditions:

**Dependent Student.** If the parent or U.S. court-appointed legal guardian has maintained domicile in Georgia for at least 12 consecutive months and the student can provide clear and legal evidence showing the relationship to the parent 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. Under Georgia code legal guardianship must be established prior to the student's 18th birthday.

**Independent Student.** If the student can provide clear and legal evidence showing relations to the spouse and the spouse has maintained domicile in Georgia for at least 12 consecutive months immediately preceding the first day of classes for the term. This waiver can remain in effect as long as the student remains continuously enrolled.

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, spouse or U.S. court-appointed legal guardian (BR Minutes, June 2006).

[Download Application](#)

- **Border County Residents.**

Students domiciled in an out-of-state county bordering Georgia, enrolling in a program offered at a location approved by the Board of Regents and for which the offering institution has been granted permission to award Border County waivers. This waiver is only applicable to students domiciled in Beaufort or Jasper counties South Carolina and enrolled at Georgia Tech - Savannah ONLY.

[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 104 of the Tech Tower, write to the Registrar's Office, Residency, Georgia Tech, Atlanta, Ga 30332-0315, or email. 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.

Updated October 2008

## TUITION AND FEE RATES

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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](http://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 12 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**

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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](http://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 Office of Admissions 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.

## **UNDERGRADUATE FINANCIAL ASSISTANCE**

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The Office of Scholarships and Financial Aid (OSFA) is dedicated to helping students and parents obtain the financial aid necessary to pay for a college education at Georgia Tech. The OSFA accomplishes this by awarding federal, state, and Institute funds to students and by directing students to other sources of aid. Additionally, the OSFA 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](http://www.finaid.gatech.edu) or contact the Office of Scholarships and Financial Aid , Georgia Institute of Technology, Atlanta, Georgia 30332-0460.

## **MEDALS AND PRIZES**

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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.

## OUT-OF-STATE TUITION WAIVERS

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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):

- **Academic Common Market.** Students selected to participate in a program offered through the Academic Common Market;
- **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
- **University System Employees and Dependents.** Full-time employees of the University System, their spouses, and their dependent children;  
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- **Full-time School Employees.** Full-time employees in the public schools of Georgia or the Technical College System of Georgia, 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
- **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
- **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;
- **Nonresident Graduate Students** who hold teaching or research assistantships requiring at least one-third time service at the institution; Contact your major school
- **Georgia National Guard and U.S. Military Reservists.** Active members of the Georgia National Guard, stationed or assigned to Georgia or active members of a unit of the U.S. Military Reserves based in Georgia, and their spouses and their dependent children; Military personnel
- **International and Domestic Exchange Programs.** Any student who enrolls in a University System institution as a participant in an international or domestic direct exchange program that provides reciprocal benefits to University System students.; and [www.oie.gatech.edu](http://www.oie.gatech.edu)
- **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](http://www.finaid.gatech.edu)
- **Economic Advantage.** As of the first day of classes for the term, an economic advantage waiver may be granted to a U.S. citizen or U.S. legal permanent resident who is a dependent or independent student and can provide clear evidence that the student or the student's parent, spouse, or U.S. court-appointed legal 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. For U.S. citizens or U.S. legal permanent residents, 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 an independent non-citizen possessing a valid employment-related visa status

who can provide clear evidence of having relocated to the State of Georgia to accept fulltime, self-sustaining employment. Relocation to the state must be for employment reasons and not for the purpose of 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. Independent non-citizen students may continue to receive this waiver as long as they maintain a valid employment-related visa status and can demonstrate continued efforts to establish U.S. legal permanent residence and legal domicile in the State of Georgia.

A dependent non-citizen student who can provide clear evidence that the student's parent, spouse, or U.S. court-appointed legal guardian possesses a valid employment-related visa status and can provide clear evidence of having relocated to the State of Georgia to accept full-time, self-sustaining employment is also eligible to receive this waiver. Relocation to the state must be for employment reasons and not for the purpose of enrolling in an institution of higher education. These individuals must be able to show clear evidence of having taken legally permissible steps toward establishing legal permanent residence in the United States and the establishment of legal domicile in the State of Georgia. Non-citizen students currently receiving a waiver who are dependents of a parent, spouse, or U.S. court-appointed legal guardian possessing a valid employment-related visa status may continue to receive this waiver as long as they can demonstrate that their parent, spouse, or U.S. court-appointed legal guardian is maintaining full-time, self-sustaining employment in Georgia and is continuing efforts to pursue an adjustment of status to U.S. legal permanent resident and the establishment of legal domicile in the State of Georgia. (BR Minutes, October 2008.)

[Download Application](#)

- **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 also be granted to their spouses and dependent children. This waiver may be granted for not more than one year. (BR Minutes, October 2008)

[Download Application](#)

- **Nonresident Student.** As of the first day of classes for the term, a nonresident student can be considered for this waiver under the following conditions:

**Dependent Student.** If the parent or U.S. court-appointed legal guardian has maintained domicile in Georgia for at least 12 consecutive months and the student can provide clear and legal evidence showing the relationship to the parent 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. Under Georgia code legal guardianship must be established prior to the student's 18th birthday.

**Independent Student.** If the student can provide clear and legal evidence showing relations to the spouse and the spouse has maintained domicile in Georgia for at least 12 consecutive months immediately preceding the first day of classes for the term. This waiver can remain in effect as long as the student remains continuously enrolled.

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, spouse or U.S. court-appointed legal guardian (BR Minutes, June 2006).

[Download Application](#)

- **Border County Residents.**

Students domiciled in an out-of-state county bordering Georgia, enrolling in a program offered at a location approved by the Board of Regents and for which the offering institution has been granted permission to award Border County waivers. This waiver is only applicable to students domiciled in Beaufort or Jasper counties South Carolina and enrolled at Georgia Tech - Savannah ONLY.

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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 104 of the Tech Tower, write to the Registrar's Office, Residency, Georgia Tech, Atlanta, Ga 30332-0315, or email. 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.

Updated October 2008

## **OUTSIDE SPONSORSHIPS**

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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/thirdpartbill.php>.

## **PRESIDENT'S SCHOLARSHIP PROGRAM**

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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 November 1 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](http://www.psp.gatech.edu).



## VETERANS SERVICES

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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](http://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**

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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 Scholarships and Financial Aid. More information about Federal Loan programs and various alternative loan programs may be found at [www.finaid.gatech.edu/graduate](http://www.finaid.gatech.edu/graduate).

## **GRADUATE RESEARCH ASSISTANTSHIPS**

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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 one-third of the time by the Institute. These students also will be eligible for a tuition waiver. For more information, refer to the GRA/GTA Fee Payment Program at [www.bursar.gatech.edu](http://www.bursar.gatech.edu).

## **GRADUATE TEACHING ASSISTANTSHIPS**

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Students receiving these assistantships must be registered for at least twelve 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 GRA/GTA Fee Payment Program at [www.bursar.gatech.edu](http://www.bursar.gatech.edu).

## **PRESIDENT'S FELLOWSHIPS**

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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**

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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**

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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

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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):

- **Academic Common Market.** Students selected to participate in a program offered through the Academic Common Market;
- **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
- **University System Employees and Dependents.** Full-time employees of the University System, their spouses, and their dependent children;  
Download Application
- **Full-time School Employees.** Full-time employees in the public schools of Georgia or the Technical College System of Georgia, 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
- **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
- **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;
- **Nonresident Graduate Students** who hold teaching or research assistantships requiring at least one-third time service at the institution; Contact your major school
- **Georgia National Guard and U.S. Military Reservists.** Active members of the Georgia National Guard, stationed or assigned to Georgia or active members of a unit of the U.S. Military Reserves based in Georgia, and their spouses and their dependent children; Military personnel
- **International and Domestic Exchange Programs.** Any student who enrolls in a University System institution as a participant in an international or domestic direct exchange program that provides reciprocal benefits to University System students.; and [www.oie.gatech.edu](http://www.oie.gatech.edu)
- **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](http://www.finaid.gatech.edu)
- **Economic Advantage.** As of the first day of classes for the term, an economic advantage waiver may be granted to a U.S. citizen or U.S. legal permanent resident who is a dependent or independent student and can provide clear evidence that the student or the student's parent, spouse, or U.S. court-appointed legal 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. For U.S. citizens or U.S. legal permanent residents, 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 an independent non-citizen possessing a valid employment-related visa status



who can provide clear evidence of having relocated to the State of Georgia to accept fulltime, self-sustaining employment. Relocation to the state must be for employment reasons and not for the purpose of 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. Independent non-citizen students may continue to receive this waiver as long as they maintain a valid employment-related visa status and can demonstrate continued efforts to establish U.S. legal permanent residence and legal domicile in the State of Georgia.

A dependent non-citizen student who can provide clear evidence that the student's parent, spouse, or U.S. court-appointed legal guardian possesses a valid employment-related visa status and can provide clear evidence of having relocated to the State of Georgia to accept full-time, self-sustaining employment is also eligible to receive this waiver. Relocation to the state must be for employment reasons and not for the purpose of enrolling in an institution of higher education. These individuals must be able to show clear evidence of having taken legally permissible steps toward establishing legal permanent residence in the United States and the establishment of legal domicile in the State of Georgia. Non-citizen students currently receiving a waiver who are dependents of a parent, spouse, or U.S. court-appointed legal guardian possessing a valid employment-related visa status may continue to receive this waiver as long as they can demonstrate that their parent, spouse, or U.S. court-appointed legal guardian is maintaining full-time, self-sustaining employment in Georgia and is continuing efforts to pursue an adjustment of status to U.S. legal permanent resident and the establishment of legal domicile in the State of Georgia. (BR Minutes, October 2008.)

[Download Application](#)

- **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 also be granted to their spouses and dependent children. This waiver may be granted for not more than one year. (BR Minutes, October 2008)

[Download Application](#)

- **Nonresident Student.** As of the first day of classes for the term, a nonresident student can be considered for this waiver under the following conditions:

**Dependent Student.** If the parent or U.S. court-appointed legal guardian has maintained domicile in Georgia for at least 12 consecutive months and the student can provide clear and legal evidence showing the relationship to the parent 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. Under Georgia code legal guardianship must be established prior to the student's 18th birthday.

**Independent Student.** If the student can provide clear and legal evidence showing relations to the spouse and the spouse has maintained domicile in Georgia for at least 12 consecutive months immediately preceding the first day of classes for the term. This waiver can remain in effect as long as the student remains continuously enrolled.

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, spouse or U.S. court-appointed legal guardian (BR Minutes, June 2006).

[Download Application](#)

- **Border County Residents.**

Students domiciled in an out-of-state county bordering Georgia, enrolling in a program offered at a location approved by the Board of Regents and for which the offering institution has been granted permission to award Border County waivers. This waiver is only applicable to students domiciled in Beaufort or Jasper counties South Carolina and enrolled at Georgia Tech - Savannah ONLY.

[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 104 of the Tech Tower, write to the Registrar's Office, Residency, Georgia Tech, Atlanta, Ga 30332-0315, or email. 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.

Updated October 2008

## **OUTSIDE SPONSORSHIPS**

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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/thirdpartbill.php>.

## VETERANS SERVICES

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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](http://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.

## **I. PURPOSE**

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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**

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### **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**

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### **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

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### 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**

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#### **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**

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#### **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**

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#### **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**

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### **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

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### 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

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### 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.

## **V. GRADES AND SCHOLASTIC AVERAGE**

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### **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.



## V. GRADES AND SCHOLASTIC AVERAGE

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### 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**

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### **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 12 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.

## **VI. SCHOLASTIC REGULATIONS**

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### **B. ELIGIBILITY FOR CLASS RINGS**

A student may purchase a class ring any time after receiving credit for seventy semester credit hours.

## VI. SCHOLASTIC REGULATIONS

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### 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 6 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 6 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.

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## VI. SCHOLASTIC REGULATIONS

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### 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.

## **VI. SCHOLASTIC REGULATIONS**

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### **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 12 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 12 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.)

## **VI. SCHOLASTIC REGULATIONS**

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### **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.



## **VI. SCHOLASTIC REGULATIONS**

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### **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

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### 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

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### 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

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### 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**

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## 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](http://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.

## VIII. WITHDRAWAL FROM SCHOOL AND READMISSION

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### 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.

## VIII. WITHDRAWAL FROM SCHOOL AND READMISSION

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### 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

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### 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.

## **IX. SCHEDULING**

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### **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 3 credit hours each term of enrollment. Exceptions to this regulation may be made during the student's graduation term.

## IX. SCHEDULING

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### 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**

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### **D. ATTENDING CLASSES**

1. Students may attend only those particular classes for which they are registered and paid.

## **IX. SCHEDULING**

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### **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 12 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.)

## **IX. SCHEDULING**

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### **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**

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### **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.
7. The deadline to change the grade mode from letter grade to pass/fail (and vice-versa) is the same day as the last day to withdraw from a course without penalty.

## **X. PASS/FAIL SYSTEM**

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### **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**

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### **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**

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### **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 concurrent registration is 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**

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### **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.

## **XII. EXAMINATIONS**

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### **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 to the Bursar's office, and authorization by the Office of 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. Students will not be allowed to take an examination for advanced standing in a course for which the prerequisite(s) has not been met, except with the consent of the school offering the course.
6. 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.
7. Advanced standing is not allowed for laboratory or studio classes, except with the consent of the school offering the course.
8. Students may not use more than 9 credits of advanced standing to meet degree requirements.

## XII. EXAMINATIONS

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### 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.

**Note:** per the faculty handbook regulations please be aware of the following:

The following policy applies only to Standard Terms. Quizzes and tests may not be given during the week preceding final exams. No final exam will be given earlier than final exam week under any circumstances. All quizzes and tests must be graded and returned on or before the last day of class preceding final exam week.

### **XIII. UNDERGRADUATE DEGREES**

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#### **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 4 hours of basic ROTC and a maximum of 6 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 48 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.

### **XIII. UNDERGRADUATE DEGREES**

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#### **B. RESIDENCY RULE**

No student may be considered a candidate for a degree unless the final 36 credit hours required for the degree are earned in residence at Georgia Tech and approved by the major school.

### **XIII. UNDERGRADUATE DEGREES**

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#### **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.



### **XIII. UNDERGRADUATE DEGREES**

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#### **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.

### **XIII. UNDERGRADUATE DEGREES**

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#### **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.

### **XIII. UNDERGRADUATE DEGREES**

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#### **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 36 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.

### **XIII. UNDERGRADUATE DEGREES**

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#### **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**

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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**

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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**

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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**

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### **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 6 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 6 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.



## **XVII. EXTRACURRICULAR ACTIVITIES**

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### **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.

## **XVII. EXTRACURRICULAR ACTIVITIES**

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### **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.

## **XVII. EXTRACURRICULAR ACTIVITIES**

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### **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.

## **XVII. EXTRACURRICULAR ACTIVITIES**

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### **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**

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### **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.

## XVIII ACADEMIC HONOR CODE

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### 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.

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## **XVIII ACADEMIC HONOR CODE**

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### **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.

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## **XVIII ACADEMIC HONOR CODE**

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### **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.

## XIX. STUDENT CODE OF CONDUCT

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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 Web site. This subsection shall expire upon the adoption of a separate Code of Conduct governing Student Organizations.

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## **XIX. STUDENT CODE OF CONDUCT**

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### **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.

## **XIX. STUDENT CODE OF CONDUCT**

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### **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.



## **XIX. STUDENT CODE OF CONDUCT**

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### **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 Web site 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 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.

## **XIX. STUDENT CODE OF CONDUCT**

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### **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.

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## **XIX. STUDENT CODE OF CONDUCT**

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### **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.

## **XIX. STUDENT CODE OF CONDUCT**

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### **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.

## **XIX. STUDENT CODE OF CONDUCT**

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### **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**

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### **I. REFERENCES**

Academic Honor Code: [www.honor.gatech.edu](http://www.honor.gatech.edu)

Board of Regents: [www.usg.edu/regents/policymanual](http://www.usg.edu/regents/policymanual)

Computer Use and Network Policy: [www.security.gatech.edu](http://www.security.gatech.edu)

Department of Housing: [www.housing.gatech.edu](http://www.housing.gatech.edu)

Faculty Senate: [www.Facultysenate.gatech.edu](http://www.Facultysenate.gatech.edu)

Office of the Dean of Students: [www.deanofstudents.gatech.edu/](http://www.deanofstudents.gatech.edu/)

Office of Student Integrity: <http://www.deanofstudents.gatech.edu/osi/>

The following policies can be found on the OSI Web site:

Student Policy on Alcohol and Illegal Drugs

Student Policy on Sexual Harassment and Misconduct

## **XX. STUDENT ACADEMIC GRIEVANCE PROCEDURES**

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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, intellectual diversity, 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. Student concerns may be discussed with the faculty member and/or reported to the school or unit head, the academic deans, or the Assistant Vice Provost for Academic Affairs.

### **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**

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### **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

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### 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.

## XX. STUDENT ACADEMIC GRIEVANCE PROCEDURES

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### 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**

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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**

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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.

# FAMILY EDUCATIONAL RIGHTS AND PRIVACY ACT (FERPA) AND APPLICANT RECORDS

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## A. NOTIFICATION OF STUDENT RIGHTS UNDER FERPA

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 whether volunteering for or 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

## B. APPLICANT RECORDS

- Access to applicant records is strictly controlled and governed by Institute policy. These records are treated as confidential.

## **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 social security numbers.

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

### **ADDITIONAL INFORMATION**

Additional information on Georgia Tech's FERPA policies is available from the Registrar's Office.

## **INTELLECTUAL PROPERTY POLICY**

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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

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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 20 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**

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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 404.894.2564 or the Director of the Employee Relations at 404.894.3249.

## **REQUIRED STUDENT COMPUTER OWNERSHIP**

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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 Scholarships and Financial Aid for more information.