

# Georgia Tech Library Collection Development Policy

## School of Electrical and Computer Engineering 2004

### Collection Development Objectives

The Library & Information Center at Georgia Institute of Technology supports faculty and student research and the curriculum through doctoral degree level in the discipline of Electrical and Computer Engineering. It also supports research projects and programs conducted on behalf of faculty researchers, research engineers, and research scientists in the School of Electrical and Computer Engineering's various laboratories and research centers.

### School Profile -- Overview

The School of Electrical Engineering was founded in 1897. Computer engineering was added to the program in 1986 and the name of the School was changed to Electrical and Computer Engineering in 1993. The School of Electrical and Computer Engineering ([ECE](#)) is the largest of the nine Schools within the College of Engineering. The School prepares students at the bachelor's, master's, and doctoral levels for a career in electrical and computer engineering. Georgia Tech's College of Engineering placed fourth nationally in graduate school rankings by the 2006 U.S. News and World Report and the School of Electrical and Computer Engineering's computer engineering graduate program ranked sixth in the U.S. News rankings and sixth for the electrical engineering graduate program. Among the over 115 academic faculty, there are five members of the National Academy of Engineering, five Fellows of the Optical Society of America, and 35 Fellows of the Institute of Electrical and Electronic Engineers (IEEE). Also among the faculty are seven Georgia Research Alliance (GRA) Eminent Scholars, two Presidential Early Career Award in Science and Engineering recipients, and 27 NSF Presidential Young Investigator/National Young Investigator /CAREER Award recipients. There are about 4 Regents professors, 50 professors, 27 associate professors, 24 assistant professors, 6 associate chairs, 28 endowed chairs, and 17 professor emeriti (2004).

### School Chair

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Professional Accreditation

Both the computer engineering and the electrical engineering programs are accredited by the Engineering Accreditation Commission of ABET (Accreditation Board for Engineering and Technology).

## School Profile – Curriculum

### Enrollment

With approximately 1,800 undergraduate and 1,000 graduate students (2003/2004), the School of Electrical and Computer Engineering is the largest unit on the Georgia Tech campus and is one of the largest EE/CmpE programs in the United States.

Computer Engineering, Electrical Engineering, GTREP Electrical Engineering.  
Fall Semester Enrollment

<b>Enrollment</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>
Computer Eng Undergraduate	927	1008	903	749	611
Electrical Eng Undergraduate	952	903	955	945	926

Electrical and Computer Engineering, Fall Enrollment

<b>Enrollment</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>
ECE Graduate	793	899	1006	975	875

### Degrees offered

The School offers bachelors, masters, and doctoral degrees in electrical and computer engineering.

The Doctor of Philosophy degree requires concentration in a particular area of electrical engineering as well as demonstrated mastery over the fundamentals of electrical engineering. It is awarded in recognition of demonstrated proficiency and high achievement in the student's major field within electrical engineering or computer engineering.

Graduate students in the School of Electrical and Computer Engineering may pursue either the undesignated Master of Science (MS) degree or the Master of Science in Electrical and Computer Engineering (MSECE) degree.

A five-year combined B.S.-M.S. program is available to highly qualified undergraduates.

The School of Electrical and Computer Engineering offers two [undergraduate](#) degree programs: electrical engineering (EE) and computer engineering (CmpE).

Undergraduate electrical engineering (EE) and computer engineering (CmpE) elective courses are available in a wide variety of major areas including analog electronics, bioengineering, computer engineering, systems and controls, microsystems, electronics packaging, digital signal processing, optics and photonics, electric power, energy processing, electro-magnetics, and telecommunications.

ECE participates in the Georgia Tech's [Cooperative Education Program](#) where undergraduate students alternate semesters of academic study with semesters of paid work experience. ECE also participates in the [Undergraduate Research Opportunity Program](#) where students earn academic credit for working on real world research projects. The Graduate Cooperative Program provides both masters and doctoral students with opportunities to include specialized work experiences in their studies.

[Professional Communications Program](#) enables undergraduate students to learn teamwork and professional communication skills in the context of actual coursework. The graduate curriculum includes a [Professional Communications Program](#) that is designed to help students develop professional written and oral communication skills.

The School of Electrical and Computer Engineering offers graduate level academic and research programs in of its ten technical interest areas, which include: bioengineering, computer engineering, digital signal processing, electric power, electromagnetics, electronic design and applications, microsystems, optics and photonics, systems and controls, and telecommunications.

ECE laboratories offer additional opportunities in the areas of analog electronics, audio systems, automated measurements, computer architecture, robotics, digital systems, electric power, antennas, electromagnetic wave theory, computational electromagnetics, remote sensing, integrated circuits, lasers, microprocessors, optics, photovoltaics, and solid-state devices.

In addition to the specialization within electrical engineering, the School participates in several multidisciplinary certificate programs. A student who successfully completes one of the multidisciplinary programs will receive a certificate from the College of Engineering in addition to the degree in electrical engineering. Multidisciplinary programs in diverse areas such as manufacturing, energy engineering, and acoustics are offered jointly with other engineering schools on the Georgia Tech campus. For example, the Practice Oriented Master's (POM) program combines a Master's in engineering with a certificate in Microelectronic Packaging and a minor in Management.

The School of Electrical and Computer Engineering participates in the MS and Ph.D. degree programs in [Bioengineering](#). ECE's interdisciplinary program is offered in conjunction with the College of Engineering, with advanced courses in bioengineering, engineering specialties, and life sciences.

Students may choose to pursue graduate degrees in electrical and computer engineering at Georgia Tech [Lorraine](#), the European platform of the Georgia Institute of Technology, located in Metz, France. A summer undergraduate program is also offered at Georgia Tech Lorraine <http://www.georgiatech-metz.fr/en/>

The School of Electrical and Computer Engineering participates in the Georgia Tech Regional Engineering Program (<http://www.gtrep.gatech.edu/>) in southeast Georgia. Both the computer engineering and electrical engineering degree programs are offered through Georgia Tech Savannah's partner institutions (Armstrong Atlantic State University, Georgia Southern University, and Savannah State University) and the Georgia Tech Savannah campus in southeast Georgia.

The [Shanghai Study Abroad Program](#) which is offered for the first time in 2005 is jointly sponsored by the Office of International Education, the Ivan Allen College , the School of Economics, and ECE.

The School of Electrical and Computer Engineering offers working professionals throughout the continental United States the opportunity to enroll in many of its graduate [distance learning](#) courses through video and online technologies. Qualified individuals can complete the requirements for the master's degree utilizing the video-based and online delivery system.

[Degrees Awarded, School of Electrical & Computer Engineering](#)

<b>Degree</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>
Bachelors	343	317	367	435	397
Masters	219	199	266	291	249
PhD	53	55	53	77	99

**School Profile -- Research**

[Faculty Research Areas](#)

With the support of over \$37 million in grants and contracts (2003/2004), ECE leads the world in technological innovations that have brought the School to its present stature of international preeminence. Faculty are engaged in research that encompasses all major areas of electrical and computer engineering and are affiliated with a network of 16 world class research centers.

ECE's faculty is organized into 10 technical interest groups (TIGs) that collectively represent the major research thrusts of the School. These areas are highly interrelated, and many faculty members engage in research in multiple TIGs. Following is a brief description of each TIG, with their major areas of research.

- **Bioengineering.** Biosensors/BioMEMS, Neuroengineering, Medical Imaging and Signal Processing. Bioengineering is concerned with the application of engineering principles to the study and control of biological processes. In this area, mathematical and physical concepts are developed which are applied to medicine and biology.
- **Computer Engineering.** Computer Architecture, Embedded Systems and Software, Design Tools, Test and Verification, Computer Networks and Internetworking, Distributed Systems and Software, VLSI Design. The field of computer engineering is centered in digital design, computer architecture, and computer applications. This includes circuits and devices, computer systems, and engineering software systems.
- **Digital Signal Processing.** DSP Theory, Image and Video Signal Processing, Multimedia Signal Processing and Networking, Signal Processing for Communications and Security, Radar and Array Processing, Speech and Audio Processing, Statistical Signal Processing, Hardware/Software Systems for Signal Processing. Digital Signal Processing (DSP) is concerned with the representation of signals in digital form, and with the transformation of such signal representations using digital computation.
- **Electric Power.** Power System Monitoring, Analysis Protection, Operation and Control, Distributed Generation, Power System Simulation and Visualization, High Voltage Engineering and Power System, Components, Electric Machine Control, Condition and Monitoring and Protection, Power Electronics. Electric Power is primarily concerned with meeting the future demand for electric energy while satisfying environmental constraints.
- **Electromagnetics.** Microwave Circuits, Remote Sensing of Obscured Targets, RadioScience, Planetary Remote Sensing, and Space, Communications, Analysis and Design of Antennas, Computational Techniques for Electromagnetics, Signal Integrity in Digital and Mixed Signal Systems, Terrestrial Radio Wave Propagation. Electromagnetics involves the study of Maxwell's equations and their application to the analysis and design of devices and systems.
- **Electronic Design and Applications.** MEMs Circuit Technology, Analog VLSI, Radio Frequency/Wireless Integrated Circuits (RFIC), High Speed Mixed Signal, Analog. Electronic Design and Applications involves device and integrated circuit fabrication, circuit and system design and simulation, and instrumentation and testing techniques.
- **Microelectronics/Microsystems.** Microsystems and Nanosystems, Photovoltaics, Microelectronics Systems Packaging, Manufacturing and Gigascale Integration, Compound Semiconductors, Biomedical Microsystems. Microelectronics is concerned with the design, analysis, growth, and fabrication of micron/sub-micron feature length devices.
- **Optics and Photonics.** Optical Communication Networks, Nonlinear Optics, Photonics and optoelectronics, Diffractive and holographic optics. Optics and Photonics involves the study of lasers, optics, and holography.
- **Systems and Controls.** Mathematical systems theory, Discrete event systems and hybrid system, Nonlinear control, Computer vision, Intelligent control, Sensor technologies. Systems and controls is concerned with mathematical and

computational techniques for modeling, estimation, and control of systems and processes.

- Telecommunications. Wireless Communications and Networking, Communication Theory, Information Theory and Adaptive Systems, Multimedia Networking, Inter-networking, Network Management, and Network, Security, Optical Networks. Telecommunications is concerned with the characterization, representation, transmission, storage, and networking of information over various media including space, optical fiber, and cable.

## Research Centers

- ACDEE Arbutus Center for Distributed Engineering Education: A center to support educational development processes including research for education, research on pedagogy, content creation and the distributed delivery of education.
- CBAR Center for Board Assembly Research: An industry-supported center for advanced research on board assembly processes and systems including monitoring, optimization, equipment interfacing and communications, and diagnostics.
- CERCS Center for Experimental Research in Computer Systems: An industry supported center focusing on the design and evaluation of the next generation of interactive information grids via prototyping and experimentation. This center operates in partnership with the College of Computing.
- CMMT Center for MEMS and Microsystems Technologies: A center dedicated to the advancement of state-of-the-art technologies in microelectromechanical systems (MEMS) and Microsystems.
- CREST Center for Research on Embedded Systems and Technology: A center dedicated to the helping programmers to rapidly prototype embedded applications through the application of compiler-centric software.
- CSIP Center for Signal and Image Processing: A center providing research and education in digital signal processing with applications in telecommunications, machine, communications, medical technology, radar and sonar, and seismic data analysis.
- CSC Communications Systems Center: A center engaged in research in internet-protocol networks, digital two ways CATV, and wireless network systems. The Center also is engaged in developing new technologies for network security.
- GCATT Georgia Centers for Advanced Telecommunications Technology: An initiative of real and virtual clusters of excellence in advanced telecommunications with approximately 20 different research centers that fall under the GCATT umbrella. The Center supports development of the latest technologies and applications in communications, computing and content processing.
- IMTC Interactive Media Technology Center: A research, design, and education center focusing on digital media processing applied to technology, education, culture, and medicine.

- MiRC Microelectronics Research Center: A center providing the expertise, facilities, infrastructure and teaming environments to enable and facilitate interdisciplinary research in microelectronics, integrated optoelectronics, and microsensors and actuators
- NEETRAC National Electric Energy Testing Research and Applications Center: A membership-centered organization engaged in pre-competitive research and development, and testing for the electric energy industry.
- PRC Microsystems Packaging Research Center: The largest university-based research and education center focusing on next generation system-level packaging of electronics. The Center is sponsored by the National Science Foundation.
- UCEP University Center of Excellence for Photovoltaics Research and Education: A Department of Energy supported center engaged in research and development in advanced photovoltaic materials and devices aimed at accelerating the development of cost-effective photovoltaics.
- Consortium-type Activities. GTAC Georgia Tech Analog Consortium: A membership organization engaged in research in the design, fabrication, testing, and application of analog integrated circuits and systems and CAD development and applications. GTBI Georgia Tech Broadband Institute: A consortium of the Broadband Telecommunications Center and the Wireless Institute, engaged in research on broadband connectivity for home and community networks and on integrated designs of personal information devices
- State Economic Development Initiatives. GEDC Georgia Electronic Design Center: Georgia's strategic initiative to foster growth in the broadband telecommunications industry and to encourage the establishment of Georgia as a world leader in the design of broadband communication systems, communication systems, devices and chips.

### **Classed Analysis (based on Library of Congress classifications)**

#### ECE PRIMARY LC CLASSES

- QA Mathematics. Electronic computers, computer science, computer software, probabilities, mathematical statistics, analysis, analytic mechanics, etc.  
<https://www.library.gatech.edu/serialsreview/QA.htm>
- QC Physics. Experimental mechanics, acoustics, sound, heat, solid state physics, thermodynamics, optics, light, spectroscopy, radiation physics, electricity and magnetism, electromagnetic theory, radio waves, electric discharge, plasma physics, magnetism, nuclear and particle physics, radioactivity, geophysics, meteorology, climatology, etc.  
<https://www.library.gatech.edu/serialsreview/QC.htm>
- TA Engineering (general) and civil engineering. Bioengineering, engineering instruments, human engineering, systems engineering, environmental engineering, engineering design, engineering economy, engineering machinery, engineering mathematics, applied mechanics, acoustical engineering, mechanics of materials, applied optics, photonics, plasma engineering, etc.  
<https://www.library.gatech.edu/serialsreview/TA.htm>

- TJ Mechanical engineering and machinery. Power resources, energy conservation, mechanics applied to machinery, dynamics, automata, robots, control engineering systems, automatic machinery, machine design and drawing, heat engines, turbines, turbomachines, steam engineering, renewable energy sources, hydraulic machinery, etc.  
<https://www.library.gatech.edu/serialsreview/TJ.htm>
- TK Electrical engineering, electronics, nuclear engineering. Electric meters, electric apparatus and materials, electric circuits, electric networks, production of electric energy or power, power plants, central stations, dynamoelectric machinery and auxiliaries, generators, motors, transformers, production of electricity by direct energy conversion, distribution or transmission of electric power, applications of electric power, electric lighting and heating, telecommunication, radar, television, electronics, computer engineering, computer hardware, photoelectronic devices, nuclear engineering, atomic power, etc.  
<https://www.library.gatech.edu/serialsreview/TK.htm>

#### ECE SECONDARY LC CLASSES

- HD Industries, land use, labor, industrial management, economic, energy industries, energy policy, fuel trade, decision support, etc.  
<https://www.library.gatech.edu/serialsreview/HD.htm>
- HE Transportation and communications industry, telecommunication industry, cellular telephone services industry, wireless telephone industry, artificial satellite telecommunications industry, etc.  
<https://www.library.gatech.edu/serialsreview/HE.htm>
- Q Science (general), cybernetics, information theory, etc.  
<https://www.library.gatech.edu/serialsreview/Q1-Q500.htm>
- QD Chemistry, photochemistry, crystallography, etc.  
<https://www.library.gatech.edu/serialsreview/QD.htm>
- QP Physiology, neurophysiology, etc.  
<https://www.library.gatech.edu/serialsreview/QP.htm>
- QR Microbiology <https://www.library.gatech.edu/serialsreview/QR.htm>
- R Medicine (general) <https://www.library.gatech.edu/serialsreview/R1-R900.htm>
- RC Internal medicine, neurosciences, etc.  
<https://www.library.gatech.edu/serialsreview/RC-RD.htm>
- T Technology (general), industrial engineering, applied mathematics, quantitative methods, operations research, systems analysis, managerial control systems, information technology, automation, man-machine systems, etc.  
<https://www.library.gatech.edu/serialsreview/T1-T900.htm>
- TL Motor vehicles, aeronautics, astronautics, rockets, etc.  
<https://www.library.gatech.edu/serialsreview/TL.htm>
- TP Chemical technology, chemical engineering, biotechnology, fuel, cryogenic engineering, polymers, etc. <https://www.library.gatech.edu/serialsreview/TP.htm>
- TS Manufactures, production management, operations management, packaging, etc. <https://www.library.gatech.edu/serialsreview/TS.htm>

- UG Military engineering, air warfare, space warfare, etc.  
<https://www.library.gatech.edu/serialsreview/U-V.htm>