

# 2019 – 2020 ECE GRADUATE HANDBOOK

SCHOOL OF ELECTRICAL AND COMPUTER  
ENGINEERING  
GEORGIA INSTITUTE of TECHNOLOGY

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The *ECE Graduate Handbook* can be accessed online at

[http://www.ece.gatech.edu/academics/graduate/internal/graduate/current\\_grad\\_handbook.pdf](http://www.ece.gatech.edu/academics/graduate/internal/graduate/current_grad_handbook.pdf)

Some of the information included in this handbook is derived from the Georgia Institute of Technology General Catalog, which can be accessed at <http://www.catalog.gatech.edu>

Individuals with disabilities, who wish to acquire this publication in an alternate format, should contact the Graduate Affairs Office of the School of Electrical and Computer Engineering at (404) 894-2900 or at <http://www.ece.gatech.edu/academics/graduate/contact.html>.

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# **INTRODUCTION**

## **Purpose of this Handbook**

The administrative and academic units of Georgia Institute of Technology endeavor to provide policy and procedural information as well as the personal guidance needed by students to successfully complete degree programs at Tech. The ECE Graduate Handbook provides information about ECE's graduate degree programs as well as the policies and procedures of the School. Its purpose is to familiarize ECE graduate students with degree program requirements, policies, procedures, and the resources available to students through the ECE Graduate Affairs Office and other Georgia Tech administrative offices.

This manual is not intended to be an exhaustive set of rules. The policies and procedures of the Board of Regents of the University System of Georgia, as well as those issued by the central administration of the Georgia Institute of Technology, supersede the information contained in this document.

It is the responsibility of each student to know and understand the information in this manual and the Georgia Institute of Technology general catalog. The administrative staffs of the ECE Graduate Affairs Office, the Georgia Tech Registrar's Office and the Graduate Studies – VPR office are additional sources of information regarding departmental, institute and university system policies and regulations.

The Georgia Institute of Technology General Catalog is a web-based document, located at:

<http://www.catalog.gatech.edu/rules/>

All ECE graduate students are expected to know and understand the information provided in the General Catalog, paying specific attention to the “Information for Graduate Students” (<http://www.catalog.gatech.edu/students/grad/index.php>) and “Rules and Regulations” (<http://www.catalog.gatech.edu/policies/>) sections for valuable procedural and policy information.

## **A Welcome From The Chair**

### **Georgia Tech School of Electrical and Computer Engineering**

On behalf of the School of Electrical and Computer Engineering at Georgia Tech, I would like to welcome you to one of the best engineering programs in the nation. Your admission to the School means that you belong to an elite group and there is no question that you have the capability and potential to succeed here at Georgia Tech and in your subsequent professional career. It is the goal of the School's faculty and staff to help you be successful in your studies, and ultimately to assist you in realizing your potential.

Georgia Tech's School of Electrical and Computer Engineering is one of the largest such schools, annually being one of the leading producers of electrical engineering and computer engineering graduates. There are some obvious size-related compromises in student-faculty relationships compared to smaller schools, where students frequently have the same instructor for several subjects. On the other hand, because of our size, we can offer an unmatched richness and diversity of educational experiences. The School offers courses and programs across the breadth and spectrum of electrical and computer engineering and our curricula are specifically designed to enable you to tailor your programs to suit your individual needs and interests by selecting appropriate electives, both from electrical and computer engineering course offerings and from courses available from other units of Georgia Tech.

Your program of studies will provide you with technical preparation for a professional career. Equally important is the matter of professional ethics, which is implicitly and explicitly woven throughout your program of studies. Our Faculty Credo and our Student Honor Code are presented on the following pages. It is essential that you understand, fully endorse, and commit to the ethical practice of your profession.

We are delighted that you have chosen to join us in the School of Electrical and Computer Engineering and we are deeply committed to making sure that you will continue to regard that as a wise choice during your tenure at Georgia Tech and beyond.

Dr. Magnus Egerstedt  
Professor and Steve W. Chaddick Chair  
School of Electrical and Computer Engineering, Georgia Institute of Technology

## Honor Code

### Georgia Tech School of Electrical and Computer Engineering

It is expected that all students in the Georgia Tech School of Electrical and Computer Engineering will maintain the high degree of professionalism held standard for all engineers. We, as engineers, expect academic honesty and integrity from ourselves at all times.

Students shall conduct themselves in a professional manner as described in, but not limited to, the list below, taken from the *IEEE Code of Ethics* and the Georgia Tech Student Conduct Code.

1. Accept responsibility for your actions.
2. Respect and treat fairly your instructors and fellow students regardless of any personal characteristics.
3. Engage in no acts of cheating, as defined by each instructor.
4. BE HONEST:
  - (a) Never lie to or mislead an instructor.
  - (b) Never use improperly acquired information.
  - (c) Never collaborate with others in an unauthorized manner.
  - (d) Never misuse data.
  - (e) Never plagiarize.
  - (f) Never engage in unethical conduct in general.

The Student Advisory Board of the School of Electrical and Computer Engineering generated this Honor Code in October 1992.

In order for any Honor Code to be successful, the EE/CmpE Student Advisory Board feels that the following must be accomplished:

- (1) Require each professor to clearly define cheating for each class. Whatever standards a given professor sets should be handed out in writing to each student at the beginning of each term along with the course syllabus. *Instructors in the School of Electrical and Computer Engineering are expected to provide access to old quizzes and examinations so that students may use them as a study resource.*
- (2) Clearly define and adhere to punishment for anyone caught cheating.

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***IMPORANT - This Honor Code is subject to the provisions of the Institute Honor Code, which became effective October 1996.***

## **Faculty Credo**

### **Georgia Tech School of Electrical and Computer Engineering**

#### UNITY OF PURPOSE

Our purpose is to provide students at all degree levels with highest quality preparation for successful professional careers, and, through dedicated scholarship, to advance our profession. We will contribute to the expansion and responsible application of knowledge to the benefit of society. Our relentless pursuit of these goals will fulfill our vision of a Georgia Tech preeminent in information and telecommunications systems, energy and automation systems, and in the underlying enabling technologies.

#### DIVERSITY OF FUNCTION

We recognize and embrace the technical diversity of our profession. We seek to enhance this diversity by active engagement with relevant associated Georgia Tech and external professional activities. We will encourage cultural diversity within the ranks of the profession by being a leader in the education of minority and women electrical and computer engineers, students attracted and taught by a faculty equally rich in role models.

#### PROFESSIONALISM OF METHOD

We participate in the noblest aspect of a noble profession. We will honor that profession by example, instilling in our students by our own conduct the highest standards of professional behavior.

# **ACADEMIC ADVISEMENT**

## **The Graduate Affairs Office**

With approximately 1,200 undergraduate and 1,200 graduate students, the School of Electrical and Computer Engineering is one of the largest EE/CmpE programs in the USA. Because of the large numbers of both students and faculty, we have established certain policies and procedures in order to operate efficiently. Students should consult this manual and the ECE Graduate Affairs Office staff for policy, procedure and advisement information. Guidance provided by fellow students may not be the most up to date and may be unreliable.

For graduate students, the primary contact with the administration of the School will be through the Graduate Affairs Office, which is located in **Room W-208 of the Van Leer (ECE) Building**. The Graduate Affairs Office is administered by the Associate Chair for Graduate Affairs, Professor Benjamin Klein. The staff in the office consists of Ms. Katrina Patton, Ms. Tschadia Robinson, Dr. Daniela Staiculescu, Mr. Andrew Stargill, and Ms. Tasha Torrence.

The primary functions of the ECE Graduate Affairs Office are:

- Process and make recommendations to the Graduate Admissions Office of the Institute on all applications for admission to the graduate program.
- Process and make recommendations to the ECE school chair on all applications for financial assistance in support of graduate programs.
- Initiate and maintain a file on each incoming graduate student.
- Coordinate the assignment of examination and reading committees for thesis and dissertation activity.
- Receive, process, and validate all petitions and applications for graduate degrees.
- Process information on graduate assistantships and monitor eligibility for tuition waivers.
- Prepare draft requests for student (F and J) visas; assure compliance with Bureau of Citizenship and Immigration (BCIS) and SEVIS rules and regulations.
- Provide academic advisement and guidance to ECE graduate students.
- Make teaching assistantship assignments.
- Issue registration permits for ECE graduate level classes.

The preferred way to contact the ECE Graduate Affairs Office is through the “Contact Us” website at <https://www.ece.gatech.edu/contact-graduate-office-current-students>. Our fax number is 404-894-3047 and the office number is 404-894-2983.

The ECE Graduate Affairs Office provides academic advisement to ECE students in a variety of ways:



## **Daily Advisement Hours**

- Students desiring one-to-one advisement are welcome to visit the ECE Graduate Affairs Office.
- The office staff is generally available from 9:30 a.m. to 12:00 noon and 1:30 p.m. to 4:00 p.m. on Monday through Friday.
- All staff members may not be available during the posted office hours.
- Students wishing to meet with the Associate Chair for Graduate Affairs must make an appointment. An appointment request should be requested at the front desk in Van Leer W208.
- Suggesting dates and times when you could be available for a meeting could speed up the process.

## **New Students**

- New, on-campus ECE graduate students are **required** to attend an orientation program prior to the start of classes.
- The Academic Office holds WebEx orientation sessions for the new Online MS students each fall and spring semester. Online MS residing in the Atlanta area are welcome to attend the on-campus orientation.
- Students admitted into the Georgia Tech – Lorraine (GTL) program or Georgia Tech - Shenzhen participate in the advisement program on their campus.

## **Continuing Students**

- Advisement for continuing students is provided prior to the first phase of registration each term. Advisors are available during the hours listed above for any students needing assistance.

## **Web-based Materials**

- The ECE website ([www.ece.gatech.edu](http://www.ece.gatech.edu)) serves as a means by which students may obtain information about graduate degree requirements, policies and procedures.
- Degree program information, frequently used forms, handbooks, are all available on the Student Resources page of the ECE website (<https://www.ece.gatech.edu/current-students/graduate>).

## **Email Communication**

- At both the administrative and the academic levels, email is the official means of communication with Georgia Tech students. The list [grads@ece.gatech.edu](mailto:grads@ece.gatech.edu) includes the email addresses of all enrolled ECE graduate students. This list is updated after the close of registration each term and is used to send information related to academic issues - policies, procedures, registration or deadlines, etc. - to the entire ECE graduate student body.
- The OIT website <https://lists.gatech.edu/sympa> provides access to the “GT Mailing List Services” site where a variety of subscription-based lists may be accessed. This is the web interface for Georgia Tech's mailing list server, lists.gatech.edu. Using this website, you can subscribe to lists, unsubscribe, manage lists you own, review archives, etc. (The availability of these actions for a particular list will depend on that list's configuration.) If you are a Georgia Tech student, faculty, or staff member, you can log in using your GT Account

username and password. This will allow you to manage lists attached to your published e-mail address.

### **Faculty Advisors**

- Faculty (or research) advisors are not required for students pursuing a non-thesis master degree.
- Ph.D. students and M.S. students choosing the thesis option must have research advisors and are expected to select an advisor early in their degree program.
- Students selecting advisors outside of ECE must have a co-advisor who is ECE faculty.

### **Ph.D. Research Advisor**

- Ph.D. students are expected to select an advisor by the end of the term in which they pass the Ph.D. Coursework Qualifier.
- The advisor selection form is available online at <https://secure2.ece.gatech.edu/PHP/gradforms/login.php>. This form should be submitted as soon as the advisor selection is confirmed.
- Students in the process of choosing an advisor may use the ECE website (<http://www.ece.gatech.edu/research>) for up-to-date information on faculty research interests.

### **M.S. Thesis Advisors**

- M.S. thesis option students should select a research advisor during their first term and no later than the end of registration for their second term in residence.
- The ECE Graduate Affairs Office is informed of the advisor selection by the submission of the signed “Select M.S. Thesis Advisor” form. This form is available through our website at: <https://www.ece.gatech.edu/masters-degrees>
- Only after the submission of the form can the student register for ECE 7000 (M.S. Thesis Research) under the selected advisor.

### **Changing Advisors**

- Circumstances may arise which make it necessary for a student pursuing the Ph.D. or M.S. thesis option degree to change advisors. The decision to change advisors is not to be made lightly. Students considering a change of advisor are urged to meet with the Associate Chair for Graduate Affairs for guidance before making a change. It is important that all involved (student, current advisor and new advisor) are aware of the situation and that a mutually acceptable resolution results from the change of advisor.
- Students are expected to make good progress in completing their chosen degree program. A single change of advisor, where warranted, is understandable. Multiple advisor changes are viewed as an indication of poor degree completion progress and may have a negative impact on the student’s funding and future academic status.

# **REGISTRATION**

## **Registration Structure**

### **New Student Information Sessions**

- Prior to the start of each term, ECE holds a general advisement session for students entering our graduate program. The specific dates and times of these sessions are announced to new students approximately four to six weeks before the term starts. Attendance at the advisement sessions is mandatory, even for recent bachelor degree graduates of Georgia Tech.
- Other Georgia Tech entities may also provide orientation/advisement sessions. Students are expected to be aware of these programs and to participate in those that apply to them.
- ECE makes every effort to schedule our advisement program so that it does not interfere with other sessions that ECE students may be required to attend.

### **Web-based Registration**

- Registration for classes takes place on-line through the Georgia Tech's OSCAR ("On-line Student Computer Assisted Registration") system at <https://oscar.gatech.edu/>.
- The Registrar's Office staff is available to handle questions regarding registration from 9:30 a.m. to 3:30 p.m. Monday through Friday during registration periods.
- Registration-related questions may be sent to [comments@registrar.gatech.edu](mailto:comments@registrar.gatech.edu) or filed through the registrar's "Contact Us" site at: <http://www.registrar.gatech.edu/contact.php>.
- Additional registration assistance and/or information may be found at [www.registrar.gatech.edu](http://www.registrar.gatech.edu) under the "Registration" or "Student" tabs.

Registration at Georgia Tech is divided into two phases:

### **Phase I Registration**

**Phase I is for continuing students and internship students at work.**

- Specific dates for this phase of registration are available on the OSCAR System and through the Registrar's website (<http://www.registrar.gatech.edu>).
- Current graduate students, especially those holding graduate research or teaching assistantships, are expected to register during Phase I.
- To provide maximum access to ECE graduate classes for our students, all ECE graduate level classes are restricted to ECE majors through the first phase of registration.
  - Major restrictions are lifted after all ECE students have had ample opportunity to register.
  - Failure to register during Phase I can limit access to popular ECE classes.
  - Registering during Phase I enables the ECE administration to assess expected enrollments. Classes may be cancelled due to low enrollment in Phase I registration enrollment.

### **Phase II, Registration/Schedule Changes**

- Newly admitted students, readmitted students, and continuing students who need to make schedule adjustments register during Phase II.
- Specific dates for this phase of registration are available on the OSCAR System and through the Registrar's website (<http://www.registrar.gatech.edu>).
- This registration period runs through Friday of the first week of classes for the term.

- All students are required to pay their tuition and fees no later than the Monday after registration is closed. Failure to do so will result in a late fee being added to the assessment for the term.
- Students who were not able to finalize their schedule during Phases I must do so during Phase II.
- **Phase II is the last chance students have to add courses to their schedules or to change hours on variable hour classes (for example: ECE 8997, 8998, 7000, 8900, 9000).**
- Students may change the grade basis of classes listed with multiple grade options (e.g. letter grade, pass/fail, and audit). Changes from letter grade to audit can be made through the close of registration in each term. Changes from letter grade to pass/fail may be made through drop day of the term. However, ECE classes are generally offered with a single grade basis, so this option may not be available for ECE classes. Please check degree requirements before changing to an audit or pass/fail basis for a course.
- There is **no way** to add classes after registration for the term closes at 4:00 p.m. on Friday of the first week of school.
- Students should be aware of the difference between *schedule changes* made prior to the close of the final phase of registration for a term and *withdrawing from (or dropping)* a course between the close of registration and "Drop Day."

### Registration Restrictions

- A student attempting to register for classes may not be able to do so because of registration restrictions that have been placed by an academic or administrative unit at Georgia Tech. A permit must be issued by the unit that placed the registration restriction before one is able to register.
- A registration hold may prevent registration until required documentation is provided to the Institute or a change in the student's status or classification is made.
- The ECE Academic Affairs Office is able to assist in dealing with restrictions, but it may be necessary to seek assistance from another academic or administrative unit in some cases.

Some of the registration restrictions that students may encounter include:

### Campus Restriction

- Georgia Tech classes are offered on campus in Atlanta, at Georgia Tech Lorraine in France, at Georgia Tech Shenzhen in China, and the Online Master's Degree.
- Registration is structured so that students can only register for the classes taught through the specific program and/or at the specific campus to which they were admitted.
- **Students who attempt to register for classes in a program other than the one in which they are enrolled will receive a "CAMPUS RESTRICTION" error message.** A student cannot take classes on different programs/campuses during the same term.

### Major Restriction

- Academic units may place enrollment restrictions on their classes to ensure that students in their major area have full access to the classes they offer. For example, ECE graduate level classes are restricted to ECE majors until the Monday of the second phase of registration. This way we can be sure that ECE students have access to our classes.
- Each academic unit determines its own criteria for awarding permits. **Students attempting to register for classes with this restriction receive a "MAJOR RESTRICTION" error message.**

- Permits to override the “Major Restrictions” can only be issued by the academic unit that offers the classes.
- Additional information regarding “Major Restrictions” can be found on OSCAR.
- The academic affairs office of the unit offering the class is also a good place to ask for a major restriction permit.

#### Maximum Hours Restriction

- The maximum number of hours for which a student may register in fall or spring semester is 21; in summer term the maximum allowed is 16.
- **Students attempting to register for more hours will receive a “MAXIMUM HOURS EXCEEDED” error message** and must see the Registrar’s Office to request an exception.
- Students wishing to be approved for this exception should advise the ECE Graduate Affairs Office of their plans, as the Registrar’s Office will contact us for additional information regarding the request.

#### Permit Required

- Some classes are set up so that no one can register for them without permission. **Students attempting to register for classes with this restriction receive a “PERMIT REQUIRED” error message.**
- In ECE, Special Problem (ECE 8901, 8902, 8903) classes are restricted to those with registration permits. ECE 8999 (Search for a Research Topic and/or Advisor) and ECE 8022 (Professional Communications Seminar) are also offered on a permit-only basis.
- The “permit required” restriction for classes offered by other academic units can only be handled by the unit offering the class.

#### Time Conflicts

- **Students attempting to register for two classes that meet at the same time will receive a “TIME CONFLICT WITH XXXX” error message.**
- Assuming that the instructors of both classes are willing to accommodate a student in this situation, a permit to register for both classes may be obtained. A time conflict form has to be signed by the student and both instructors to receive this permit.
- Students with “time conflict” permits must adhere to the on campus schedule for each class unless other arrangements are made with the faculty instructor(s).

#### Prerequisite Restriction

The faculty of the School of ECE expect that graduate students’ knowledge of mathematics should be equivalent or superior to that of a Bachelor’s degree recipient in Electrical or Computer Engineering at Georgia Tech. This expected mathematics knowledge includes the content of the following Georgia Tech courses:

Math 1551: Differential Calculus <http://math.gatech.edu/courses/math/1551>

Math 1552: Integral Calculus <http://math.gatech.edu/courses/math/1552>

Math 1553: Introduction to Linear Algebra <http://math.gatech.edu/courses/math/1553>

Math 2551: Multivariable Calculus <http://math.gatech.edu/courses/math/2551>

Math 2552: Differential Equations <http://math.gatech.edu/courses/math/2552>

It is recommended that a graduate student who has not taken these courses or their equivalent at other institutions should acquire this mathematics knowledge in order to be successful in ECE graduate courses.

The course listings in the General Catalog of Georgia Institute of Technology (<http://www.registrar.gatech.edu>) and on-line at <https://oscar.gatech.edu/> contain information regarding class prerequisites.

- Prerequisite requirements for graduate level (6000 and higher) classes are not hard-wired into the registration system. Students taking graduate classes may register for and take classes for which they do not have the specific prerequisite. Graduate students lacking prerequisites (or who are unsure as to whether they have the required background) for a graduate level class are encouraged to contact the course instructor for an assessment of their background before registering for the class.
- Prerequisite requirements for undergraduate level (1000-4999) classes are hard-wired into the registration system.
  - **Students attempting to register for classes with this restriction receive a “LACKS PRE-REQUISITE” error message.**
  - Permits for ECE undergraduate classes are handled by the **undergraduate advisors** in the ECE Academic Affairs Office.
  - Graduate students seeking to enroll in undergraduate classes with prerequisites must file a registration permit through the web-based permit request system found at [https://secure.ece.gatech.edu/overloads\\_permits/](https://secure.ece.gatech.edu/overloads_permits/)
  - The ECE undergraduate advisors may require that students requesting prerequisite permits meet with them before a registration permit is awarded.
- Prerequisite permits for classes in areas other than ECE are handled by the schools or departments offering the classes.

### Course Overload Policy

A specific number of registration spaces are allotted for each class offered through Georgia Tech. When the number of students enrolled in a class reaches the allotted number, registration for that class is closed.

- **Students attempting to register for classes that are closed will receive a “CLOSED SECTION” error message.**
- Although ECE graduate level classes are very popular with ECE and non-ECE graduate students as well as some upper class undergraduate students, **we do not accept requests from students to be considered for overloads into our graduate level classes.** ECE makes every reasonable effort throughout registration to manage enrollment availability in order to accommodate as many ECE students as possible in our courses.
- Students attempting to register for a graduate class that is full should continue to monitor registration for openings. It is common for spaces to become available in classes that once appeared to be filled to capacity. This is especially true after the first few days of classes and throughout the final phase of registration.

- To seek permission to register for a non-ECE course that is closed, students should contact the school or department offering the course and follow that academic unit's overload procedure. Contact information for other academic units can be found in OSCAR.

### Registration Holds

Registration holds are used by various Georgia Tech academic or administrative units as a way to get the attention of students. When a hold is issued, students cannot register for classes, remove classes from their schedules, withdraw from school, etc. A hold may even prevent graduation. A very brief explanation of the reason for the hold and an indication of the unit placing the hold are indicated in OSCAR.

- **Holds can only be removed by the academic unit that placed the hold.**
- Although the ECE Graduate Affairs Office can only remove holds that we have placed, we can help determine which unit placed a non-ECE hold if that is not clear.
- To have a hold removed so that one may register (drop a class, withdraw from school, etc.), it is necessary to contact the unit that issued the hold.
- Graduate students with registration holds placed by ECE must contact us via email through the "Contact Us" site <https://www.ece.gatech.edu/content/contact-graduate-affairs-office-current-students> or by coming to the ECE Graduate Affairs Office during regular office hours.

### Proper Registration

Students who use the facilities and/or the services of Georgia Tech's personnel (faculty, staff) in a term must be registered. Only students who have been approved for enrollment waivers in their graduating term or who are taking a term off from school are able to not be enrolled in a term.

- Full-time enrollment for graduate students is defined as a minimum of 12 hours, at least 9 of which must be on a letter grade and/or pass fail basis. This status applies to the following groups of students:
  - International students (on F1 or J1 visas)
  - Students supported on fellowships, scholarships, and/or other sponsorships that require full-time enrollment to be eligible to receive funds
  - Students supported with Graduate Research or Teaching Assistantships
- All students who are working on research should register for 21 hours in the fall/spring and 16 hours in the summer.
  - Ph.D. students who have passed the Coursework Qualifier and selected a research advisor should register for ECE 9000.
  - M.S. thesis students should register for ECE 7000. Non-thesis M.S. students **should not register** for ECE 7000.
  - Students who are working on research but are not eligible to register for thesis hours should sign up for ECE 8900 under the professor who is directing their research.

- All students who are registered for ECE 9000, ECE 7000 and ECE 8900 and are GRAs or funded by an entity that requires full time status should register for 21 hours in fall/spring and 16 hours in the summer.
- Students who are searching for a research advisor or research topic should register for ECE 8999, which is a permit-restricted class. For more details on ECE 8999 restrictions see “Variable Credit Hour Courses”.
- Students who are GTAs should register for ECE 8997 and GRAs for ECE 8998.

### **WARNING:**

- Students who have received a tuition waiver have to be enrolled full time. **Full time status has to be maintained after dropping classes with a W grade.** Students who are not enrolled full time or who lose the full time status after dropping classes will lose their tuition waiver and will be charged full tuition (around \$15,000 for out of state students). Additionally, international students who lose full time status will fall out of compliance with their visa status and will be required to leave the country until their status is cleared.
- Summer Term: All of the above requirements are in place during the summer semester, as summer is considered a standard term for Georgia Tech. Students who are on-campus in summer term and meet one or more of the criteria above are expected to be registered on a full-time basis during that term as well.
  - International students (on F1 or J1 visas) may take summer term as a vacation term and may be permitted to register on a part-time basis in summer without jeopardizing their visa status. Visa requirements are independent of GTA/GRA requirements.
  - If students plan to be away from campus for a large part of the summer and, therefore, are not eligible to register as a full time student cannot hold GRA/GTA positions. They might be eligible to be hired as an hourly employee. Note that hourly employees are very limited in the number of hours that they are allowed to work.

### **Change Course Grade Basis**

In order to be able to make a change in the grade basis of a course, it must be offered with multiple options (letter grade, pass fail, and/or audit). With the exception of marker courses, ECE classes are only offered on a letter grade basis.

Care should be taken to remain within the degree requirements when seeking to make grade basis changes for both ECE and Non-ECE classes. One could delay completion of the degree by opting to take a class on a pass fail or audit basis. ECE restricts the use of pass fail hours toward graduate coursework requirements and does not approve the use of audit hours other than those associated with the marker courses.



## **COURSES AND SCHOLASTIC REQUIREMENTS**

The information in this section is a synopsis of general graduate school requirements, especially those policies for which there are special ECE requirements. Additional information regarding specific Institute rules and regulations may be found in the Georgia Institute of Technology General Catalog. The information in this handbook is by no means exhaustive; students are **required** to be familiar with policies, rules, and regulations as recorded in the General Catalog available at <http://www.catalog.gatech.edu>. The Student Rules and Regulations (<http://www.catalog.gatech.edu/rules/>) section of the catalog is especially useful for students.

### **Academic Standing**

Students whose grades and/or grade point averages fall below the applicable minimums in any term will have academic standings of “Warning,” “Probation,” “Review,” or “Dismissal” depending upon their specific situation. The Georgia Institute of Technology General Catalog at <http://www.catalog.gatech.edu/> provides the official description of these academic standings and their consequences.

**ECE students whose overall and/or term grade point average is below that required by the Institute will be contacted by the Associate Chair for Graduate Affairs to discuss their progress and plans for improving their academic performance.**

### **Withdrawal from Classes**

Withdrawing from (or dropping) a course is a serious decision. Students are expected to make good progress toward completing their degrees. Graduate Research and Teaching Assistants, students holding F or J Visas or on fellowships, and active duty military are expected to be full-time students.

- A Georgia Tech student is entitled to withdraw from a course during the early weeks of the term. Students withdrawing from classes after the close of registration for the term will receive "W" grades in the classes from which they withdraw. **Students who must have full time status must make sure that they will retain that full time status after the withdrawal.**
- The exact date of the deadline for withdrawal from classes is posted in the **Official School Calendar** (<http://www.registrar.gatech.edu>) and are also found on the OSCAR system. **It is each student's responsibility to know the exact deadline for each term.**
- Students withdraw from classes electronically through the OSCAR System. Prior to dropping a class, all students are encouraged to check with an Academic Advisor if their full time status and/or degree progress will be affected by dropping the class. If you are not sure, **ALWAYS** ask an Academic Advisor! You can send your inquiry online at <https://www.ece.gatech.edu/content/contact-graduate-affairs-office-current-students> or visit the Academic Office during office hours.

### **Withdrawal from School**

A student who needs to **leave school** does so by withdrawing from **all classes**.

- **Students are responsible for completing the electronic withdrawal from school before the official (Institute) deadline.**
- **Full-time graduate students who withdraw from school during a term are required to remain out of school in the following term as well.** A petition to the faculty (available on the registrar's website) requesting a waiver of this requirement may be filed.
- If the student is not registered in **two consecutive terms** (including the one in which the withdrawal occurred), an application for readmission must be filed. An application fee is charged when submitting an "Application for Readmission."
- Part-time graduate students who withdraw during a term are not required to remain out of school for an additional term.

### **Readmission**

- Any student in "Good" academic standing who is not enrolled for a single term (fall, spring, or summer) is eligible to re-enroll without applying for readmission to the Institute.
- Any student who is not enrolled for two or more consecutive terms (including summer) must apply for readmission.
- An "Application for Readmission" form is used for this purpose and can be obtained by accessing <http://www.registrar.gatech.edu> and clicking on "Forms and Student Records," then "Readmission" and following the directions provided. A fee will be charged for readmission.
- For purposes of readmission, there is **no distinction** between the terms of the regular academic year (fall and spring) and the summer term.

### **Graduate Level Course Structure**

ECE's graduate level courses are grouped among 11 Technical Interest Areas (TIAs), listed below. For a list of the current classes under each TIA, check the projected class schedule on the ECE website at [http://www.ece.gatech.edu/academics/graduate/course\\_schedule.pdf](http://www.ece.gatech.edu/academics/graduate/course_schedule.pdf).

**Bioengineering (BioE)**

**Computer Systems & Software (CSS)**

**Digital Signal Processing (DSP)**

**Electrical Energy (EE)**

**Electromagnetics (Emag)**

**Electronic Design & Applications (EDA)**

**Nanotechnology (Nano)**

**Optics & Photonics (Opt)**

**Systems & Controls (S&C)**

**Telecommunications (Comm)**

**VLSI Systems & Digital Design (VSS)**

## Cross-Listed Courses

The term "cross-listed courses" is used in two different ways in the School of Electrical and Computer Engineering.

- Some ECE courses are cross-listed between two ECE technical interest areas.
  - Students using these classes toward the degree program must be especially careful not to overlook the cross listing when planning the programs of study since there are limitations on how cross-listed courses can be used to satisfy degree requirements. The cross-listed courses are indicated in the TIA Course listings of this handbook. For details on degree requirements for the M.S. and for the Ph.D., consult those sections of this handbook.
- The other use of "cross-listed courses" has an Institute-wide connotation and refers to classes that are offered with the same number and same course content in more than one discipline. (For example: ECE 6789 is also listed as BMED 6789, CHE 6789, ME 6789 and MGT 6789.)
  - These classes generally have course numbers beginning with "67," but not all "67xx" courses are cross-listed.
  - The Georgia Tech General Catalog indicates which "67xx" courses are cross-listed and the disciplines with which they are cross-listed.
  - Classes that are cross-listed with ECE cannot be used toward the minor requirement for the Ph.D. degree.

Examples ECE courses cross-listed with other disciplines are as follows. To confirm that a specific class is cross-listed, check the current term on Oscar.

<b>Course #</b>	<b>Course Name</b>	<b>TIA(s)</b>	<b>GT Cross Listing</b>
6771	Optoelectronics: Materials, Processes, Devices	Opt/Nano	Physics
6780	Medical Image Processing	Bio/DSP	Computer Science and BME
6767	Quantitative Electrophysiology	Bio	BME and Physics

## GTA/GRA Marker Courses:

- GRAs must sign up for ECE 8998, which is a one credit hour audit course that shows up on a transcript indicating the GRA status.
- GTAs must sign up for ECE 8997, which is a three credit hours audit course that shows up on a transcript indicating the GTA status.
- In addition, all GTA/GRAs must be registered full time.

## Variable Credit Hour Courses:

There are several variable credit hour courses. The default is usually 1 credit hour when students try to register for the courses, so students must change the number of credits when they register. Many of these courses allow up to 21 hours, and we ask all students who plan to take these courses to sign up for the maximum load, which is 21 hours in fall/spring and 16 hours in summer.

- Research Hours: Students undertaking research must register for research hours to document their activities on their GT transcript, and should register for 21 hours in the fall/spring and 16 hours in the summer.
  - ECE 9000 Ph.D. Thesis (P/F): Doctoral degree students who have passed the Ph.D. Coursework Qualifier, have selected a research advisor, and have submitted the Ph.D. Advisor Selection form online should register for Ph.D. dissertation hours (ECE 9000) under their advisor.
  - ECE 7000 M.S. Thesis (P/F): Master's degree students who are taking the "Thesis Option" should register for M.S. thesis hours (ECE 7000). M.S. thesis option students must also provide a completed M.S. Thesis Advisor Selection form to the ECE Graduate Affairs Office before registering for ECE 7000 hours.
  - ECE 8900 Special Problems (P/F): Students who do research under the supervision of an ECE faculty member and are not pursuing the M.S. thesis option degree or have not passed the Ph.D. Coursework Qualifier may register for the section of ECE 8900 assigned to their research advisor. This course is pass/fail and does not count towards degree credit. It should not be confused with ECE 8901, ECE8902, and ECE8903, also called "Special Problems", which are letter grade courses.
- ECE 8999 Ph.D. Dissertation Preparation (P/F): For students who are seeking an advisor or a research topic. This class is permit only and can be taken for a maximum of 9 credit hours. It is limited to one semester for M.S. students who seek a M.S. Thesis advisor and to two semesters for Ph.D. students who seek a Ph.D. advisor.

### Special Problems Hours

Special Problem hours, ECE 8901, ECE 8902, ECE 8903 and CS 8903 are independent study courses under the direction of a faculty supervisor. Special Problem courses are an excellent way to get to know faculty members and to become involved in research that is going on at Georgia Tech. Please note that students may not count Special Problems course credit towards their degree if they simultaneously were paid for doing the work (as a GRA or as a Graduate Assistant) or if they were registered for thesis hours to do the same work.

- Master's students may include up to a total of six special problem credits in their graduate program as free elective hours.
- Ph.D. students, under specific circumstances and with approval by the Associate Chair for Graduate Affairs, may use up to six hours of special problem credits as free elective hours in their graduate programs.
- A registration permit is required to be able to register for special problem hours.
- The last digit in the course number refers to the number of credit hours awarded for the ECE Special Problem; i.e. 8901 = 1 credit, 8902 = 2 credits, and 8903 = 3 credits.
- CS special problem hours can also be used towards the elective course requirements, both for M.S. and Ph.D. students. CS 8903 is a variable hour course that has to be taken for letter grade. ECE accepts CS 8903 only for 1, 2 or 3 credit hours and only with the letter grade option. Please visit the Academic Office before taking a special problem in CS that you plan to use towards your degree requirements.
- Students wishing to undertake a special problem should
  - Meet with a faculty member and define a research problem.
  - After the problem is defined a special problem form is prepared and signed by the student and faculty advisor. The forms are found as follows:

- ECE <https://www.ece.gatech.edu/coursework-planning>
- CS [https://www.cc.gatech.edu/sites/default/files/images/8903\\_coc\\_special\\_problems\\_1.pdf](https://www.cc.gatech.edu/sites/default/files/images/8903_coc_special_problems_1.pdf)
- Paper versions of the special problem form can also be found in the ECE/CS Academic Affairs offices.
- A one-page proposal of the problem is included with the special problem form. The proposal should state the problem, study method to be applied, and expected results.
- The completed paperwork is submitted to the Graduate Affairs Office for approval. Once approved, a registration permit will be issued for the particular faculty member's section.

### Audit Hours

- The GRA/GTA marker courses ECE 8998 and 8997 are the only audit hours that ECE students should be using toward their full-time course loads.
- ECE classes are not offered on an audit basis, therefore, no ECE courses other than 8997 and 8998 can be scheduled on an audit basis.
- Students wishing to take classes in other schools or departments on an audit basis must contact that school to inquire if this is possible.
- Since ECE classes are only offered on a letter grade basis, students wishing to take an ECE class on an audit basis may only do so informally by “sitting in” on the class in agreement with the class instructor.

### Seminar Courses

- Seminar courses are one credit hour pass/fail courses. Some of the following courses may be allowed to be used as free electives (M.S. and Ph.D. degree requirements differ): ECE 8001, ECE 8002, CS/CSE 800x, ECE 8022, ECE 6792, PHIL 6000.

**PLEASE NOTE:** Throughout the Master of Science and Ph.D. degree sections which follow in this handbook, the term “6000 level” is used frequently when referring to graduate classes. Included under the heading of “6000 level” are courses at the 7000 and 8000 levels. An indication that a “6000 level class” is needed to meet a requirement, means that an appropriately approved 7000 or 8000 level class may also be used.

It should be further noted that **not all ECE 6000, 7000, 8000 level courses are approved** for use toward the graduate degree coursework requirements. Specific notations as to the type of classes that must be used to fulfill requirements are indicated in the information that follows.

## **THE MASTER OF SCIENCE DEGREE**

The School of Electrical and Computer Engineering offers an extensive graduate program encompassing a broad range of areas of specialization. When designing the M.S. curriculum, the ECE faculty intended that the graduate degree requirements would be flexible enough to meet the individual needs of ECE graduate students while at the same time insuring that all graduates complete a well-rounded program of study that will support their professional goals. The school offers two options: a thesis option and a non-thesis option.

### **M.S.E.C.E Degree Requirements**

The following table summarizes the requirements for the Masters degree in the School of Electrical and Computer Engineering.

<b>Requirement</b>	<b>Class Hours (Non-Thesis Option)</b>	<b>Class Hours (Thesis Option)</b>
Group I - ECE 6000 level classes in one or two Technical Interest Areas (TIAs)	9	6
Group II - ECE 6000 level classes, at least two of which come from TIA(s) other than those in Group I	9	6
Group III - Elective Hours (4000 level or above)	12	6
M.S. Thesis Research	0	12
Total Hours	30	30

#### **Groups I and II – Selection of ECE 6000 Level or Higher Classes**

6000-level or higher ECE courses offered by specific TIAs can be used to satisfy these requirements, including Special Topics courses.

- Technical Interest Areas (TIAs) are groups of related courses within electrical and computer engineering and include: Bioengineering, Computer Systems & Software, VLSI Systems & Digital Design, Digital Signal Processing, Electrical Energy, Electromagnetics, Electronic Design & Applications, Nanotechnology, Optics & Photonics, Systems & Controls, and Telecommunications.
- Nine hours of 6000 level or higher coursework in one or two Technical Interest Areas (TIAs) are needed to fulfill the Group I requirement for non-thesis master's candidates and six hours for the thesis master's students.
- In Group II, at least six hours of 6000 level or higher coursework must be completed outside the TIA(s) of Group I. These courses must not be cross-listed with the TIA(s) chosen for Group I. Group II classes may be selected from one, two or three TIAs, provided degree requirements are met. ECE courses not designated to belong to a TIA cannot be used for Group II or Group II requirements.

- To verify the technical interest area of a particular course, look at the course listings in the “Graduate Level Course Structure” Section of this manual or on the ECE website at [https://www.ece.gatech.edu/courses/course\\_menu](https://www.ece.gatech.edu/courses/course_menu).
- To determine the TIA of a Special Topics course, students may examine the Projected Course Schedule available on the ECE website at [http://www.ece.gatech.edu/academics/graduate/course\\_schedule.pdf](http://www.ece.gatech.edu/academics/graduate/course_schedule.pdf)
- Pass/Fail, audit, and Special Problems courses cannot be used to satisfy Group I and Group II requirements.
- M.S. students planning to pursue the Ph.D. degree should note that all nine hours of classes in Group II must be from TIAs other than those in Group I to fulfill the Ph.D. coursework requirement.

### Group III (Electives): 12 Hours

- These hours may be selected from most disciplines offered at Georgia Tech (including ECE). Students choosing elective hours outside of ECE or other technical/engineering/math/science disciplines may be asked to justify their choices.
- No courses below the 4000 level can be used toward Group III (Electives) or any other portion of the M.S. program.
- In the thesis-option M.S. degree, only 6 Group III ECE electives are needed. The rest of the degree requirement is fulfilled by 12 hours of 7000 hours (M.S. thesis research).
- Special Problems courses, ECE8901, ECE8902, and ECE8903 (but not ECE8900), and CS 8903 can be used to satisfy Group III requirements only for the non-thesis option.
- Pass/fail hours may only be used in the Group III portion of the program, and no more than **three** hours of pass/fail coursework may be used toward the non-thesis M.S. degree. The **only** pass/fail courses that are acceptable elective hours are the ECE seminars (ECE 6792, 8001, 8002, 8022), CS/CSE seminars (CS/CSE 800x) or PHIL 6000 (Responsible Conduct of Research).
- Ph.D. students, who have completed the Professional Communications Seminar (ECE 8022) and are petitioning for an M.S. degree, may use ECE 8022 as one of the three pass/fail classes that may be used in the elective portion of their M.S. degree requirements.

### General Requirements

- A minimum grade of “C” is required in all classes used toward the master’s degree.
- A master’s degree student must have a minimum GPA 2.70 in order to graduate. Georgia Tech does not round GPAs, they truncate them. So a 2.67 is not sufficient to graduate.
- A cumulative grade point average of 2.70 must be maintained to remain in “Good” academic standing in the M.S. program.
- **No more than 9 hours of 4000 level courses** can be used toward a graduate level ECE degree.
- ECE 8900, 8997, 8998, 8999, 9000 and CETL courses cannot be used to satisfy degree requirements



## Thesis Option

- Students registered for M.S. thesis hours are expected to complete the M.S. thesis option degree. However, circumstances might arise that impede the completion of the thesis. The student is allowed to switch to non-thesis option if in agreement with the thesis advisor, but will not be able to count any of the thesis hours toward the non-thesis degree requirements.
- Students choosing the M.S. thesis option must complete a **minimum** of 12 hours of ECE 7000 to meet degree requirements. These hours are shown in the Group III (Electives) portion of the M.S. coursework plan.
- Thesis option students are required to have a research advisor who will indicate their commitment to serve as advisor by signing the "M.S. Thesis Advisor Selection" form and submitting the completed form to the ECE Graduate Affairs Office.
- M.S. thesis option students present a research review (proposal) to their M.S. Thesis Committee (research advisor and two additional ECE faculty members) when a significant portion of their research is completed.
- The research advisor determines the manner in which this review is to be presented.
- After the research progress is reviewed, the committee provides a signed "Masters Thesis Topic Approval" form to the ECE Graduate Affairs Office for processing. The form has to be submitted together with a Thesis Summary of 5 to 10 pages.
- **There must be a minimum of 90 days between the submission of the Masters Thesis Topic Approval form and the submission of the Certificate of Thesis Approval.**
- Detailed guidelines related to the M.S. thesis option degree, along with a link to the M.S. Thesis Topic Approval Form, can be found on the ECE website at: <https://www.ece.gatech.edu/masters-degrees>.
- Georgia Institute of Technology thesis preparation and submission guidelines are available at: <http://grad.gatech.edu/theses-dissertations>.
- The links for all the above listed documents and forms, along with a checklist, are available at <http://www.grad.gatech.edu/theses-dissertations-forms>.
- The format of the thesis and other related reporting are controlled by the Graduate Studies – VPR office (Savant Building). The student must keep in touch with that office in order to insure that all degree requirements are met.
- The Graduate Studies – VPR office strongly urges M.S. thesis students to have their thesis format checked before submitting the final version of the thesis to them. A thesis checking deadline is posted on their website at: <http://www.grad.gatech.edu/theses-dissertations-deadlines>.
- If, at any time, there is uncertainty about the M.S. thesis process, check with the ECE Graduate Affairs Office. Do not rely on secondhand information!

## RCR Requirement for M.S. Thesis

- The Responsible Conduct of Research (RCR) Academic policy requires M.S. students enrolled in 7000 thesis hours to complete the appropriate RCR training requirement before the Request for Approval of Master's Thesis Topic Form can be processed.

- **First Option** - Successfully complete the online CITI RCR course <https://rcr.gatech.edu/online-training>
- OR
- **Second Option** - Successfully complete an in-person requirement - PHIL 6000 has been approved for ECE doctoral students and may also be used for M.S. Thesis students. ECE does not have its own in-house RCR course, but it will accept an academic program's in-house RCR training approach (Please see the Ph.D. section of this handbook for approved courses).

## **M.S. in Cybersecurity**

Starting Fall 2018, graduate students in the School of Electrical and Computer Engineering may pursue the Master of Science in Cybersecurity with an Energy Systems track (M.S.C.S.E.C.) degree.

The Master of Science in Cybersecurity degree requires 32 credit hours of coursework (including a 5 credit practicum project course). Two of the core courses, which students in each track will take, will provide a broad overview of technology and policy dimensions of cybersecurity. The flexible core course will provide breadth because it must come from a track separate from the one in which a student is enrolled. Finally, a practicum project (5 credit hours) with common learning objectives across all participating units is a core requirement.

The M.S.C.S.E.C. degree requirements are as follows:

### **Core Courses: Group I**

<b>Course #</b>	<b>Course Name</b>	<b>Hrs</b>
CS 6035	Introduction to Information Security	3
<u>CS/MGT</u> <u>PUBP 6725</u>	Information Security Policies	3
CS/ECE/ PUBP 6727	Information Security Practicum	5
CS/PUBP 6XXX	Flexible core course – 3-hour course must be different from ECE's track – (To meet this requirement, a student must complete a required course from a specialization track that is different from the one in which they are enrolled).	3
	<b>Total Core Course Hours</b>	<b>14</b>

### **Energy Systems Track: Group II**

<b>Course #</b>	<b>Course Name</b>	<b>Hrs</b>
ECE 6320	Power Systems Control and Operation	3
ECE 88x3	Introduction to Cyber-Physical Electrical Energy Systems // Cyber-Physical Security in Electric Energy Systems	3
ECE 88x3	Introduction to Cyber-Physical Systems Security	3
ECE 6150	Computational Aspects of Cyber-Physical Systems	3

OR ECE 8803 - CPS	OR Cyber Physical Design and Analysis	
	<b>Total ECE Track Hours</b>	<b>12</b>

**Electives: Group III - Select Two Courses from List Below**

<b>Course #</b>	<b>Course Name</b>	<b>Hrs</b>
ECE 6550	Linear Systems and Controls	3
ECE 6607	Computer Communication Networks	3
ECE 6615	Sensor Networks	3
ECE 6102	Dependable Distributed Systems	3
ECE 88x3	Advanced Computer Security	3
ECE 6323	Power System Protection	3
ECE 88x3	Principles of Smart Electricity Grids // Smart Electricity Grids	3
ECE 88x3	Software Vulnerabilities and Security // Advanced Topics in Malware Analysis	3
ECE 88x3	Hardware Security // Advanced Hardware Oriented Security and Trust	3
	<b>Total Elective Hours</b>	<b>6</b>

**TOTAL DEGREE REQUIREMENTS**

**32**

More details about the program can be found on the Institute for Information Security and Privacy (IISP) website at <http://www.iisp.gatech.edu/master-cybersecurity-course-listing>.

**Degree Completion Progress**

Graduate students in the ECE degree programs are expected to make diligent progress toward completion of degree requirements. It is in the best interests of both students and faculty for all students to progress through the program expeditiously. The following recommendations indicate reasonable progress in the M.S. program:

Non-thesis Option

- A full-time Master’s student seeking the non-thesis M.S.E.C.E. should complete all degree requirements in a maximum of three semesters of enrollment, not counting summer terms, or a maximum of four semesters of enrollment if that student participates in the Internship program.
- It is possible to complete the requirements in fewer terms.
- Students are permitted to spend one regular (non-summer) semester as an intern in an industrial or government position during their program of study. For more information about the internship program please refer to the “Graduate Internship Program” section of this handbook.

Thesis Option

- A full-time Master’s student seeking the thesis-option M.S.E.C.E. should complete all degree requirements in four semesters of enrollment, not counting summer terms.
- Students are permitted to spend one regular (non-summer) semester as an intern in an industrial or government position. For more information about the internship program please refer to the “Graduate Internship Program” section of this handbook.

## **Transfer Credits**

- Up to six semester hours of graduate-level credit from another graduate school in the United States or an international partner school may be transferred toward the ECE M.S. degree. The grades for classes to be transferred must be at the “B” level or higher.
- 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.
- A completed “Request to Transfer Classes” form, original transcript showing completion of the class(es), and a syllabus and other descriptive materials must be submitted to the Academic Office for use in arranging transfer credit.
- An original letter from the registrar of the institution where the classes were taken must be provided. This letter certifies that the classes to be transferred were not used toward any degree at that school.
- The ECE Faculty will evaluate this material and make a decision. Not all classes completed elsewhere will be allowed to transfer.

## **Change from M.S. to Ph.D.**

Students admitted as M.S. who want to switch to Ph.D. will have to apply to the ECE Academic Office in order to be considered alongside the other applicants to the Ph.D. program.

M.S. students who wish to be admitted into the Ph.D. program have to meet the following requirements:

- Pass the Ph.D. Coursework Qualifier
- Find a research advisor
- Have a funding source
- Maintain a 3.5 graduate GPA

The following papers will have to be submitted to the Academic Office for approval prior to filling out a Change of Major form with the Registrar’s Office:

- Advisor selection form (online, VPN needed if not on a GT computer)  
<https://secure2.ece.gatech.edu/PHP/gradforms/login.php>
- Recommendation letter from the Ph.D. advisor
- Proof of funding
- Statement of purpose form  
<https://www.ece.gatech.edu/sites/default/files/documents/grad/Change-from-MSECE-to-Ph.D.-ECE.pdf>

Additional requirements, to be verified in the Academic Office, are:

- Pass the Coursework Qualifier
- Maintain a 3.5 minimum graduate GPA

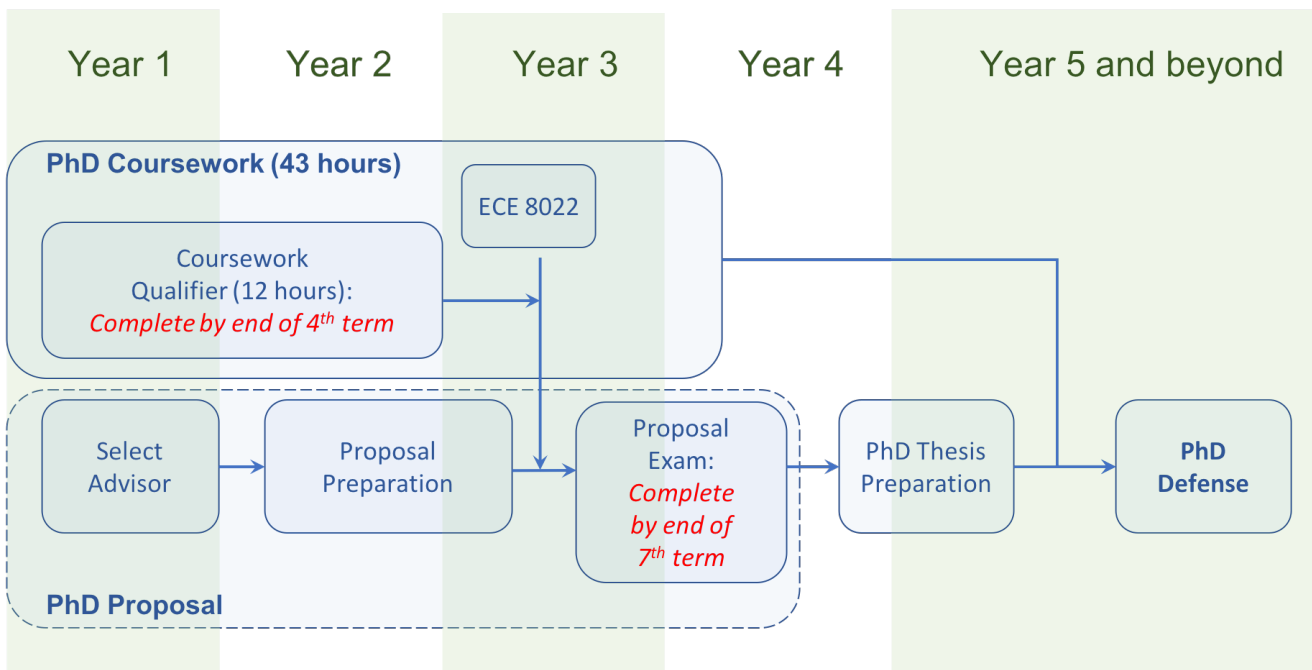
## THE PH.D. DEGREE

The Doctor of Philosophy degree requires concentration in a particular area of electrical or computer engineering as well as demonstrated mastery over the fundamentals of electrical and computer engineering. It is awarded in recognition of demonstrated proficiency and high achievement in the student's major field within electrical or computer engineering. A significant contribution to the knowledge in the area of electrical and computer engineering is made through successful dissertation research.

The Ph.D. degree requirements include:

- 43 credit hours of coursework
- Responsible Conduct of Research training
- Ph.D. Residency requirement
- Passing the Ph.D. Comprehensive Exam, including the Proposal Exam
- Conducting research, writing and successfully defending a Ph.D. dissertation

## PH.D. TIMELINE



## Coursework requirements

The following table summarizes the coursework requirements for the Ph.D. degree in the School of Electrical and Computer Engineering.

Requirement	Hours	Description
<b>Group I: ECE 6000 level classes in one or two TIAs</b>	9	Nine hours of classes from one or two technical interest areas (TIAs) of the student's choice. All for letter grade credit.
<b>Group II: ECE 6000-level classes</b>	9	Nine hours of classes, <u>all of which</u> must be from one or more TIAs that are outside of and not cross-listed with the TIA(s) in Group I. All for letter grade credit.
<b>Group III: Minor in an area outside ECE</b>	9	Nine hours of classes in a <u>single discipline</u> outside of ECE. All for letter grade credit.
<b>Group IV: Electives</b>	14	(Up to 12 M.S. thesis hours, <u>recorded as such on an official transcript</u> , may be used in this area)
<b>ECE 8022 (Professional Communications Requirement)</b>	1	Pass/fail. Permit required. Students have to pass the Coursework Qualifier to receive a permit.
<b>Responsible Conduct of Research (RCR) requirement (PHIL 6000)</b>	1	Pass/fail. <u>NEW:</u> All PhD students with a catalog year of 2011-12 or after have to complete the RCR requirement. The requirement is reflected in DegreeWorks for all students who need to complete the RCR training under the new policy.
<b>Total hours</b>	43	

### Groups I and II – Selection of ECE 6000 Level or Higher Classes

6000-level or higher ECE courses offered by specific TIAs can be used to satisfy these requirements, including Special Topics courses.

- Technical Interest Areas (TIAs) are groups of related courses within electrical and computer engineering and include: Bioengineering, Computer Systems & Software, VLSI Systems & Digital Design, Digital Signal Processing, Electrical Energy, Electromagnetics, Electronic Design & Applications, Nanotechnology, Optics & Photonics, Systems & Controls, and Telecommunications.
- In Group II, all nine hours of coursework must be completed outside the TIA(s) of Group I. These courses must not be cross-listed with the TIA(s) chosen for Group I. Group II classes may be selected from one, two or three TIAs, provided degree requirements are met. Courses that do not belong to any TIA cannot be used to satisfy Group I or Group II requirements.

- Pass/Fail, audit, and Special Problems courses cannot be used to satisfy Group I and Group II requirements.
- To determine the TIA of a course, students may examine the Projected Course Schedule available on the Graduate Website at [http://www.ece.gatech.edu/academics/graduate/course\\_schedule.pdf](http://www.ece.gatech.edu/academics/graduate/course_schedule.pdf)

#### Group III (Minor): 9 Hours outside ECE as a Minor Field of Study

A minor consists of nine credit hours of courses in a **single discipline** (e.g. Math, Physics, Mechanical Engineering, etc.). 4000 level or higher classes may be taken subject to the following guidelines:

- Minors are expected to be in subject areas that enhance and relate to Ph.D. students' research. Students may choose Math, CS, any non-ECE engineering or science discipline. Other fields would need to be approved by the ECE Graduate Committee. Minor courses in non-technical areas (for example, Management) need special approval. Classes that are part of the TI:GER program in the Scheller College of Business can be used towards the Ph.D. minor.
- **Minor courses cannot be cross-listed with ECE classes.**
- All minor courses must be taken for letter grade.
- 6000 level minor courses are preferred, 4000 level or a combination of 4000 and 6000 level courses will be considered for approval, provided the overall degree requirements are met.
- Math and CS are the most popular Ph.D. minors for ECE students. A list of recommended CS and undergraduate Math courses are listed on the ECE website at <https://www.ece.gatech.edu/coursework-planning>.
- Approval of the minor courses is secured from the ECE Graduate Affairs Office via the web-based Ph.D. coursework completion plan at <https://www.ece.gatech.edu/coursework-planning>. When all the coursework is completed, Ph.D. minors are submitted by the ECE Academic Affairs Office to the Georgia Tech Graduate Studies – VPR office for approval.
- The PhD minor courses must have a minimum grade average of 3.0/4.0.

#### Group IV General Elective Courses

- General electives are meant to enhance the technical background of students. Non-technical classes should be pre-approved by the ECE Graduate Office.
- Up to 6 credit hours of Special Problems (ECE 8901, 8902, 8903 and CS 8903) may be used as general elective courses, subject to approval by the ECE Graduate Office. **Faculty supervisors must certify that the work done for these courses is at Ph.D. level and is not simultaneously being done for pay (as in a GRA) or for other credit (as for ECE 9000, ECE 8900, or ECE 7000).** To receive approval for these courses to be counted towards the Ph.D. degree, students need to complete the approval form found on the ECE website at <https://www.ece.gatech.edu/coursework-planning>. It is expected that these courses are rigorous and the level of work is commensurate with the equivalent credit of a graduate level course.
- Non-ECE Special Topics courses can be used for general electives.
- Center for Teaching and Learning (CTL) courses do not satisfy the Ph.D. degree coursework requirements.

- Pass/fail courses cannot be used in any other Group except for Group IV General Electives. The only pass/fail hours that can be used are ECE seminars (ECE 8001, 8002, 8022 or 6792), CS/CSE seminars (CS/CSE 800x), and the RCR requirement (PHIL 6000). No more than **four** pass/fail hours can be used towards the Group IV General Electives.
- Only 4000 level or higher courses can be used for degree requirements, but note that there is a total limit of 9 hours of 4000 level courses that can be used for the Ph.D. degree
- Students are welcome and encouraged to take additional elective courses to enhance their background. These courses would be for the student's benefit and would not count towards degree requirements.

### The Professional Communications Requirement

- All ECE Ph.D. students are required to complete ECE 8022, a one-hour professional communications seminar, in order to fulfill the Ph.D. coursework requirement.
- Permits are required for ECE 8022. Only students classified as "Ph.D." and who have passed the Coursework Qualifier will be allowed to take ECE 8022.
- All the Ph.D. students are expected to take ECE 8022 the first fall or spring semester after they passed the Ph.D. Coursework Qualifier, and no later than the end of the 3<sup>rd</sup> year.
- The ECE department offers a technical writing class for international Ph.D. students who need to improve their writing skills. The Scientific Writing for International Students class is offered the spring and fall terms. It is a non-credit course and cannot be found on OSCAR. The Graduate Office advertises the class every semester and participants are selected on a first-come, first-served basis. For more information, please contact Dr. Daniela Staiculescu in the Graduate Office.
- In addition to the Scientific Writing Class, students are encouraged and may be required by their research advisor or their proposal review committee to take additional communications courses offered by Center for Teaching and Learning (CTL).

### Responsible Conduct of Research (RCR) Requirement

Georgia Tech requires all Ph.D. students to complete an RCR requirement that consists of on-line training and in-person training. M.S. students who transition to Ph.D. students must also meet this requirement.

Additional graduate students may need to complete this requirement, depending on their source of funding. Students may refer to the applicability criteria listed in the **Georgia Tech RCR Compliance Policy** to determine if their source of funding requires RCR training ([http://www.compliance.gatech.edu/forms/GT\\_RCR.pdf](http://www.compliance.gatech.edu/forms/GT_RCR.pdf)).

*The On-line CITI Requirement:* The online portion of the requirement, a CITI RCR course, must be successfully completed within 90 days of when applicable students begin the first full semester in their doctoral program. The CITI RCR course can be found here: <https://www.citiprogram.org>.

If a student goes past the 90 day time frame, a hold may be placed on course registration until the student completes the online training.

*The In-Person Requirement:* Students covered by this policy are required to successfully complete PHIL 6000 OR an academic program's in-house RCR training approach. Students are strongly encouraged to



complete in-person training within the first 12 months of their doctoral program. In general, applicable students will be expected to take PHIL 6000 **during the first summer session after they begin their doctoral program at Georgia Tech**. Additional sections will be available during the fall and spring semesters for those students who would not otherwise be enrolled during the summer session.

The following academic programs have an approved in-house RCR training approach for their doctoral students. ECE does not have its own in-house RCR course but would accept any of the following courses approved for other schools:

- **Applied Physiology – PHIL 6710 / APPH 6710 / ECE 8813-B:** Ethics of Biotechnology and Bioengineering Research
- **Biological Sciences – BIOL 8106:** Tools of Science
- **Biomedical Engineering – BMED 7004:** Teaching & Research Practicum I (effective Fall 2015)
- **Building Construction – BC 8100:** Research Methodology
- **Chemical & Biomolecular Engineering – ChBE 6001:** Introduction to Research and **ChBE 6003:** Chemical Process Safety (both courses are required)
- **Chemistry – CHEM 8002:** Information Resources for Chemists and Biochemists
- **Civil and Environmental Engineering – CEE 8097:** Introduction to Transportation Research
- **Computational Science and Engineering – CSE 6001:** Introduction to the PhD
- **Computing – CS 7001:** Introduction to Graduate Studies (effective Fall 2013)
- **Earth and Atmospheric Sciences – EAS 6000:** Introduction to Research and Responsible Conduct
- **Mathematics – MATH 6001:** Introduction to Graduate Math
- **Physics – PHYS 8002:** Seminar and Responsible Conduct of Research
- **Psychology – PSYC 6000:** Responsible Conduct of Research
- **Public Policy – PUBP 8101 and PUBP 8102:** Workshop on Public Policy Research (both courses are required)

These courses or PHIL 6000 can be counted in the Group IV General Elective category. More information as well as an FAQ can be found at <http://www.rcr.gatech.edu/resources>.

### Ph.D. Residency Requirement

All Ph.D. students, with no exception, are required to be enrolled full time for at least two semesters while classified as Ph.D. students. The residency requirement is verified before the Ph.D. coursework is approved and certified.

### Additional Restrictions and Conditions on Coursework

- Students with prior graduate work, including an M.S. degree from another institution may have up to 30 hours of courses applied towards the ECE Ph.D. degree requirements, subject to approval.
- No more than three senior (4000) level courses (9 semester hours) are permitted to be used toward the Ph.D. coursework requirement. 4000 level classes can only be used toward the elective (Group IV) or minor (Group III) areas of the Ph.D. coursework requirements.
- No more than a total of four pass/fail hours can be used toward the Ph.D. coursework requirement—this includes 8022 and PHIL 6000.

- Georgia Institute of Technology requires that Ph.D. students maintain a cumulative grade point average of 3.0/4.0 to remain in good standing and must have at least a 3.0/4.0 to graduate.
- The minor courses (Group III) must have a minimum grade average of 3.0/4.0.
- All classes used to fulfill the Ph.D. coursework requirement must have grades of “C” or above.
- Ph.D. students are required to complete a minimum of two full-time terms on campus. ECE expects that most if not all of one’s Ph.D. coursework and research will be completed on campus, under the supervision of an ECE faculty member.

### Filing a Coursework Plan

- All ECE Ph.D. students are required to file a coursework plan no later than the Ph.D. proposal submission.
- Coursework plans are filed through a secure ECE website (<https://secure2.ece.gatech.edu/PHP/gradforms/login.php>)

### Applying M.S. Coursework Completed at other Schools toward the Ph.D. Coursework

There is no formal transfer of credit for the Ph.D. degree, that is, classes taken elsewhere would not appear on the Georgia Tech transcript. However, M.S. coursework completed at other schools can be used toward the ECE Ph.D. coursework requirement. An approved Ph.D. coursework plan serves as an agreement between the student and ECE (on behalf of Georgia Tech) to permit the student to count courses from another school toward the Ph.D. coursework requirement.

- When submitting the coursework plan for the Ph.D. degree, students who have completed an ECE M.S. degree will list classes completed at the M.S. school along with classes to be completed at Georgia Tech. These classes should be listed as they appear on the M.S. school's transcript, using that school's number (if any), course name, and grade awarded.
  - To request approval of these courses, students should submit a transcript and a syllabus and other descriptive materials to the ECE Graduate Office.
  - The credit hours for classes completed elsewhere should be reported in semester hours. If the M.S. classes were recorded in quarter hours, those hours are to be converted to semester hours by multiplying the number of quarter hours by 2/3, making a three hour quarter class equivalent to two semester hours.
- If a thesis was completed at the M.S. school, it may be possible to apply up to 12 semester hours of thesis credit toward the 43 hour Ph.D. coursework requirement. The following items are needed in order for this option to be considered for approval:
  - English version of the M.S. thesis
  - Documentation on the official transcript of completion of the M.S. with a thesis
  - Completion of M.S. thesis research hours on the M.S. school’s transcript
- Six hours of the previously completed coursework that was transferred toward a Georgia Tech ECE M.S. degree may be applied toward the Ph.D. coursework requirement.

### Coursework Qualifier

The Coursework Qualifier consists of four courses that are selected by each student from lists prepared by the ECE Technical Interest Groups (TIGs). The lists are included below. A student may select four courses from a single TIG’s list; or three courses from one TIG’s list and a single course from another TIG’s list. A student’s advisor may ask that they select courses from a particular TIG’s

list; however, the School of ECE will not enforce this. In order to successfully complete the Coursework Qualifier requirement, a student must earn a grade point average (GPA) of 3.5 in the four courses they have selected. Once this requirement has been completed, the student must complete the Coursework Qualifier form and turn it in to the ECE Graduate Office for verification. This requirement must be completed by the end of the second year after the student matriculated into an ECE Graduate program.

The Coursework Qualifier requirement will apply to all students starting in Fall 2018. For ECE PhD students matriculating into an ECE graduate program in Fall 2018 or after, the Coursework Qualifier requirement must be completed by the end of their second year. **Any ECE PhD student who has already passed the ECE Preliminary Exam is exempted from the Coursework Qualifier requirement.** Students who matriculated before Fall 2018 but have not passed the Preliminary Exam are subject to the transition timeline for completion of the Coursework Qualifier requirement that can be found on the ECE website at <https://www.ece.gatech.edu/phd-degrees>, under “Coursework Qualifier”.

An MS student who wishes to become a PhD student must complete the Coursework Qualifier requirement, secure funding, and identify a willing ECE faculty advisor before being considered for transfer to the PhD program.

All the Coursework Qualifier Courses must be taken at Georgia Tech. Classes taken at other institutions cannot be used towards the Coursework Qualifier requirements.

The courses that satisfy the Coursework Qualifier requirements are as follows:

### **Bioengineering:**

ECE 6200 - Biomedical Applications of MEMS  
ECE 6229 - Introduction to MEMS (Cross-listed with CHBE/ME 6229)  
ECE 6250 - Advanced Digital Signal Processing  
ECE 6790 - Information Processing Models in Neural Systems  
ECE 88x3 - Implantable Microelectronic Devices  
ECE 6781 - Biomedical Sensing Systems  
ECE 88x3 - Medical Ultrasound: From Diagnostic Imaging to Image-Guided Therapy  
BMED 6210 - Magnetic Resonance Imaging  
BMED 8813 - Optical Microscopy

### **Computer Systems & Software:**

ECE 6130 - Advanced VLSI Systems  
ECE 6100 or CS 6290 - Advanced Computer Architecture  
ECE 6101 - Parallel and Distributed Computer Architecture  
ECE 6276 - DSP Hardware System Design  
ECE 7103 - Memory Systems  
ECE 6115 - Interconnection Networks for High Performance  
ECE 6102 - Dependable Distributed Systems  
ECE 6122 - Advanced Programming Techniques  
CS 6210 - Advanced Operating Systems

CS 6241 - Design and Implementation of Compilers  
ECE 6280 - Cryptography and Security  
ECE 6612 - Computer Network Security  
ECE 6612 or CS 6262 - Computer Network Security  
ECE 88x3 - Advanced Topics in Malware Analysis  
CS 6238 - Secure Computer Systems

**Digital Signal Processing:**

ECE 6250 - Advanced Digital Signal Processing or ECE 88xx - Mathematical Foundations of Machine Learning  
ECE 6254 - Statistical Digital Signal Proc & Modeling (Core course in the PhD ML degree)  
ECE 6255 - Digital Processing of Speech Signals  
ECE 6258 - Digital Image Processing  
ECE 6272 - Fund of Radar Signal Processing  
ECE 6276 - DSP Hardware Systems Design (cross-listed in VLSI Systems & Digital Design)  
ECE 6605 - Information Theory  
ECE 7251 - Signal Detection and Estimation (Core course in the PhD ML degree)  
ECE 88x3 - Convex Optimization for SP (Core course in the PhD ML degree)  
ECE 88x3 - Probabilistic Graphical Models in Machine Learning (Core course in the PhD ML degree; cross-listed ECE/ISYE/CS)

**Electromagnetics:**

ECE 6350 - Applied Electromagnetics  
ECE 6360 - Microwave Design  
ECE 6370 - Electromagnetic Radiation and Antennas  
ECE 6380 - Intro to Computational Electromagnetics  
ECE 6390 - Satellite Comm and Navigation Systems  
ECE 7350 - Topics in Analytical EM  
ECE 7380 - Topics in Computational EM  
ECE 6420 - Wireless IC Design  
ECE 6520 - Integrated Optics  
ECE 6250 - Advanced Digital Signal Processing  
ECE 6272 - Radar Signal Processing  
ECE 88x3 - Radio Wave Propagation in the Earth and Space Environment  
EAS 6145 - Remote Sensing of the Atmospheres and Ocean  
EAS 6360 - Space Physics and Instrumentation

**Electronic Design and Applications:**

ECE 6412 - Analog Integrated Circuit Design  
ECE 6414 - Analog Integrated System Design  
ECE 6420 - Wireless IC Design  
ECE 6422 - Interface IC Design  
ECE 6435 - Neuro Analog VLSI Circuits  
ECE 6444 - Si-based Hetero Devices and Circuits  
ECE 6445 - Power IC Design

**Energy:**

ECE 6320 - Control and Operation of Power Systems  
ECE 6331 - Power Electronic Circuits  
ECE 88x3 - Smart Grids  
ECE 6323 - Power System Protection  
ECE 6335 - Electric Machinery Analysis (jointly taught with ECE 4335)  
ECE 6456 - Solar Cells  
ECE 88x3 - High Voltage Engineering  
ECE 6445 - Power IC Design  
ECE 88x3 - Power System Economics  
ECE 6332 - Power Electronics CAD Laboratory  
ECE 6336 - Dynamics & Ctrl Electric Machine Drive

**Nanotechnology:**

ECE 6229 - Introduction to MEMS (Cross-listed with CHBE/ME 6229)  
ECE 6444 - Silicon-Based Heterostructure Devices and Ckts (cross-listed in Electronic Design & Applications)  
ECE 6450 - Intro to Microelectronics Technology  
ECE 6451 - Intro to the Theory of Microelectronics  
ECE 6453 - Theory of Electronic Devices  
ECE 6455 - Semiconductor Process Control  
ECE 6456 - Solar Cells  
ECE 6458 - Gigascale Integration  
ECE 6460 - Microelectromechanical Devices (Cross-listed with CHBE/ME 6460)  
ECE 6542 - Optoelectronics: Dev, Integr, Pkg, Sys (cross-listed in Optics and Photonics)  
ECE 6771 - Optoelectronics: Matls, Processes, Dev (cross-listed in Optics and Photonics) (Cross-listed with PHYS 6771)  
ECE 6776 - Microelectronic Systems Packaging Technologies (Cross-listed with ME/MSE 6776)  
ECE 6779 - Thermal Engineering for Packaging of Micro and Nano Systems (Cross-listed with ME 6779) ECE 8823 - Memory Device Technologies and Applications

**Optics and Photonics:**

ECE 6350 - Applied Electromagnetics  
ECE 6451 - Intro to the Theory of Microelectronics  
ECE 6500 - Fourier Tech System & Analysis  
ECE 6510 - Electro-Optics  
ECE 6515 - Nanophotonics  
ECE 6520 - Integrated Optics  
ECE 6522 - Nonlinear Optics  
ECE 6530 - Modulation, Diffractive & Crystal Optics  
ECE 6540 - Organic Optoelectronics  
ECE 6542 - Optoelectronics: Dev, Intgr, Pkg, Sys  
ECE 6543 - Fiber Optic Networks  
ECE 6771 - Optoelectronics: Matls, Processes, Dev

**Systems and Controls:**

ECE 6500 - Fourier Tech System & Analysis  
ECE 6550 - Linear Systems and Controls  
ECE 6552 - Nonlinear Systems  
ECE 6553 - Optimal Control  
ECE 6554 - Adaptive Control  
ECE 6555 - Optimal Estimation  
ECE 6562 - Control Robotic Systems

**Telecommunications:**

ECE 6601 - Random Processes  
ECE 6602 - Digital Communications  
ECE 6604 - Personal and Mobile Communication  
ECE 6605 - Information Theory  
ECE 6606 - Coding Theory & Applications  
ECE 6607 - Computer Communication Networks  
ECE 6610 - Wireless Networks  
ECE 6612 - Computer Network Security  
ECE 6613 - Broadband Access Networks  
ECE 6615 - Sensor Networks

**VLSI Systems and Digital Design:**

ECE 6130 - Advanced VLSI Systems  
ECE 6132 - Computer-Aided System Design  
ECE 6133 - Physical Design Automation  
ECE 6140 - Digital Systems Test  
ECE 6150 – Computational Aspects of Cyber Physical Systems  
ECE 88x3 - Advanced Hardware Oriented Security and Trust  
ECE 88x3 - Digital Systems at Nanometer Nodes  
ECE 88x3 - Digital Design using Modern VLSI Devices  
ECE 88x3 - Machine Learning for IoT  
ECE6250 - Advanced Digital Signal Processing  
ECE 6254 - Statistical Machine Learning  
ECE 6412 - Analog Integrated Circuit Design  
ECE 6420 - Wireless IC Design  
ECE6550 - Linear Systems and Controls  
ECE 6451 - Introduction to the Theory of Microelectronics  
ECE 6458 - Gigascale Integration  
ECE 6414 - Analog Integrated System Design  
ECE 6331 - Power Electronic Circuits  
CS 6550 - Design and Analysis of Algorithms  
CS 7641 - Machine Learning

## **Advisor Selection**

- Students who are looking for advisors and/or research topics should register for ECE8999.
- While completing the Ph.D. Coursework Qualifier, a student is expected to identify a research advisor and report that advisor's name to the ECE Office for Graduate Affairs.
- It may be necessary and appropriate for a student to change advisors during the process of identifying a suitable dissertation topic. Any change should be coordinated through the ECE Graduate Affairs Office.

## **Dissertation Proposal**

The Dissertation Proposal Exam in the School of Electrical and Computer Engineering serves two functions:

1. The second part of the ECE Comprehensive Exam (the Coursework Qualifier being the first part.)
  - Test whether the student has sufficient background to enter the Ph.D. Program
  - Allow the committee to judge the student's ability to execute a research task and to communicate the results.
2. Evaluation of the Ph.D. Dissertation topic and research plan by the Dissertation Reading Committee.
  - Evaluate the proposed topic to ensure that, if completed as posed, it constitutes an original contribution to knowledge.
  - Evaluate the proposed research plan to ensure that it is well-conceived and feasible to complete with the resources available within a reasonable time frame.

## **Timing of the Proposal Exam**

- The Proposal Exam must be successfully completed by the end of the 7<sup>th</sup> semester (not including summer) after the student matriculated into an ECE Graduate program. Students who matriculated before Fall 2018 are subject to a transition plan that can be found on the website at <https://www.ece.gatech.edu/phd-degrees> under "Proposal Examination".
- As of Summer 2018, the new timing of the Proposal Exam (within 7 semesters) will be strictly enforced. As a result, expectations for the Proposal Exam have changed. The student is not expected to have completed a large body of the original research that is necessary for their PhD Thesis. The student is expected to demonstrate background knowledge of their dissertation topic, as well as a fundamental understanding of the discipline. The Proposal must contain a detailed and sound plan for the completion of PhD-level research on the dissertation topic, and preferably some results. However, it is understood that any results will be early and possibly inconclusive; and the dissertation topic, methods, and results may evolve considerably in-between the Proposal and the PhD defense.
- The Ph.D. coursework plan should be completed by the time of the Ph.D. Proposal. If the coursework has not been completed, the Academic Office needs to approve the coursework form indicating very clearly when the remaining classes will be completed. The proposal examination cannot be held if the student has not completed the professional communication seminar, ECE 8022, and did not meet the institute PhD residency requirement (full time enrollment for at least two semesters while classified as PhD student).
- The Proposal Exam must occur at least 6 months before the Ph.D. Dissertation Defense Examination.

- Under no circumstances will the student be allowed to take the Proposal and Defense Exams during the same term.

### Proposal Process

- Ph.D. Proposal Committee is comprised of 3-4 faculty members: the advisor (and a co-advisor, if one exists), and two faculty members selected by the student. Additional members can be added upon request.
- The format for the Proposal Examination involves a written report and an oral presentation.
- The written proposal is no more than 35 pages including references and appendices.
- The proposal must contain a chapter or sub-chapter entitled “Literature Survey”, appearing anywhere in the document that the student finds appropriate. The “Literature Survey” section is a minimum of five pages and must be written by the student with no outside help.
- The rest of the proposal document contains at minimum a concise statement of the Ph.D. dissertation topic, summary of the research completed, outline of the research to be completed and clearly summarizes the contributions of the research. The student can get help in preparing the rest of the proposal document. The documents are submitted to the Academic Office, which is in charge of assigning the Ph.D. Proposal chair and sending the Ph.D. proposal documents to the members of the committee. The committee needs to be given at least two weeks to read the Ph.D. Proposal before scheduling the oral portion of the exam.
- If the Ph.D. Committee is satisfied with the written report, the oral presentation is scheduled. The presentation usually lasts about 40 minutes. There is a general audience question and answer period followed by a closed door examination period with the committee.

**The official detailed information about preparing and presenting the proposal is available in the “Proposal Guidelines” document, to be found in the Ph.D. Proposal section at <https://www.ece.gatech.edu/phd-degrees>. If, at any time, there is uncertainty about what to do next or what is expected of the student, check with the ECE Graduate Affairs Office. Do not rely on secondhand information!**

The following is the summary of the Ph.D. Proposal process. For more details, consult the Proposal Guidelines document.

1. **Fill out** the coursework plan at <https://secure2.ece.gatech.edu/PHP/gradforms/login.php>, showing all grades earned for the classes already completed and the planned remaining classes. Form needs to be approved by the ECE Graduate Affairs Office.
2. **Visit** the Academic Office to express the intent of submitting the proposal, to verify the coursework and the committee, and to clarify all details of the process.
3. **Submit** the following to the ECE Graduate Affairs Office:
  - **Online:**
    - Electronic committee form submission at <https://secure2.ece.gatech.edu/PHP/gradforms/login.php>.
  - **To the Academic Office (email [daniela@ece.gatech.edu](mailto:daniela@ece.gatech.edu)):**
    - Electronic (pdf) copy of the proposal document with the scanned disclaimer form inserted before the Table of Contents page (a copy of the disclaimer form is included at the end of this document).



- Admission to Ph.D. Candidacy form. Only the Name, Title and Brief Description fields have to be filled out. The Brief Description must begin with “The objective of the proposed research is...”.
  - The body of the email must contain a copy of the Brief Description from the Admission to Ph.D. Candidacy form.
- 4. The Academic Office assigns the chair and distributes the proposal materials to the committee members.
- 5. The Committee Chair coordinates proposal committee activities and seeks input on the proposal.
- 6. When the committee determines that the proposal is ready for examination, the chair schedules the exam through the ECE Graduate Affairs Office. The date, time and location of the proposal exam must be announced a minimum of five working days in advance.
- 7. The process could take as short as 3 weeks but it can take up to 8 weeks or longer especially at busy times of the term or at times when faculty are traveling away from campus.

### After passing the proposal

- The Ph.D. Proposal Committee members chosen by the student, including the advisor, become the Ph.D. Reading Committee Members. Only these people need to sign the “Request for Admission to Ph.D. Candidacy Form”.
- Because the proposal examination may occur relatively early in the process of defining the dissertation topic, it may be necessary to modify the topic as the research progresses. Any substantial modification requires approval of the reading committee and a submission of a revised “Request for Admission to Ph.D. Candidacy” form with the new dissertation title and abstract, signed by the student and advisor/co-advisor.
- The proposal should not be construed as a “binding contract” between the committee and the student, but as a somewhat flexible agreement that is expected to evolve as the research progresses.

### Dissertation and the Final Defense

- The primary requirement of the Ph.D. student is to do original and substantial research that is reported in the Ph.D. Dissertation and at the Final Defense. The quality of the dissertation depends upon the conscientious work of both the student and the Reading Committee. The School entrusts the standards of the School in this area to this committee.
- **The Final Defense Committee** is composed of five people including the Reading Committee members plus two extra members. The chair of the Dissertation Committee is the Thesis Advisor. The two extra members are chosen as follows:
  - One of the members has to be Academic Faculty outside the School of Electrical and Computer Engineering. This person can be from another university, with the restriction that they are not within one year of having earned the Ph.D. degree. If the person is not a Georgia Tech faculty member, then that person must provide a current CV in order to be approved by the Institute Graduate Office. Outside ECE academic faculty who have and adjunct position in ECE are approved, but not faculty with double appointments in ECE and another department.
  - The last committee member can be ECE faculty. At minimum, they must hold a Ph.D. and be active in research. If the extra person is not a Georgia Tech faculty member, then a CV must be provided to the ECE Graduate Office for approval.

- The student has to clear the dissertation with their thesis advisor before disseminating the document to the committee. The thesis advisor is responsible for proofing the content of the document prior to distributing it to the Reading Committee.
- The student should submit the dissertation to the Reading Committee with sufficient time to examine, typically at least two weeks but preferably a month. Once the Reading Committee is satisfied with the dissertation, the student must obtain their signatures on the Reading Committee Memo.
- The Advisor has to coordinate the scheduling of the dissertation exam with the committee members and submit the Schedule Defense Memo to the ECE Graduate Affairs Office.
- The two memos (Reading Committee and Schedule Defense) need to be submitted to the Graduate office at least two weeks before the dissertation defense date. The memos can be found online in the “Dissertation and Final Defense” section at <https://www.ece.gatech.edu/phd-degrees>.
- The additional committee members should receive a copy of the dissertation no later than two weeks prior to the defense date.
- The Certificate of Thesis Approval which is available through the Graduate Studies – VPR office website at <http://www.grad.gatech.edu/theses-dissertations-forms> should be signed by the final examination committee at the dissertation defense and submitted to the Academic Office for the final signature from the School Chair/Graduate Coordinator signature. Each committee member has to fill out an individual evaluation form right after the dissertation defense, to be submitted to the ECE Graduate Affairs Office together with the Certificate of Thesis Approval.
- After all signatures are collected, the student is responsible for submitting the Certificate of Thesis Approval, and the rest of the documents on the checklist found at <http://www.grad.gatech.edu/sites/default/files/documents/checklist-documents201603.pdf> to the Graduate Studies – VPR office.
- The student is responsible for uploading the thesis after all the defense forms have been signed. The Graduate Studies – VPR office controls the format of the thesis and other related reporting. The student must keep in touch with that office in order assure that all degree requirements are met. Guidelines for preparing and submitting the dissertation are available at the Graduate Studies – VPR office website (<http://www.grad.gatech.edu/theses-dissertations>)
- If, at any time, there is uncertainty about what to do next or what is expected of the student, check with an advisor in the Academic Office. Do not rely on secondhand information!

### **Reasonable Degree Progress**

- A “Ph.D. student” is defined as one who has accepted an admission offer that indicated "Ph.D." rather than "M.S." degree. M.S. students who wish to be reclassified as Ph.D. students should contact an Academic Advisor for additional information.
- Graduate students in the ECE degree programs are expected to make diligent progress toward the Ph.D. degree. It is in the best interests of both students and faculty for all students to progress through the program expeditiously. Recommendations and requirements for reasonable progress are defined as follows:
  - Students seeking a Ph.D. degree are required to pass the Coursework Qualifier in the first four semesters (not including summer).
  - Ph.D. Students are encouraged to complete all required coursework, including the Professional Communications requirement and the minor, by the end of the third year in

- the program (if entering from a B.S. degree program) or the end of their second year in the program (if entering with an M.S.).
- Students are encouraged to identify a Ph.D. research advisor as early as possible in the program, and are urged to do so by the end of the term in which they pass the Coursework Qualifier and no later than the term following the one in which they pass the Coursework Qualifier.
  - ECE PhD students matriculating into an ECE graduate program in Fall 2018 or after are required to complete their Proposal Exam by the end of their 7<sup>th</sup> term, not including summer.
  - If a student has not met the above Coursework Qualifier or Proposal Exam requirements by the end of the terms specified above, they will be dismissed from the PhD program. A student may petition the graduate committee for a one-semester extension. Petitions for Proposal Exam extensions must include a statement detailing the student's progress. Exceptions may be made by the Associate Chair for Graduate Affairs after reviewing the circumstances involved as presented by the student and the research advisor.
  - It is recommended that the Proposal Examination will be successfully completed at least one year prior to the Final Defense examination, and that it **must be** completed at least 6 months in advance of the Defense Examination.
  - The Institute requires that Ph.D. students (full-time or part-time) complete all degree requirements within 7 years of passing the Comprehensive Examination, that is, the Ph.D. Proposal Exam in ECE.
  - During the Ph.D. program, students are permitted an unlimited number of summer terms of non-residence, during which they may be employed as interns at industrial or government employers. A student's research advisor, however, may advise against summer leave if circumstances so dictate.
    - Students supported as GRA are expected to coordinate internships with their advisor.
    - Only one non-summer term may be used for internships or other employment without the prior permission of the ECE Associate Chair for Graduate Affairs.

## **FINANCIAL ASSISTANCE**

### **Financial Aid**

- Financial Aid in the form of fellowships and loans is available to qualified students. Long and short-term student loans are handled through the Office of Scholarships and Financial Aid. Interested students should contact that office directly.
- Many national graduate fellowships consider applicants who are “at or near” the beginning of their graduate programs. ECE encourages qualified graduate students to apply for national graduate fellowships in their studies. Information about fellowships and links to important fellowship information can be found at <http://fellowships.gatech.edu/>.
- Students who have been awarded the President's Fellowship or other Georgia Tech supplemental fellowships are also strongly encouraged to apply for national fellowships early in their tenure at Tech.

### **Graduate Internship Program**

The Graduate Internship Program provides both masters and doctoral students with opportunities to include specialized work experiences in their studies. This program is managed through the Georgia Tech Center for Career Discovery and Development <http://www.careerdiscovery.gatech.edu/graduate-students>

- Information on the internship program can be obtained through their website <http://www.careerdiscovery.gatech.edu/graduate-students/co-op-internship>
- Students who apply for assignments through the Graduate Internship Program must advise the ECE Graduate Affairs Office of their intentions **before** participation can be approved. Interns need to be registered the semester of the internship for 12 credit hours.

#### How to submit a request to approve your graduate internship:

- Complete Experiential Learning Application in CareerBuzz
- Obtain a written offer letter from your prospective internship employer. Be sure it includes the dates you will work, the address where you will actually work, and contact information.
- Obtain signed approval from your academic advisor allowing a full-time or part-time graduate internship. Doctoral students must also have their faculty advisor sign.
- Upload the offer letter and advisor approval form in CareerBuzz.

**Detailed information on the internship application process can be found at**  
**<https://career.gatech.edu/graduate-student/application-process>**

- Students approved for graduate internship will receive a confirmation email and a permit to enroll in a no-tuition audit course. You must register by the close of Phase II registration.
- Students need to complete a new placement form before EACH semester's work term
- If you wish to appeal your internship decision, information on the new appeal process can be found here <http://career.gatech.edu/internship-appeals-process>

#### Timing of Internship:

- ECE does not encourage students to intern during fall and spring semesters as a significant number of courses are offered in these two terms and most faculty are on campus. ECE graduate students seeking outside work assignments should plan to be gone during summer term and be in school during fall and spring.
  - Students may be permitted to spend one regular fall/spring semester as an intern in an industrial or government position per degree (that is, once while seeking the M.S. degree and once while seeking the Ph.D. degree).
  - Students desiring more than one semester (fall, spring) of internship or other employment must have the expressed permission of the ECE Associate Chair for Graduate Affairs.
- Students supported as GRAs are expected to coordinate internship with their advisor.
- Subject to the approval of the research advisor, Ph.D. students are permitted an unlimited number of summer terms of non-residence, during which they may be employed as interns at industrial or government employers.
- International students who have completed less than two semesters of full-time graduate level study in ECE's graduate program will not be given approval to participate in the graduate internship program.
- Approval to work off campus will also not be granted to any student who is not in good academic standing or is not making good progress toward the completion of their degree program.

### **Graduate Teaching and Research Assistantships**

Some students are offered assistantships as part of their admissions package. Others arrange assistantships through direct contact with faculty working in an area of shared research interest. Graduate Research Assistants (GRA) and Graduate Teaching Assistants (GTA) positions come with a tuition waiver, with the requirement that the students are registered full time.

- Common Rules for GRAs and GTAs:
  - To be eligible for the tuition waiver, GRA/GTAs must be employed at a minimum rate of one-third time (13-15 hours per week) and must be enrolled full time (at least 12 hours of credit, no more than 3 of which are audit). **Students who fail to meet one of these criteria are assessed full tuition and fees based on their residency status.**
  - As a courtesy to students, the ECE Graduate Affairs Office monitors the registration status of students with GRA/GTAs. Email messages are sent to individuals who are not registered properly or have underpaid their tuition and fees. Do not ignore an “improper registration” message. Failure to comply with Institute requirements may result in a loss of the tuition waiver, cancellation of classes, loss of employment, or loss of immigration status.
  - No student can be employed as a GTA/GRA for more than 50% time (20 hours per week).
  - ECE requires that all students who hold GRAs carry a total load of 21 hours in fall and spring semesters, 16 hours in summer term.
  - GRA/GTAs must be hired no later than the end of the final registration period for the term.
  - It is the responsibility of the hiring faculty member to supervise the assistantship efforts of the students in their employ each term.
  - It is the responsibility of the student to insure that all criteria necessary for fee reduction eligibility are met and that the assistantship supervisor's employment requirements are fulfilled.

- More specific details regarding employment as a GRA/GTA are available in the ECE Graduate Assistant Handbook located on the ECE website.
- ECE graduate students are permitted to seek GRA/GTA appointments outside of ECE. The hiring department must hire the student in GradWorks, or report the appointment to the ECE Academic Office so that the tuition waiver can be recorded.
- Those wishing to be considered for Graduate Teaching Assistantships (GTAs) in the School of Electrical and Computer Engineering may indicate their interest by filing the Position Request form on the secure website (<https://secure2.ece.gatech.edu/PHP/gradforms/login.php>).
  - The priority for GTA hires is the following: 1) students to whom GT has a commitment (such as fulfilling an admission offer obligation), 2) students who have a unique qualification to TA a specific course, 3) Ph.D. students who have temporarily lost funding and are otherwise making good progress towards their degree, 4) students who are well-qualified and making good progress towards their degree.
    - Ph.D. students who wish to be hired under category 3) above must have their advisor request the position by contacting the Associate Chair for Graduate Affairs. That request should contain the following information: why the student needs funding, how long the support is expected to be needed, and the last time that such a request was made from that advisor (for any of their students). Priority for these cases will be to students who are making good progress towards their degree and whose advisors have not received recent GTA funding for their students.
    - An exception to the priorities above is for instructors of ECE 3710 and ECE 2020IE, the two courses ECE teaches for non-majors. Only students who have an M.S. degree or who have completed 30 hours towards their degree are allowed to teach these courses. **We strongly encourage any student who is interested in an academic career to consider teaching ECE 3710 or ECE2020IE.** We typically guarantee at least two terms of support for these instructors. These instructors are also required to take a teaching practicum class.
  - All GTAs must register for ECE 8997 each semester in which they are a GTA.
  - **All GTAs must take CETL 8000**, a one credit hour pass/fail class, during their first term as GTA, even if they are continuing students.
- Students who wish to be considered for Graduate Research Assistantships (GRAs) should make direct contact with faculty members researching in their interest area to discuss the possibility of being hired.
  - ECE is using GradWorks for hiring the Graduate Research Assistants every semester. After confirming being hired by a faculty member, the faculty initiates the process by filing a hire request in GradWorks. The process continues with accounting, academic office, and human resources approvals. GradWorks keeps the entire hiring process in one place for easy tracking and management.
  - More information on GradWorks can be found at <http://www.gradadmiss.gatech.edu/GTGradWorks>.
  - Once the hiring process is completed in GradWorks, students hired for the first time and students who have been off payroll for more than a year will receive an offer letter that includes additional information on ECE and Institute policies and paperwork for accepting the assistantship.

- **No** assistantship offer in the School of Electrical and Computer Engineering is valid without an offer letter from the Associate Chair for Graduate Affairs.
- All GRAs must register for ECE 8998 each semester in which they are a GRA.

### **Hourly (or Graduate Assistant) Positions**

- Students may be hired as a Graduate Assistant (GA) and paid on an hourly basis. However, Georgia Institute of Technology applies significant restrictions to the hiring of graduate students as GAs.
  - Hourly appointments **must be** approved by the Associate Chair for Graduate Affairs **before** the student is hired since ECE must be able to justify the hourly appointment to the College of Engineering and to the GT Graduate Studies Office.
  - Hourly (GA) hires are appropriate only in the following circumstances:
    - Students are not eligible to be hired as a GRA or GTA since they are employed for less than 12 hours per week, will be away from campus for a significant portion of the semester and are not registered as full time.
    - Students whose position does not entail research or education may be hired as a GA.
    - Students whose fellowships pay for tuition are hired as a GA rather than a GTA or GRA.
- Students who are employed must be registered and will pay tuition and fees based on their residency status for the course hours in which they are registered.

### **Tuition Waivers**

- Georgia Tech provides a limited number of out-of-state tuition waivers to exceptional graduate students. These waivers permit full-time students to pay Georgia resident fees instead of out-of-state fees.
- Most of these waivers are used to fulfill agreements made with external funding agencies such as The Fulbright Commission.
- Students wishing to be considered for a tuition waiver nomination must contact an academic graduate advisor before submitting the tuition waiver requests.
- Military personnel and international students who are becoming permanent residents of the US should contact the Registrar's Office for tuition waivers specific to their statuses.

### **Direct Deposit**

- Georgia Institute of Technology requires that all employees (including student employees) arrange to have their salary/stipend payment directly deposited with the financial institution of their choice.
- Arrangement for direct deposit of the GRA or GTA stipend can be made at the time one completes the GT hiring paperwork with the Office of Student Employment.
- Non-employment related payments such as tuition refunds, fellowship payments, etc. are made to students through the Bursar's Office.
- The Bursar's Office also offers a direct deposit option to students who may receive tuition refunds, fellowship payments, etc. through their office.
- Information on arranging direct deposit of funds handled through the Bursar's Office can be found at: <http://www.bursar.gatech.edu/>.

## **GRADUATION**

The culmination of the efforts made to fulfill the M.S. and/or Ph.D. degree requirements is the awarding of the degree – GRADUATION!

- All the instructions and necessary forms needed to apply for graduation are available online at <https://www.ece.gatech.edu/masters-degrees> for the M.S. degree and <https://www.ece.gatech.edu/phd-degrees> for the Ph.D. degree.
  - Ph.D. students submit only the Online Application for Graduation (OAG). This is done through OSCAR.
  - M.S. students submit OAG, and fill out the ECE coursework form at <https://www.ece.gatech.edu/coursework-planning>.
- The OAG and the coursework form must be completed no later than the deadline provided by the Academic Office.

### **Enrollment in the Graduation Term**

- It is an Institute requirement that students be enrolled for a minimum of three hours in the term in which they graduate.
- M.S. thesis option and Ph.D. students who have no requirement to be enrolled on a full-time basis (i.e. no GRA or GTA, no fellowship support, no visa requirements) are permitted to register for a single hour **in their final term**. The one-hour option can only be used **one time**. Students who do not graduate in their expected term may have to enroll in the next term in order to graduate.
- Students who complete all of their degree requirements before the close of registration in the next term are eligible to graduate without being enrolled (with an enrollment waiver). This option is also only available on a one-time basis.
  - In order to request an enrollment waiver, the student must complete a form (signed by the thesis advisor - where applicable - and the ECE Graduate Affairs Office) certifying that all degree requirements have been met and that the student will not be making use of any of Georgia Tech's facilities during the term of graduation.
  - In cases where a thesis is being submitted, this waiver is filed with the required thesis submission paperwork after the thesis or dissertation has been uploaded electronically.
  - Where a thesis is not required, the enrollment waiver is filed with the degree petition.

**NOTE: International students (those with F or J visa) who plan to register for less than a full-time course load in their graduation term must file additional paperwork for reduced course load with the Office of International Education. Failure to do so, could result in the student being considered "out of status" in their final term.**

Candidates for degrees are not required to attend commencement. However, Georgia Tech's commencement program is worth attending. Information concerning each commencement is available on the GT website at: <http://www.gatech.edu/commencement>.

### **Graduation Invitation Letters**

It is Georgia Tech policy that **neither academic nor administrative units** provide "Graduation Invitation Letters." Student wishing to have family members who would need visas in order to enter the U.S. attend their graduation ceremony may write invitation letters for their relatives, but no official letter from ECE or Georgia Tech will be issued.



### Online Master's Degree Students

- It is Georgia Institute of Technology policy that Online Master's Degree students must graduate in the term following the one in which they complete their degree requirements.
- In addition to completing the OAG and the coursework form, online students must include a completed enrollment waiver form found at [http://registrar.gatech.edu/docs/pdf/Enrollment\\_Waiver\\_form.pdf](http://registrar.gatech.edu/docs/pdf/Enrollment_Waiver_form.pdf).

### Reactivating/Reapplying to Graduate

- M.S. and Ph.D. students who do not graduate in the term for which they applied must reapply by submitting an Online Application for Graduation (OAG).

## **ADDITIONAL INFORMATION FOR ALL STUDENTS**

### **Absence from School**

ECE students are expected to complete their degrees in a timely manner. It is understood that professional conferences, internships, employment opportunities, vacations, family obligations, and personal emergencies may warrant time away from school. In addition, accurate student contact information must be maintained on the OSCAR system. The ECE Notice of Absence form is located in the ECE Academic Office.

Students travelling away from campus during times other than formal break periods (or who will be away from campus longer than a scheduled break period, holiday, or weekend), must file an “Absence Request” form, found in the ECE Graduate Affairs Office. The form is prepared by the student and must be approved by the student’s advisor. Not all absence requests are approved. It should be noted that these forms do help us to locate a student in case of an emergency or some other valid reason requires knowledge of their whereabouts.

International students (those holding F or J visas) must check in with the Office of International Education before traveling away from Georgia Tech. Students traveling abroad should be aware of global conditions that may impede their return to Tech.

International students should also be aware that the only term that they are able to take as a “vacation term” is summer. International students should take care to make travel plans with this stipulation in mind.

All students, regardless of their citizenship status, are expected to plan leave time based upon the official Georgia Institute of Technology calendar maintained by the Registrar’s Office.

Graduate Research and Teaching Assistantships are part-time, temporary positions. As such, students employed in those positions do not accrue vacation or sick time. Students (including those with GRAs or GTAs) wishing to take vacations should do so in accordance with the official school calendar.

Vacations or other non-emergency leaves should not be taken during the official period of a term. Plans should be made so that students who take leave are back on campus no later than the first day of classes and do not leave for a significant period (other than official school holidays) until after the close of the term. Graduate classes may meet in the first session of each term. Missing class can have significant consequences later in the term.

In situations in which Ph.D. students and/or M.S. thesis option students are permitted by their research advisor to be gone from campus during a term, every effort must be made to limit the time away from campus. Students who are supported with Graduate Research or Teaching Assistantships must comply with GT requirements for funding and fulfill the commitments required in compliance with the employment opportunity they accept.

## Alternative Study Opportunities

### Online Master's Degree

The M.S. degree in Electrical and Computer Engineering is also offered online. Detailed information about this program is available at [www.dlpe.gatech.edu](http://www.dlpe.gatech.edu).

Most online students are admitted directly into the Online Master's Degree program. Occasionally an on campus student may wish to switch to online studies. A request sent to <https://www.ece.gatech.edu/contact-ece-graduate-affairs-office> is the best way to start this process. No change from on campus to Online Master's Degree is made until after the student has contacted the distance learning program coordinator.'

### Georgia Tech – Lorraine

Georgia Tech operates a graduate electrical and computer engineering program at its campus in Metz, France. Nestled in Technopole 2000, an industrial park on the outskirts of Metz, Georgia Tech Lorraine offers a program leading to the M.S.E.C.E. and Ph.D. School of Electrical and Computer Engineering faculty members in residence at GTL teach classes. Dual degree programs with French partner schools are also available. For information about opportunities for study at GTL, please visit the GTL website at <http://lorraine.gatech.edu/>.

### Georgia Tech – Shenzhen

Starting in Fall 2014, Georgia Tech offers its existing M.S. degree in Electrical and Computer Engineering in Shenzhen, China, housed at the Shenzhen Virtual University Park (SZVUP). SVUP is an innovative model in China emphasizing university-industry partnerships, technology transfer and business incubation. Situated next to Hong Kong, Shenzhen has the fourth largest GDP in China. It is a clean, green city, has a young population and is very high-tech. GT-Shenzhen will serve as a platform for graduate study abroad for all GT students. A unique program - the Global Engineering Immersion Program (GEIP) - will capitalize on GT's academic presences in Atlanta, GA, Lorraine, France, and Shenzhen, China, and encourage students to complete the GT M.S. degree by studying with GT on 3 different continents as little as 12 months. More information about this program can be found on the Georgia Tech – Shenzhen website <http://www.shenzhen.gatech.edu/index.html> or by contacting the Georgia Tech – Shenzhen Program Coordinator Chelcea Warren at 404-385-5753.

### Multidisciplinary Certificates

In addition to the specialization within electrical engineering, the School participates actively in several multidisciplinary certificate programs. These programs consist of groupings of courses that cut across existing disciplinary lines and address specific application areas. 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. Examples of such certificates are:

<http://www.spp.gatech.edu/graduate/certificates/pubp>

<https://www.scheller.gatech.edu/academics/certificates/management-of-technology-certificate.html>

Please see a graduate advisor for any specifics on how a graduate certificate can be integrated into the ECE course requirements.

### Interdisciplinary Degrees

School of ECE participates in multiple campus-wide interdisciplinary degree programs: the M.S. in Cybersecurity, the Online M.S. in Cybersecurity, Ph.D. in Robotics, Ph.D. in Machine Learning, and the M.S. and Ph.D. degree programs in Bioengineering. New students seeking admission to Georgia Tech would mark one of these options on the application as the discipline. Existing students who wish to transfer into these programs are required to visit the Academic unit of the program they wish to transfer into.

**For specific information on all degree programs involving the school of ECE visit:**

<https://www.ece.gatech.edu/future-students/graduate/what-can-i-study>.

### Certification Letters

Graduate students may find that they are requested to provide documentation of their academic status or verification of employment to entities outside of Georgia Institute of Technology. The Office of Human Resources (OHR) is the official source for employment verification information. The Registrar's Office is responsible for providing documentation related to academic matters. The ECE Graduate Affairs Office does not provide documentation of either employment or academic status.

To request documentation of a teaching or research assistantship you should follow the instructions at <http://ohr.gatech.edu/employment-verification>.

Requests for certification of enrollment, academic standing, etc. can be filed through OSCAR (<https://oscar.gatech.edu>) or through the Registrar's Office website ([www.registrar.gatech.edu](http://www.registrar.gatech.edu)). From the Registrar's website, select the "Students" tab, then "Forms & Student Records" from the menu on the left and "Certifications/Verifications." Select the option that best describes your certification need and follow the directions to file a request. Through OSCAR, log in using the Secure Access Login, then select "Student Services and Financial Aid" and "Student Records." Scroll down the list to "Request Verification" and file your request.

Both the Registrar's and Human Resources websites provide information about the time needed to process certification requests and assistance to guide you through the request process.

### Communication with Students

- The Georgia Institute of Technology email account is the official means of communication with Georgia Tech students.
- All ECE graduate students are required to activate their Georgia Tech email accounts.
- Students who prefer to use an email service other than the Georgia Tech email as their primary account, **must** arrange for messages sent to the official address to be forwarded to the preferred email address.
- The ECE Graduate Affairs Office and other Georgia Tech administrative offices use the Georgia Tech email account as a means of conveying important information to students.
- It is the responsibility of each student to be aware of the information sent by email.

- **Deadline reminders are sent by the Graduate Affairs Office as a courtesy. All deadline information is available on the ECE website. Stating that a reminder email was not received is not a valid excuse for a missed deadline. It is the student's responsibility to know of and to meet all important deadlines.**
- ECE uses three bulk email addresses as a means of getting information to our graduate students.
  - grads@ece.gatech.edu is used to convey academic-related information to all graduate students. This email address is built from the enrollment rolls each term.
  - phds@ece.gatech.edu goes only for the Ph.D. students as they are classified at the beginning of the term.
  - news\_grads@ece.gatech.edu is used to convey non-academic information, such as announcements about events in ECE, scholarships, career fairs, upcoming conferences, post-graduate employment opportunities, etc. to students who are interested in receiving that information. Students wishing to subscribe (or unsubscribe) to/from the [news\\_grads@ece.gatech.edu](mailto:news_grads@ece.gatech.edu) list do so through the OIT website at <https://lists.gatech.edu/sympa>.
  - Students may also subscribe at <https://www.gatech.edu/emergency/notification.html> to an institute-wide service that will send emergency alerts to individual GT email accounts.
- Students are required to update their personal contact information (addresses, phone numbers, etc.) with Georgia Institute of Technology through OSCAR. The ECE Graduate Affairs Office will refer to this information when attempting to contact students.
- ECE recognizes that personnel information is confidential and under no circumstances will this information be shared with outside parties. Written permission must be given before personal information is released to anyone outside of ECE.

## **Health Insurance**

- All graduate students who are employed as Graduate Research or Teaching Assistants and all graduate students attending Georgia Tech on F1 or J1 visas are required to obtain health insurance through a University System of Georgia negotiated health plan. Information on the program can be found at <http://www.bursar.gatech.edu/content/mandatory-student-insurance>.

## **Mail Service**

- Due to limited resources and a large student population, ECE does not provide departmental mailboxes for students.
- Students who reside in campus housing will be assigned campus post office mailboxes.
- Students living off campus may apply for campus post office boxes. There is a fee for this service. More information can be found at <https://studentcenter.gatech.edu/resources/po/Pages/default.aspx>.
- Graduate students must make arrangements to have their mail sent to their local addresses or to their mailbox at the campus post office.
- Mail and/or packages sent to the School of Electrical and Computer Engineering for graduate students should be sent in care of the students' research advisors.

- Mailboxes assigned to specific classes are provided in the ECE mail/copier room (W203, Van Leer). These boxes are for use by graduate teaching assistants (GTAs) with responsibilities for the classes designated. It is each GTA's responsibility to check the mailbox for their assigned class on a daily basis and to be sure that all materials are removed from the mailbox at the end of the term so that assignments for the next term can be made.

## **INFORMATION FOR ECE UNDERGRADUATES**

### **Permission to take Graduate Level Classes**

- The School urges qualified Georgia Tech undergraduates to attend graduate school since the Master's degree is increasingly regarded as the starting point of a professional career.
- The School provides two ways for a qualified undergraduate to get a head start on the Georgia Tech graduate degree requirements: the B.S.-M.S. Program and the Graduate Option.

### **The B.S.-M.S. Program**

- The B.S.-M.S. program permits early admission into the M.S. program, streamline application for graduate school, and double counting six hours of undergraduate or graduate courses (Must be 4000 level or higher) taken as an undergraduate.
- Students applying for the B.S.-M.S. program must have a minimum Georgia Institute of Technology grade point average (GPA) of 3.5 at the time of application. Application must be made during the term in which students complete ECE 3040 (EE) or ECE 3030 (CmpE) or by Drop Day of the term immediately following completion of ECE 3040 or ECE 3030. Applications submitted prior to completing ECE 3040 (EE) or ECE 3030 (CmpE) will not be accepted and could negatively impact program eligibility.
- Students interested in applying for the B.S.-M.S. program will submit a graduate school application and a brief Statement of Purpose addressing interests and ambitions, how a graduate level degree will support these plans and offering a brief recap of academic and personal accomplishments that support their interest in graduate level work.
  - One letter of recommendation from an ECE faculty member is also required. Additional recommendation letters are also accepted.
  - The GRE and application fee requirements are waived for students admitted through the B.S.-M.S. program.
- Once admitted, B.S.-M.S. students are expected to maintain a strong grade point average through the remainder of their undergraduate program.
  - The final undergraduate GPA is expected to be 3.50 or higher.
  - Students admitted into the B.S.-M.S. program cannot have an undergraduate term GPA lower than 3.0.
- Students admitted into the B.S.-M.S. program may use up to six credit hours of undergraduate or graduate level ECE coursework for both degrees.
- In order to double count hours towards the B.S. and M.S., the Master's degree must be completed within a two-year period from the award date of the Bachelor's degree.
- Students wishing to apply for the B.S.-M.S. program should first review the B.S.-M.S. materials on ECE's website: <https://www.ece.gatech.edu/current-students/undergraduate/joint-bsms>.

### **Classes Completed as a GT Undergraduate**

- Students who graduated with a B.S. from ECE with at least a 3.5 GPA may choose the “**Graduate Option**” rather than the B.S.-M.S. plan. In this case, they apply to graduate school using the full application and they may double-count 6 credits taken as a Georgia Tech undergraduate towards their M.S. degree provided that the classes meet the requirements for both degrees. In order to double count class toward both the B.S. and the M.S., the M.S. degree requirements must be completed and the M.S. degree awarded within two years of the BS degree.

- Students who completed their undergraduate degree in ECE, including those who are ineligible for the B.S.-M.S. program may be able to count excess courses taken as an undergraduate towards their M.S. degree. This information will be verified by an ECE undergraduate advisor.
  - Under this option, students take hours in excess of those required for the undergraduate degree, at either the graduate or senior level.
  - An undergraduate wishing to take graduate level courses using this option must be classified as a senior, have a minimum GPA of 3.25 and receive an on-line permit before registering for the course.
  - The excess hours so accumulated are considered for use toward the graduate degree by listing them along with the other classes to be used toward the graduate degree on the ECE Coursework Planning Form.
  - These classes are distinguished from those to be taken as a graduate student by recording a grade notation of "UG" and noting the term and year in which each class was completed.
  - The use of hours from undergraduate studies is also subject to approval by the Registrar's Office. This is done when M.S. the degree petition is submitted.
  - Up to 12 hours completed as an undergraduate may be used for the Master's degree. B.S.-M.S. students and Graduate Option Students who double-count 6 credits towards their M.S. degree are allowed two additional graduate level courses (taken as an undergraduate and not used towards the BS degree) to count towards their M.S. degree.

IMPORTANT NOTE: Undergraduate students are not to delay completion of the bachelor's degree by taking classes intended to be used toward a future graduate degree.

- Requests for permits to register for graduate level classes to be taken while classified as an undergraduate student are filed through the "Overload/Permit Request System" tab at <https://www.ece.gatech.edu/coursework-planning>. When you have to select the level of class for which you are seeking the permit, select "GRADUATE (ECE 6000-9999)". Your request will be forwarded to our office. You will be notified by email of our decision regarding your request.



## INFORMATION FOR NON-ECE GRADUATE STUDENTS

### Registration Permits for Graduate (6000-9999) Level Classes

- All ECE graduate level classes are restricted to ECE majors through the first day of classes in each term.
- Non-ECE majors are considered for registration permits after the first day of classes.
- Non-ECE majors seeking permission to register for ECE graduate level courses must submit requests for registration permits through the “Overload/Permit Request System” tab at <https://www.ece.gatech.edu/coursework-planning>. When you have to select the level of class for which you are seeking the permit, select "GRADUATE (ECE 6000-9999)". Your request will be forwarded to our office. You will be notified by email of our decision regarding your request.

### Registration Permits for Undergraduate (1000-4999) Level Classes

- Non-ECE graduate students needing prerequisite over-rides or other permission to take ECE undergraduate courses should follow the instructions above.
- Non-ECE graduate students seeking permission to register for ECE undergraduate level courses must submit requests for registration permits through the “Overload/Permit Request System” tab at <https://www.ece.gatech.edu/coursework-planning>. When you have to select the level of class for which you are seeking the permit, select "UNDERGRADUATE (ECE 1000-4999)". Your request will be forwarded to our office. You will be notified by email of our decision regarding your request.

### Non-Majors Seeking an ECE Degree

- Students in other Georgia Institute of Technology graduate programs may request permission to pursue an M.S. degree in ECE as part of their studies at Georgia Tech. Students wishing to change their major to ECE are required to visit the ECE Academic Office.
- Non-ECE students who intend to pursue a secondary ECE M.S. degree while attending the Georgia Institute of Technology must make their intentions known to ECE's Graduate Affairs Office before completing **no more than four** ECE courses at Georgia Tech. This is done by submitting the following materials with the ECE Graduate Affairs Office:
  - Letter of Intent: With this letter, the student requests permission to pursue an ECE M.S. degree and includes a statement of purpose outlining the reasons for pursuing the ECE M.S. – i.e. describes how the ECE M.S. degree fulfills the student's academic, research, and career goals. The Letter of Intent must be endorsed by the Graduate Coordinator of the major school.
  - Recommendation Letter
    - A recommendation letter from the student's advisor addressing the ways in which the ECE M.S. degree supports the student's studies in the major school.
    - If the student does not have a research advisor, they need to submit a recommendation letter from a faculty member in their department.
  - Request the home department to forward a copy of the initial application to Georgia Tech to the ECE Academic Office.

## **THE FINAL WORD**

### ECE Graduate Affairs

If you are unable to find the information you seek, are unsure about specific requirements, need advise, or just need to talk to someone, contact the ECE Graduate Affairs Office:

- Seek information on ECE's website: <https://www.ece.gatech.edu/>
- Email for guidance at: <https://www.ece.gatech.edu/content/contact-graduate-affairs-office-current-students>
- Telephone 404-894-2900
- Come by during office hours (9:30 a.m. to 12:00 p.m., 1:30 p.m. to 4:30 p.m.) or request an appointment

### Registrar's Office

**Seek information on their website (<http://www.registrar.gatech.edu>) or contact them at [comments@registrar.gatech.edu](mailto:comments@registrar.gatech.edu) or <http://www.registrar.gatech.edu/contact.php> for matters concerning:**

- Registration, Graduation, Commencement, Degree Completion Verification
- Enrollment Certification
- Letters of Completion
- Institute Academic Policy

### Office of International Education

Seek information on their website ([www.oie.gatech.edu](http://www.oie.gatech.edu))

- Visa and Immigration Matters
- Optional Practical and/or Curricular Practical Training Matters

### Bursar's Office

Seek information on their website ([www.bursar.gatech.edu](http://www.bursar.gatech.edu))

- Student financial accounts, Fee Payments
- Refunds

### Center for Career Discovery and Development

See information on their website (<http://www.careerdiscovery.gatech.edu/>)

- Internship Opportunities

### GT Graduate Studies Office

Seek information on their website (<http://www.grad.gatech.edu>)

- Thesis Deadlines, Thesis Submission Procedures and Forms

### Student Financial Assistance

Seek information on their website (<http://www.finaid.gatech.edu>)

- Loans
- Tuition Waivers
- Fellowships

### **DO NOT RELY UPON SECOND HAND ADVICE**

Well intentioned faculty and fellow students may not be aware of current policy information and may unintentionally provide inaccurate information. Your degree is too important to rely on second hand information. Contact the ECE Graduate Affairs Office for any questions.