ECE Graduate Student Policy Manual

For the 2023-2024 Academic Year

VT | COLLEGE OF ENGINEERING
BRADLEY DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
VIRGINIA TECH.

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1   General Information

The Bradley Department of Electrical and Computer Engineering (ECE) at Virginia Tech offers master's and doctoral degrees in Electrical Engineering (EE) and Computer Engineering (CPE). This **ECE Graduate Student Policy Manual** provides graduate students with basic information about the policies, procedures, and activities in the ECE Department. Students must also refer to the Virginia Tech Graduate School Catalog for the policies and procedures that apply to all Virginia Tech graduate students.

Specifically, this Manual contains information about:

- The ECE Graduate Advising Offices and a general introduction to policies and common procedures for ECE graduate students
- The available graduate degree programs offered by the ECE Department
- The admissions requirements for prospective ECE graduate students
- New student information
- Requirements for completing the M.S. degrees in both EE and CPE
- Requirements for completing the M.Eng. degrees in both EE and CPE
- Requirements for the Ph.D. degree programs in both EE and CPE (including the procedures and various examinations required in completing each degree program, scheduling information).

If there are any questions regarding the interpretation of any regulation or requirement in this Manual, or if there are questions about the graduate program involving matters not covered in this Manual, please consult your Graduate Academic Advisor.

1.1   ECE Graduate Advising Offices

The ECE graduate program is administered by a number of personnel including the Graduate Program Director, Graduate Directors of specific degree programs, and Graduate Advisors and Coordinators. These administrative personnel are listed in the Appendix. The responsibilities of these personnel are described below.

1.1.1   Graduate Academic Advisors

The Graduate Academic Advisors assist in all aspects of the admissions process and advise new and enrolled ECE graduate students with the academic procedures for obtaining ECE graduate degrees. The advisors may be contacted by email to vt.ece.gradadm@vt.edu (for all admissions questions) and to eceadvising@vt.edu (for all graduate advising questions).

> **Mailing Address for Admissions Correspondence:**
> ECE Graduate Admissions
> 1185 Perry Street
> 453 Whittemore (0111)
> Virginia Tech
> Blacksburg, VA 24061-0111

1.1.2 Graduate Program Director

The ECE Graduate Program Director is appointed by the ECE Department Head. The duties of the Director include the following:

- Chair the ECE Graduate Committee
- Manage ECE graduate admissions
- Ensure that the ECE Graduate Handbook is available on the ECE web page and is kept current
- Make final decisions regarding exceptions to ECE graduate policies
- Help to resolve conflict or outstanding issues that may arise as part of ECE graduate students' education at Virginia Tech
- Ensure that the ECE contents of the Virginia Tech Graduate Catalog web page is kept current.

1.1.3 Assistant Graduate Program Directors

The Assistant Graduate Program Director for specific degrees programs are appointed by the ECE Department Head. The duties of these Program Directors are to assist in the management of their appointed degree program in consultation with the Department Head and the ECE Graduate Program Director.

1.1.4 ECE Graduate Committee

The ECE Graduate Committee is composed of the Graduate Program Director (who chairs the committee), all other ECE Graduate Program Directors, and additional faculty members appointed by the ECE Department Head. The Graduate Academic Advisors and the ECE Department Head serve as non-voting members of the committee. The committee addresses recommendations from faculty, with graduate curriculum development, and with all other matters concerning graduate studies with in ECE. Activities include, but are not limited to:

- The development of academic and strategic goals, policies, and procedures for the ECE graduate program
- Continual review of the graduate curriculum, evaluation of the ability to meet the stated goals, and proposals of needed curricular revisions
- The evaluation of proposals from faculty relevant to the ECE graduate degree programs.

1.1.5 Virginia Tech Graduate School

The Graduate School publishes a Graduate Catalog, providing the Graduate School requirements and regulations that apply to all graduate students. There are additional departmental requirements which, in some instances, are more stringent than those of the Graduate School. Thus, the information in this Manual supplements, and in many cases supersedes, the information given in the Graduate Catalog. This Manual includes the department rules and regulations that apply to ECE graduate students and assistants together with many of the most commonly encountered Graduate School regulations. Students must consult the Graduate Catalog and this manual when planning or revising their plans of study.

1.2 Virginia Tech Graduate Honor Code

The Graduate Honor Code establishes a standard of academic integrity. As such, this code demands a firm adherence to a set of values. In particular, the code is founded on the concept of honesty with respect to the intellectual efforts of oneself and others. Compliance with the Graduate Honor Code requires that all graduate students exercise honesty and ethical behavior in all their academic pursuits at Virginia Tech, whether these undertakings pertain to study, course work, research, extension, or teaching.

It is recognized that graduate students have very diverse cultural backgrounds. In light of this, the term ethical behavior is defined as conforming to accepted professional standards of conduct, such as codes of ethics used by professional societies in the United States to regulate the manner in which their professions are practiced. The knowledge and practice of ethical behavior shall be the full responsibility of the student. Graduate students may, however, consult with their major professors, department heads, International Graduate Student Services, or the Graduate School for further information on what is expected of them.

More specifically, all graduate students, while being affiliated with Virginia Tech, shall abide by the standards established by Virginia Tech, as described in this Constitution. Graduate students, in accepting admission, indicate their willingness to subscribe to and be governed by the Graduate Honor Code and acknowledge the right of the University to establish policies and procedures and to take disciplinary action (including suspension or expulsion) when such action is warranted. Ignorance shall be no excuse for actions which violate the integrity of the academic community.

The fundamental beliefs underlying and reflected in the Graduate Honor Code are that (1) to trust in a person is a positive force in making a person worthy of trust, (2) to study, perform research, and teach in an environment that is free from the inconveniences and injustices caused by any form of intellectual dishonesty is a right of every graduate student, and (3) to live by an Honor System, which places a positive emphasis on honesty as a means of protecting this right, is consistent with, and a contribution to, the University's quest for truth.

For additional requirements and further information, please refer to the on-line information on Graduate Honor System and the Honor Code contained on the Virginia Tech Graduate School website at this link.

1.3 Diversity and Inclusion Requirement

The ECE Department is committed to fostering a diverse community of faculty, staff, and students. The Virginia Tech Graduate School's Office of Recruitment, Diversity, and Inclusion focuses on graduate student recruitment and on providing support to students as they get acclimated and adjusted to their graduate programs/certificates through the development of inclusive and diverse programming to meet students' needs. In addition, the ECE Department works closely with the College of Engineering's Graduate Diversity Programs to help facilitate programs designed specifically for graduate students. More information about the diversity and inclusion efforts at the Graduate School levels may be found on-line at this link.

The Graduate School requires all students receiving a graduate degree to satisfy Inclusion and Diversity Requirement. ECE graduate students satisfy this requirement by enrolling and passing the course ENGE 5304, Graduate Student Success in Multicultural Environments (GSSME), which must appear on each ECE graduate student's plan of study.

1.4   Scholarly Ethics and Integrity Requirement

The Graduate School requires all students receiving a graduate degree to satisfy a Scholarly Ethics and Integrity training requirement. In addition, all ECE graduate students are expected to uphold the Virginia Tech Principles of Community and the Graduate School's Expectations for Graduate Education as well as the scholarly integrity and research ethics standards of their disciplines. To satisfy this requirement, ECE graduate students must:

- Attend the mandatory ECE Graduate Student Orientation held for their first semester of enrollment as an ECE graduate student
- Enroll and pass the fall semester of ECE 5944, Graduate Seminar
- Successfully complete the NSF Responsible Conduct of Research (RCR) requirement as implemented at Virginia Tech.

Additional details on the ECE requirements for satisfying the Scholarly Ethics and Integrity training requirement is given at the Graduate School's website at this link.

1.5   Expectations for Graduate Education

The ECE Department supports the Virginia Tech Graduate School's expectations for graduate students, graduate program faculty, academic departments and programs, and the Graduate School at Virginia Tech across all the university's campuses. The ECE Department is committed to ensuring that these expectations are upheld by all. The Virginia Tech Graduate School's expectations document is available at this link.

1.6   Graduate Ombudsperson

The Ombudsperson for the Graduate School helps members of the Graduate School community engage in and manage conflict in a constructive way. More information about the Graduate Ombudsperson may be found at this link.

1.7   Conflict Resolution for ECE Graduate Students

If an ECE graduate student encounters a problem or a concern that cannot be resolved with their advisor, or in an ECE course (e.g., a grading issue), or with interactions within their research group, there is a "chain of command" to follow. This chain of command should be followed to help in the resolution of conflict or outstanding issues that may arise as part of your graduate education within ECE at Virginia Tech. The order is the following:

1. Your first point of contact is your academic advisor
2. The second point of contact is the ECE Graduate Program Director
3. If and only if you are unable to resolve your concern with (1) and (2), the third point of contact within ECE is the ECE Department Head
4. Issues or concerns not resolved by consulting these three ECE points of contact should be brought to the Dean of the Graduate School
5. In parallel with consulting the Graduate School Dean, for an independent advocate, you may also contact the Graduate School Ombudsperson.

1.8   Changing Graduate Degree Programs

To change graduate degree program (e.g., M.Eng. to M.S. or M.S. to direct Ph.D.), a student must obtain approval of their faculty advisor and the Graduate Program Director. The Graduate Advising Office will not proceed with the requested change without such approval. A change of degree program can be requested only after the first semester of enrollment and the student must have at least 9 graded course credit hours and a minimum 3.3 overall GPA. Note that Graduate School policy allows a student to change graduate degree only once. M.S. thesis and Ph.D. students funded at any time by a Graduate Teaching Assistantship (GTA) are not eligible to change to the M.Eng. or M.S. non-thesis degree. M.S. thesis and Ph.D. students funded by a Graduate Research Assistantship (GRA) must have faculty advisor's approval to the M.Eng. or M.S., Non-thesis, degree. The Graduate School also requires that change of degree programs be requested prior the completion of 21 graded course credit hours. Detailed information on changing from any ECE Master's degree to another ECE graduate degree is given here.

1.9   Petitions to the ECE Graduate Committee

This ECE Graduate Policy Manual includes the policies and procedures for ECE graduate degree programs. In exceptional cases, a student may have legitimate reasons for deviating from these general requirements. In such cases, the student may submit a petition to the ECE Graduate Committee to request special consideration.

1.10 Minimum Registration for Students on Assistantships

All graduate students who are supported by a teaching or research assistantship must be enrolled for some combination of coursework, research, or independent study totaling at least 12 credit hours during the semester they are funded.

1.11 English Proficiency for Teaching Assistants

The duties of graduate teaching assistants in ECE often include direct instructional contact. Therefore, international students whose native language is not English may have to pass an English Speaking Proficiency Evaluation in order to be eligible for a graduate teaching assistantship in ECE. More information is available at this link.

1.12 Immigration Advising

International students should consult directly with Cranwell International Center for guidance related to: Immigration: I-20/Visa immigration documents; maintaining immigration status; CPT and OPT applications; and reduced credit enrollment. For more information, consult the on-line resources available at this link.

1.13 ECE Graduate Student Forms and their Submission

ECE graduate students must obtain department-level approval on all requests and forms that are submitted to the Virginia Tech Graduate School. Such requests for exceptions include but are not limited to late requests to add or drop courses, force-add course requests, requests for

exemptions from ECE or university policies, change of grade options (A/F to Audit or Pass/Fail or vice versa), or the addition of research hours to a student's schedule. Exceptions to the rules, policies and procedures must be handled through the ECE Graduate Committee. Additional forms required for ECE graduate students including but not limited to independent study requests, qualifying exam forms, plans of study, payroll forms, and force add requests.

Graduate School forms can be found at the at this link. Departmental forms may be found at this link. Forms that need to be processed to the Graduate School often require a signature from the ECE Graduate Program Administrators as noted by "Department Contact (Graduate Staff Coordinator)", or the "Department Head or authorized Graduate Program Director". **Do not email these forms to the Department Head or Graduate Program Director.** Instead, completed forms that require these signatures must be uploaded electronically to this Form Submission Request Page. Once uploaded, the form will be processed by your program advisor within 5 business days. The student will be copied when the form is submitted to the Graduate School.

1.14 Completion of Plans of Study for Summer Internships

International students must have an approved plan of study that includes the course GRAD 5944 or GRAD 7944 to be able to participate in a summer internship. To have time for the review and approval of a plan of study by the ECE Department and the Graduate School, completed plans of study must be submitted to your Academic Advisor by March 1st prior to the summer your internship begins.

1.15 Graduate School Probation Policy

The Graduate School will automatically place a graduate student on probation if their GPA falls below the minimum 3.0. Students on probation must submit an academic improvement plan that is approved by their faculty advisor, the ECE Graduate Program Director, and the Graduate School Dean. Normally, the probationary period is for one semester. Two consecutive semesters below a 3.0 GPA will result in dismissal from the Graduate School. The probation policy applies to all graduate students, regardless of status or campus location.

2 Admissions

2.1 Degrees Available

The Harry Lynde Bradley Department of Electrical and Computer Engineering offers graduate degree programs leading to the Master of Engineering (M.Eng.), Master of Science (M.S.), and Doctor of Philosophy (Ph.D.) in Electrical Engineering (EE) and Computer Engineering (CPE). The M.S. and Ph.D. degree programs are offered through the Blacksburg campus as well as the extended campus consortia (National Capital Region, Northern Virginia Center, Falls Church, Virginia; Central; Hampton Roads; Western; Virtual; and VT-MENA through Alexandria and Cairo, Egypt). The M.Eng. degree is offered at the National Capital Region (NCR) and Virtual campuses.

The ECE Department offers both an M.S., Thesis, and an M.S., Non-Thesis, degree. For the M.S., Thesis, degree, each plan of study is developed by the student in consultation with his or her faculty advisor satisfying the M.S., Thesis, degree requirements and the defense of a thesis. The M.S., Non-Thesis, degree is a coursework-based master's degree. The M.Eng. degree is a professionally-oriented degree that offers graduate students a strong academic foundation in core ECE technological areas with a culminating, project-based learning experience.

The Ph.D. is the highest academic degree awarded by the university and is conferred upon students who demonstrate outstanding original scholarship during advanced study. It signifies that the student can conduct independent research and has both a broad basic knowledge of all areas of the field and a comprehensive knowledge of one area. Students applying for the Ph.D. program typically have a master's degree from an accredited college or university in EE, CPE, or a related field.

A direct-Ph.D. option is available for students without an earned master's degree. These students will earn an M.S., Thesis, or an M.S., Non-Thesis, degree in addition to the Ph.D. degree.

2.2 Admission to the M.S. and Ph.D. Degree Programs

Admission to the M.S., Ph.D., or Direct Ph.D. programs requires the submission of the following materials:

- Completion of the on-line application found at the Graduate School website
- An up-to-date, electronic copy of all official transcript(s) must be submitted with the on-line application; please do not mail your official transcripts to the Graduate School until you have received an offer of admission from Virginia Tech
- Three (3) on-line letters of recommendation from people familiar with the student's academic and/or work background
- The Graduate Record Exam (the GRE general test including the verbal, quantitative, and writing) is optional for all applicants; however, applicants with a lower GPA, or from a school from which Virginia Tech ECE may not be familiar, may benefit from providing strong GRE scores
- The TOEFL or IELTS exam is required for applicants not earning a degree from an accredited university where English is the language of instruction
- A resume and a statement of purpose submitted with the on-line application
- A nonrefundable application fee of $75.00.

After all completed application materials are received, the ECE Graduate Program Director can make recommendations to the Virginia Tech Graduate School concerning admission based on ECE faculty input. Departmental guidelines for making these recommendations are detailed [here](#).

2.3   Admission to the M.Eng. Degree Programs

Admission to the M.Eng. program requires the submission of the following materials:

- Completion of the on-line application found at the [Graduate School website](#)
- Upload with your on-line application your scanned official transcripts from each institution that you will or have earned a degree from. Please do not mail official transcripts to the Graduate School until you have received an offer of admission.
- Two (2) letters of recommendation for domestic applicants and three (3) letters of recommendation for international applicants
- Graduate Record Examination (GRE)
  - The GRE is not required for qualified domestic applicants. For stronger consideration please submit a GRE score if the applicant GPA is below 3.0.
  - The GRE is optional for international applicants; applicants with a lower GPA, or from a school from which Virginia Tech ECE may not be familiar, may benefit from providing strong GRE scores
- The TOEFL or IELTS exam is required for applicants not earning a degree from an accredited university where English is the language of instruction
- A resume and a statement of purpose submitted with the on-line application
- A nonrefundable application fee of $75.00.

After all completed application materials are received, the ECE Graduate Program Director can make recommendations to the Virginia Tech Graduate School concerning admission. Departmental guidelines for making these recommendations are detailed here.

2.4   Admission Deadlines for the M.S. and Ph.D. Degree Programs

For international students applying to the M.S. and Ph.D. degree programs the deadlines for all application materials are the following:

- To be considered for funding (e.g., a graduate teaching or research assistantship), the deadlines are January 15 for fall admission and September 1 for spring admission
- International students that do not wish to be considered for funding may apply until February 20 for fall admission and September 1 for spring admission.

All international applicants who have not earned a bachelors or master's degree from an accredited university where English is the language of instruction, are required to take the TOEFL (Test of English as a Foreign Language) Exam or IELTS in addition to the GRE. Their applications will not be acted upon until both the TOEFL and the GRE test scores have been received.

For domestic students (students currently studying in the U.S.) applying to the M.S. and Ph.D. degree applying the deadlines for all application materials are the following:

- If you wish to be considered for funding, the deadlines are January 15 for fall admission and September 1 for spring admission
- Domestic students that do not wish to be considered for funding may apply until July 1 for fall admission and December 1 for spring admission.

All applications and materials **must** be submitted by these dates for full consideration. Please note that any international applications not completed by these deadlines cannot be considered for admission and will automatically be declined.

2.5   Admission Deadlines for the M.Eng. Degree Program

For international students applying to the M.Eng. degree program the deadlines for all application materials are the following:

- International students may apply until March 1 for fall admission or October 1 for spring admission.

For domestic students (students currently studying in the U.S.) applying to the M.Eng. degree the deadlines for all application materials are the following:

- March 1 for priority admission for fall admission (priority admission means this is your best opportunity to get an offer based on space and scholarship consideration); however, domestic students that do not want to be considered for priority admission may apply until June 1 for fall admission. Domestic students may apply until November 1 for spring admission.

2.6   Recommended Test Scores

The following test scores are recommended scores for students applying for admission to ECE graduate degree programs; however, they are not the minimum scores required for admission. The department considers the complete student's application in making admissions decisions.

GRE SCORES	TOEFL AND IELTS SCORES
- Verbal Score **153** - Quantitative Score **157** - Writing Score **4.5**	- TOEFL Internet-based Total **96-97** - TOEFL Computer-based Total **243** - TOEFL Paper-based Total **590-593** - IELTS Band Total **7.5**

2.7   Deferral and Reconsideration

ECE does not automatically grant deferrals or reconsider applications for admission. Please note the following:

- If you are accepted and want to defer, you must complete a new electronic application for the semester and year you wish to enroll. Acceptance is not guaranteed as your application will be reconsidered for admission
- If you were declined, and wish for your application to be reconsidered, you must complete a new electronic application and be re-evaluated for admission.

Deferrals or reconsiderations will be subject to the admission process for the requested semester.

2.8 Students with Non-EE/CPE Backgrounds (or switching between EE and CPE)

Students holding or expecting a bachelor's degree in a curriculum other than electrical or computer engineering (for the corresponding graduate degree) are handled on an individual basis. Grade Point Average (GPA) requirements for admission status are generally higher than for electrical and computer engineering graduates.

Students from programs such as physics, mathematics, computer science, engineering (other than electrical or computer), and other programs usually lack background in areas of work required of electrical and computer engineering students.

Each student's remedial course requirements must be assessed on an individual basis. The exact nature of courses which a student may need should be decided by the student and his or her interim advisor. Students crossing from CPE to EE or EE to CPE may also require additional undergraduate (or MS level) course work. Typical needs are the following:

BACHELOR'S DEGREE BACKGROUND	TYPICAL REQUIRED COURSE WORK GROUPS (SEE TABLES BELOW FOR COURSES RELATED TO EACH GROUP.)	
	EE	CPE
Non-ECE (Engineering)	B & C	C
Physics	C	C
Mathematics	B & C	C
Computer Science	A (less Stat 4714), B, & C	A (less Stat 4714) & C
Non-Engineering, Non-Physics, Non-Math	A, B, & C	A & C

Background courses will not apply toward the EE or CPE graduate degree. However, these courses, if taken at Virginia Tech, will be counted by the Graduate School toward a student's overall grade point average (GPA). These courses may be taken concurrently with graduate level EE/CPE courses, assuming prerequisites are met.

Students seeking a graduate degree in ECE with a bachelor's degree in a discipline other than EE or CPE (or changing from EE to CPE or CPE to EE) should have or obtain a background equivalent to the following Virginia Tech undergraduate courses.

	EE	CPE
Group A:	PHYS 2305-2306, MATH 2214, MATH 2224, MATH 2534 (for CPE), STAT 4714 (for EE)	
Group B:	ECE 3105, EM Fields I	No Requirement
Group C:	ECE 2024, Circuits and Devices ECE 2214, Physical Electronics ECE 2514, Computational Engineering ECE 2544, Fundamentals of Digital Systems ECE 2714, Signals and Systems **Three (3) of the following:** ECE 3106, EM Fields II ECE 3304, Power ECE 3614, Communications ECE 3704, Continuous & Discrete Systems	ECE 2024, Circuits and Devices ECE 2214, Physical Electronics ECE 2514, Computational Engineering ECE 2544, Fundamentals of Digital Systems ECE 2714, Signals and Systems **Three (3) of the following:** ECE 3504, Computer Organization and Architecture ECE 3514, Data Structures ECE 3544, Digital Design I ECE 3574, Software Engineering

2.9 Graduate Admission Guidelines

In the following subsections we detail the admissions guidelines used by ECE faculty and the Graduate Program Director to make admissions decisions.

2.9.1 Ph.D. Programs

An applicant to the Ph.D. degree will have received the master's degree from an accredited (or Virginia Tech technically recognized) college or university. Applicants must apply for the Ph.D. Program through the on-line Graduate School Application Form.

- An applicant will rank high in his or her class academically (U.S. standard: GPA 3.5 or above on work beyond the bachelors as computed by Virginia Tech). Required standardized test scores may also be used in the admission process. The TOEFL or IELTS (for international students not earning a degree from an accredited university where English is the language of instruction) test is required for admission. The GRE general test is optional.
- The applicant must indicate a field of specialization and discuss potential area(s) of interest in their statement of purpose. Admission to the Ph.D. program requires that ECE faculty must be willing to advise the applicant in their proposed research area(s).
- The decision of acceptance into a Ph.D. Program will be determined by the Graduate Program Director typically with recommendation on behalf of the applicant from the research area in pursuit.
- A student who has not written a thesis or an equivalent research paper may be considered for admission into the Ph.D. program upon the recommendations of at least three faculty members who can comment on the student's research and writing abilities. However, it should be noted that generally a M.S., thesis, is preferred.

2.9.2 Direct-Ph.D. Programs

A highly qualified applicant with a bachelors (or equivalent) degree, without an M.S. degree, can apply for the Ph.D. Program through the on-line Graduate School Application Form for the joint

MS/Ph.D. direct-Ph.D. Program. Such students generally shall have a bachelor's degree in electrical/computer engineering from a peer university, or from an acceptable institution of higher learning that is recognized by the department.

- Direct entry into the Ph.D. program shall be contingent upon an earned GPA of 3.5 or higher over the last 60 course credit hours of his/her undergraduate degree.
- The direct-Ph.D. applicant is advised to establish a relationship with at least one faculty member of the department who agrees to be the student's dissertation advisor.
- The decision to accept direct entry into the direct-Ph.D. program shall be made by the Graduate Program Director with recommendation on behalf of the faculty from the research area in pursuit.
- The applicant must indicate a field of specialization and be acceptable to the Electrical and Computer Engineering faculty within this field.

2.9.3 Virginia Tech Master's Students Applying to the Ph.D. Program

Students who are currently enrolled in the M.S. or M.Eng. Programs at Virginia Tech, and desire to continue their studies toward a Ph.D. degree, must apply for the Ph.D. Program through the on-line Graduate School Application Form by the required departmental deadline for semester/year applying. This request must be accompanied by information as follows:

- A letter from an ECE faculty member testifying to the student's ability to perform independent research. This letter must also include a summary of the student's past academic performance (course work, examinations, etc.)
- A letter from the student with a discussion of career goals and proposed area of study
- A letter from the student's M.S. advisor (if different from the member above) commenting on the student's performance and potential in the Ph.D. program.

A student is expected to have at least a 3.5 GPA from the master's degree at Virginia Tech. Acceptance is not automatic; the willingness of a faculty member to be the student's Ph.D. advisor is required. The Admission Officers determine acceptance for students continuing their graduate studies at Virginia Tech based on academic credentials and the perceived ability to perform research.

2.9.4 Master of Science (M.S.), Thesis and Non-thesis

To be considered for the M.S. degree program, students should meet the following admission standards. Students holding or expecting a bachelor's degree from an ABET accredited engineering school should have a minimum GPA of 3.3 for the last 60 course credit hours (approximately last 2 years), as it appears on the transcript. For students from non-ABET programs, the minimum GPA is 3.8 or above, depending on the program. Additional restrictions may apply based on available funding, space within the program, compatibility with program objectives, or faculty advising.

If circumstances warrant an exception, the Admissions Officers may consider an admission status which deviates from the above policy. Factors which enter into such decisions include the institution where the student studied, the specific courses taken and grades earned (e.g., grades in technical courses may be weighted more heavily), work experience in industry or government laboratories, and recommendations from professors and/or work supervisors.

2.9.5 Master of Engineering (M.Eng.), Project and Report

To be considered for the M.Eng. degree program, students should meet the following admission standards. Students holding or expecting a bachelor's degree from an ABET accredited engineering school should have a minimum GPA of 3.0 for the last 60 course credit hours (approximately last 2 years), as it appears on the transcript. For students from non-ABET programs, the minimum GPA is 3.5 or above, depending on the program. Additional restrictions may apply based on available funding, space within the program, compatibility with program objectives, or faculty advising.

If circumstances warrant an exception, the Admissions Officers may consider an admission status which deviates from the above policy. Factors which enter such decisions include the institution where the student studied, the specific courses taken and grades earned (e.g., grades in technical courses may be weighted more heavily), work experience in industry or government laboratories, and recommendations from professors and/or work supervisors.

2.9.6 Commonwealth Campus Program

The Commonwealth Campus Program is for individuals that:

1. Are currently employed and would like to take courses upon advisement of employer, or
2. Do not have a high enough undergraduate GPA to qualify for regular admission.

The Commonwealth Campus Program is administered by the Graduate School. The application deadline for this program is two weeks prior to semester requesting entrance. Upon completion of 9 to 12 credit hours in the Commonwealth Campus Program, students may apply for Regular Admission in EE or CPE. The maximum enrollment of course credit hours per semester is 6 and no more than 12 may be taken under the Commonwealth Campus Program. More information about the Commonwealth Campus program can be found at this link.

2.9.7 Dual Student Status

Seniors within one semester of graduation, with an overall GPA of at least 3.0, may take graduate courses to satisfy an advanced degree program requirements as dual *registrants* if accepted to the graduate program (refer to the Graduate Catalog for additional details). The student must complete the Accelerated Undergraduate/Graduate Degree and Course Designation form (available from the Graduate School web site) in advance of taking the courses. The student may not receive both graduate and undergraduate credit for the same course. Once the B.S. degree is completed, the student status will automatically change from dual to regular masters. More information about Dual Degree Status can be found at this link.

2.9.8 Accelerated Undergraduate/Graduate Degree Program

The Accelerated ECE Undergraduate/Graduate Degree (UGG) program allows advanced undergraduate students the opportunity to earn both a BS degree from their home department and an ECE graduate degree. The ECE graduate degrees available are the Master of Engineering (MEng), Master of Science (MS Thesis or MS Non-Thesis), and the Doctor of

Philosophy (PhD) in either the Electrical Engineering (EE) or Computer Engineering (CPE) programs. The advantage of the program is that it allows enrolled students to double-count up to 12 course credit hours (with the restrictions listed below) toward both degrees.

Virginia Tech undergraduate students who have a minimum GPA of 3.3 or better on all undergraduate work, may apply for admission to the Accelerated ECE UGG Degree program. A student may enter the program within the 12-month time period prior to the expected completion date of their BS degree. To receive graduate credit, acceptance into the Accelerated UGG Degree program is required prior to the semester in which enrolled in the courses selected for double-counting. Once accepted to the program, and during the last two semesters of their undergraduate program, students may count a maximum of 12 credit hours of course work toward both the BS and graduate degrees.

A complete application for the ECE UGG program must include the following:

1. A submitted on-line graduate application for ECE graduate studies at Virginia Tech at this link. The application must include the following:
   - Apply for an ECE graduate degree program (MEng, MS, or PhD) in EE or CPE for the semester/year after you plan to complete your BS degree. For example, if I were planning to graduate with my BS in spring 2024, I would apply for the ECE graduate degree for fall 2024 by the May 15, 2023, or December 15, 2023, deadline.
   - Two on-line letters of recommendation are required for the application; typically, one of these letters is from the proposed faculty advisor.
   - Students applying for this program are not required to take the GRE for admission.
   - Payment of a $75.00 non-refundable Graduate School application fee.

2. A completed "Accelerated Undergraduate/Graduate Degree and Course Designation Status Form" detailing the courses to be doubled counted for both the undergraduate and graduate degree programs. This form is available on the Graduate School's forms website at this link, where it can be found under the "Admissions" section.
   - To apply for the Accelerated ECE UGG Degree program, you will need an "Advisor's Signature" on the form submitted to the Graduate School. The advisor will depend on the degree to which you are applying.
     - MEng: For the MEng degree, the MEng Graduate Program Director will sign as the advisor.
     - MS Non-Thesis: For the MS Non-Thesis degree the MS Non-Thesis Graduate Program Director will sign as the advisor.
     - MS Thesis or PhD: For the MS Thesis or PhD degrees, an ECE graduate faculty member must have agreed to serve as faculty advisor for the student's graduate degree. The student should work with their faculty advisor to develop a Research Statement to be submitted as their Statement of Purpose with their graduate application. This faculty advisor will sign the form.
   - The completed form must be submitted your ECE Undergraduate Academic & Career Advisor, simultaneously with submission of the on-line graduate application. If there are any subsequent changes to the courses to be double-counted, an updated form must be submitted prior to completion of the undergraduate degree.

3. An official Virginia Tech transcript is not required if all undergraduate degree course work is from Virginia Tech. An official transcript is required for course work transferred

from other undergraduate schools and should be submitted with your on-line graduate application.

A Summary of the Rules and Restrictions for the ECE UGG Program is given below:

1. There is a maximum of 12 credit hours that can be double-counted between your undergraduate and graduate degrees.
2. No more than six credit hours of double-counted courses can be at the 4xxx level. For conjoined, or co-located courses, students should designate the graduate version of the course. Contact the ECE Graduate Advising Office for the current list of these courses.
3. Required capstone 4xxx level courses cannot be double-counted (e.g., 4805/4806 is used for senior design credit for an CPE or EE major).
4. Students must obtain a 'B' or better in each course taken while an undergraduate to be double-counted – no exceptions.
5. All double-counted coursework must be consistent with the ECE Graduate Policy Manual for the appropriate graduate degree. Independent Study (ECE 4974) and Undergraduate Research (ECE 4994) cannot be counted toward the graduate degree.
6. The UGG program is offered at all campuses, including the Blacksburg, Northern Virginia Campus (NCR), and Virtual campuses. Students may transfer between these campuses for their graduate degree.

The recommended dates for submitting these forms are May 15th for students applying for fall semester and December 15th for spring semester admissions. Any updates to this form must be submitted by the end of the semester prior to when the student will begin their graduate program.

2.9.9 Industry Cohort Graduate Degree Program

The ECE Department has made agreements with specific companies and government agencies through Virginia Tech's Office of Continuing and Professional Education (CPE) to offer M.Eng. and M.S. Non-thesis degrees to their employees. In this Manual we refer to these students as Industry Cohort students. Typically, Industry Cohort students are part-time, taking one or two courses per semester, often as Virtual students. For more information about admission these programs, please contact the ECE Master of Engineering Admissions Director.

2.9.10 Exchange (Non-Degree) Status

Students often come to Virginia Tech to take classes that will be applied toward a degree at another institution. These students are typically enrolled in the equivalent of the UGG program at their home institution. Exchange students in this category may generally take graduate classes if they have completed the 4th year of the equivalent UGG program. A change of status to regular graduate student status will only be considered for students that are currently in the final year of their extended UGG equivalent program. The GRE general test is required for this change of status request. In addition, no more than 6 credit hours of the classes applied toward the degree at the home institution may be used toward a graduate master's degree in ECE at Virginia Tech (a final transcript confirming the courses used will be required before a graduation application may be processed). Credits earned while on non-degree status normally may be applied toward fulfillment of degree requirements, if the status is changed to a degree status and the courses meet the 6-hour limit of courses used at the home institution.

2.9.11 Readmission

For any two consecutive semesters in which a graduate student does not register, an "Application for Readmission" form (available at this link) is required to attend any subsequent semester.

3   New Student Information

3.1   ECE Advisement Orientation Session

An ECE advisement orientation session is held for incoming graduate students one week prior to the first week of classes for the fall semester and spring semesters. Attendance of this orientation session is mandatory for all new graduate—attendance for this session will be taken. Attendance is required as part of satisfying the scholarly ethics and integrity Graduate School requirement.

3.2   Payroll Forms

All newly funded graduate students (assistantships and fellowships) must report to the ECE Payroll Office to complete the I-9 and Payroll Forms by the first day of employment (which is the start date listed on the Assistantship Agreement Form) and no later than the first day of classes. Failure to report to the ECE Payroll Office will result in termination of the assistantship appointment. Instructions and the specific office to submit these payroll forms will be sent to new ECE graduate students prior to the beginning of their first semester of enrollment.

3.3   The Interim Faculty Advisor

In the following subsections we detail the role of the interim academic advisor for each ECE degree program.

3.3.1   Interim Faculty Advisor for a M.Eng. Student

Entering M.Eng. students are assigned an interim faculty advisor before the beginning of their first semester of enrollment. The interim faculty advisors can assist new students in several important ways including:

- Giving new students helpful information in selecting courses for the first one or two semesters of coursework
- Assisting students with issues specific to the M.Eng. degree programs at the Innovation Campus.

It should be noted that interim faculty advisors, each M.Eng. student will migrate to a permanent advisor to chair their M.Eng. project and report.

3.3.2   Interim Faculty Advisor for a M.S. Student

Entering M.S. thesis and non-thesis students not having a faculty advisor upon arrival will be assigned an interim faculty advisor in their desired area of concentration. Interim faculty advisors can assist new students in several important ways including:

- Giving new students helpful information in selecting courses for the first one or two semesters of coursework,
- Assisting M.S. thesis students in becoming familiar with research opportunities, and

- Helping M.S. thesis students to select permanent faculty advisors.

It should be noted that interim faculty advisors are only committed to assist students on a temporary basis. It is each M.S. thesis student's responsibility to find a permanent advisor for their thesis. M.S. non-thesis students will be assigned a faculty advisor to help ensure that they satisfy the M.S. non-thesis degree requirements.

3.3.3 Interim Faculty Advisor for a Ph.D. Student

An incoming Ph.D. student without a permanent faculty advisor will be assigned an interim faculty advisor by the chair of the area committee. The assigned interim faculty advisor will essentially be in the student's desired field of specialization. The responsibilities of an interim faculty advisor are:

- Familiarizing the student with the research activities in the interest area
- Endorsing a course plan for the first academic semester
- Ensuring that the student's work satisfies the academic standards for the Ph.D. degree
- Assisting the student in finding a permanent faculty advisor in accordance with the rules of the Graduate School
- Guiding the student toward the Ph.D. Qualifying Examination requirements.

An interim faculty advisor is not authorized to develop a formal Ph.D. plan of study with the advisee unless he or she is also willing to serve as the student's faculty advisor.

3.4 Registration

The ECE Graduate Courses and their descriptions are accessible through the ECE Graduate Student website. Upon arrival, new students should select the courses to be taken for the first semester of enrollment in consultation with their interim faculty advisor or faculty advisor. New students are encouraged to register for at least two to three courses (nine credit course hours) per semester during their first academic year. Courses are to be added by the student using the university's registration system, Hokie Spa.

The Bursar's Office has an electronic billing system and notifications of expenses incurred are sent via e-mail. Students can also access their Bursar's Account through Hokie Spa.

Registration for courses in succeeding semesters is processed electronically on the Hokie Spa during the university course request period. Once enrolled in a course, the student may choose to drop it at any time before the university drop deadline. Exceptions to the drop deadline are only given in extenuating circumstances with approval of the ECE Graduate Program Director.

The university requires graduate students that are funded on an assistantship or fellowship to enroll in 12 to 18 credit hours per semester. Assistantship and fellowship appointments will be withdrawn if enrollment falls below the minimum 12 credit hours set forth by the university. Students that are not on an assistantship are required to enroll in at least 9 credit hours per semester to be full-time.

Students may enroll in ECE 5904, Project and Report; ECE 5994, Thesis; or ECE 7994, Dissertation, to fulfill the requirement the full-time enrollment requirement. Students must enroll in Project and Report/Thesis/Dissertation by the CRN number assigned to their interim faculty advisor or faculty advisor. Students are required to inform the faculty if enrolled in one of their CRN numbers to determine the requirements and faculty expectations to earn a passing (EQ) grade. These credit hours are not to be viewed as filler but rather a commitment to a certain research load as mutually agreed upon by the student and faculty advisor.

Once an applicant registers, the application materials become part of the student's educational record. ECE faculty and staff are allowed to access graduate student's educational files for consideration of advising and research funding. Under the Family Education Rights and Privacy Act (FERPA) of 1974, a student has the right to waive this access. To do so please comply in writing to the ECE Graduate Advising Office.

3.5   Special Policies for ECE Graduate Course Work

In the following subsection, the ECE graduate program's special policies on course registration for all graduate degrees is detailed.

3.5.1   Graduate Seminar, ECE 5944

The ECE Seminar course, ECE 5944, is one-credit hour and is intended for new ECE on-campus and extended campus M.S. and Ph.D. graduate students. Research and engineering activities in many areas of current interest to electrical and computer engineers are presented by invited lecturers. The seminar course is Zoom-based and offered at the Blacksburg campus, Northern Virginia Center (NCR), and all other campuses.

For all first-year graduate students (MS and PhD), attendance at all seminars is mandatory. Students failing to attend all seminars in each semester shall receive an F on their transcript which will be included in a student's overall GPA. If assigned duties or other time conflicts interfere with a regularly scheduled seminar, students must submit a written request in advance of a seminar for an excused seminar absence to the Graduate Seminar Instructor. The seminar course is taken on a Pass/Fail basis and is included on the plan of study. Additionally, graduate students are also expected to attend seminars in their specialty area(s) within the department.

3.5.2   Cross-Listed Courses

Cross-listed courses are courses that are listed in the course catalogs of more than one department. ECE graduate students should register for the ECE version of ECE courses cross-listed with other departments.

3.5.3   Co-located and Conjoined Undergraduate/Graduate Courses

Several ECE courses are co-located or are conjoined. ECE graduate students should register for the graduate version of these courses and cannot receive credit for both courses on their plan of study. A table, not necessarily exhaustive, for these courses is given below. Students with any questions about this policy should contact their Academic Advisor.

Undergraduate Course	Co-Located or Conjoined Graduate Course
ECE 4104, Microwave & RF	ECE 5104G, Adv Microwave & RF
ECE 4134, Fiber Optics & App	ECE 5134G, Adv Fiber Optics & App
ECE 4154, Space Weather	ECE 5164, Intro to Space Science I
ECE 4194, Remote Sensing	ECE 5194, Remote Sensing
ECE 4364, Alternate Energy Systems	ECE 5374G, Adv Alternate Energy Systems
ECE 4414, Linux Kernel Programming	ECE 5414G, Adv Linux Kernel Programming
ECE 4424, Machine Learning	ECE 5424, Adv. Machine Learning
ECE 4444, Technological Singularity	ECE 5444, Adv Technological Singularity
ECE 4540, VLSI Circuit Design	ECE 5545, Adv. VLSI Design
ECE 4550, Real-Time Systems	ECE 5550G, Adv. Real-Time Systems
ECE 4554, Computer Vision	ECE 5554, Computer Vision

3.5.4 Electrical Engineering Area Courses

The areas of electrical engineering courses are determined by the course numbering scheme given in the following table. Only courses at or above the 4000-level may be listed on a graduate plan of study.

Circuits and General	Electromagnetics	Electronics	Power	Communications	Signals, Systems, and Control
x0xx	x1xx	x2xx	x3xx	x6xx	x7xx

3.5.5 Computer Engineering Area Courses

The following table lists the courses associated with each of the four areas of computer engineering.

Computer Systems	Networking	Software & Machine Intelligence	VLSI & Design Automation
ECE/CS 4504	ECE 4560	ECE 4524	ECE 4514
ECE 4520	ECE 4564	--	ECE 4540
ECE 4530	ECE 4570	--	--
ECE 5504	ECE 5560	ECE 5524	ECE 5505
ECE 5510	ECE 5565	ECE 5554	ECE 5506
ECE 5550G	ECE 5566	ECE 5574G	ECE 5514
ECE 5530	--	ECE 5575	ECE 5520
ECE 5544	--	ECE 5576	ECE 5534
ECE 5564	--	--	ECE 5545
ECE 6514	ECE/CS 6564	--	ECE 5546
--	ECE/CS 6570	--	--

3.5.6 Special Study (5984) and Independent Study (5974) Courses

Special Study courses (5984) involve a group of students and are used to study a current topic or to experiment with a new course. ECE 5984, if being used to fulfill one of the required areas in EE or CPE, count in the area the course was approved in (for example, if the Computer Area Committee approves the 5984, the course counts as a "5" or Computer Area course).

Independent Study courses (5974), which are offered on a Pass/Fail only option, involve only the professor and an individual student. The subject of an Independent Study must be a continuation (in greater depth) of a topic covered in a regular ECE graduate course, allowing students to study topics of particular individual's interest. An Independent Study course will not be approved if it appears to be only an extension of a student's research work for the degree. 5974 courses cannot be used to fulfill the area requirement of an ECE degree. A maximum of 6 credits of Special and Independent Study may be listed on a master's plan of study. A maximum of 9 credits of Special and Independent Study may be listed on the Ph.D. plan of study (see Chapter 4 and Chapter 5 for more information).

The Independent Study form (available at this link) must be submitted to the student's ECE Graduate Academic Advisor no later than Tuesday of the first week of class for the enrolled semester/session. The ECE Graduate Academic Advisor will obtain approval from the Graduate Program Director and then enter the 3 credit hours onto the student's class schedule. Students cannot add ECE 5974, Independent Study, via the Hokie Spa add/drop system.

3.5.7 M.Eng. Specific Courses

Several ECE courses are for M.Eng. students only. These courses cannot be used on an M.S. or a Ph.D. plan of study, except ECE 5984/5044, Industry Topics and Professionalism, which can be used by Industry Cohort students on a M.S. Non-thesis plan of study. These courses and their degree program associations (for satisfying M.Eng. degree breadth course requirements) are the following.

Course Number	Course Notes	EE or CPE Area Association
ECE 5984/5044 (Industry Topics and Professionalism)	MEng core course	Neither EE or CPE, satisfies Ethics and D&I requirements
ECE 5014 (R&D Methods for Engineers)	MEng core course	Neither EE or CPE, counts as ECE course
ECE 5984 (Engineering Entrepreneurship)	MEng core course	Neither EE or CPE, counts as ECE course
ECE 5984/5024 (Math Methods for ECE)	MEng core course	Counts as EE area course
ECE 5480 (Cybersecurity and the Internet of Things)	MIT course that can be taken by M.Eng. students	Counts as CPE area course

3.5.8 Non-ECE Course Restrictions

There are restrictions as to whether courses from other departments can be used on an ECE plan of study. A summary of these restrictions is given below. These restrictions are continually changing as other department's curricula evolve. **If you have a question about whether a**

specific course can be used on a plan of study, you should discuss this course question with your Academic Advisor prior to enrolling in the course.

Course Number	Course Restrictions
CS 5014 (Research Methods in Computer Science)	Cannot be used on an M.Eng., M.S., or Ph.D. plan of study.
CS 5020 (Software Design and Data Structures)	Cannot be used on an M.Eng., M.S., or Ph.D. plan of study. Satisfy the Ethics and Diversity and Inclusion requirements per your degree requirements.
CS 5024 (Ethics and Professionalism in Computer Science)	Cannot be used on an M.Eng., M.S., or Ph.D. plan of study.
CS 5040 (Intermediate Data Structures and Algorithm Analysis)	Cannot be used on an M.Eng., M.S., or Ph.D. plan of study.
CS 5044 (Object-Oriented Programming with Java)	Cannot be used on an M.Eng., M.S., or Ph.D. plan of study.
CS 5045-6 (Computation for the Data Sciences)	Cannot be used on an M.Eng., M.S., or Ph.D. plan of study.
CS 5644 (Machine Learning with Big Data)	Cannot be used on an M.S., or Ph.D. plan of study. Can be used on an M.Eng. plan of study.
CS 5664 (Social Media Analytics)	Cannot be used on an M.S., or Ph.D. plan of study. Can be used on an M.Eng. plan of study.
CS 5805 (Machine Learning)	Students may not get credit for both CS 5805 and ECE 5424.
CS 5814 (Introduction to Deep Learning)	Students may not get credit for both CS 5814 and ECE/CS 6524.
ISE 5054 (Engineering Discourse)	Cannot be used on an M.Eng., M.S., or Ph.D. plan of study.

3.5.9 Auditing Courses

On very rare occasions graduate students may wish to audit a course. Audited courses appear on the student's transcript but cannot be used on a student's plan of study. A student may enroll in a course with an audit option, provided the instructor of the course and/or student's graduate advisor approves. An audited course does not count toward full-time enrollment.

Students wishing to audit an ECE course must complete an "ECE Course Audit" form (available at this link) by the third day of the first week of classes. This form must be submitted and be approved by the ECE Graduate Advising Office. If there is space in the course after the last day to add, students will be added to the class under the audit option. This is to allow room for students who need the course for their degree. Students who do not submit the ECE Audit Form and instead add a course as audit via Hokie Spa will be dropped from the class. Note that laboratories cannot be taken under the audit option.

Once a student audits a course, the course may not be repeated for credit. Also, the audit option cannot be changed to credit or vice versa after the last day to add. At the end of the course, the instructor will determine if an audit is "satisfactory" or "unsatisfactory" based on participation and other expectations set forth at the beginning of the course. Students earning an unsatisfactory audit receive an NG on their transcript which counts as a failing grade and be included in their overall GPA.

3.6 Miscellaneous New Student Information

In the following subsections we detail miscellaneous information relevant to all ECE graduate students.

3.6.1 Computer Accounts and E-mail

Graduate students are encouraged to have their own personal computer. All campus buildings have wireless connection which provides internet access throughout the Virginia Tech campus.

All graduate students should obtain a university e-mail account (PID) through Hokie Spa as soon as possible. Many important departmental announcements are made via e-mail, such as seminar notices. E-mail should be checked daily in order to receive these announcements in a timely manner. E-mail may be read from computers in the university computer labs as well as several sites within the department. All departmental information is distributed by e-mail.

Once their Virginia Tech PID is set up, graduate students may create an account for access to the ECE Computer Workstation Lab. The workstations offer many computational tools for graduate students that may be used in their classes or research.

3.6.2 ECE Graduate Student Mailing List

ECE Graduate Student Services maintains a google mailing list for general communication with ECE graduate students. The mailing address for this list is: ecegrad-g@vt.edu, all currently enrolled ECE graduate students are included in this list. ECE graduate students should pay close attention to announcements posted to this mailing list—they are often important, including: open GRA positions and GTA opportunities; graduate student policy changes, deadlines, and other important notifications; and employment opportunities. People able to post to this list are: ECE Graduate Student Services and ECE Graduate Student Association (GSA) representatives. If you have general information that you feel should be communicated to all ECE graduate students, email this request to ECE Graduate Student Services.

3.6.3 Study Desks

The ECE Department provides desks in Whittemore Hall, Durham Hall, Torgersen Hall, and other locations, for as many students as resources permit. GTAs may use, on a shared basis, desks in several rooms which are dedicated for that purpose. Alternatively, GTAs who have teaching responsibilities in various laboratories may use desks in those labs if desks are available. Except for the dedicated GTA desks, all other student study desks are reserved for GRA use and are under the control of laboratory, center, or research group directors. Any student seeking use of a desk should see their faculty advisor for further information. All desk assignments are temporary and are reviewed for continuation at least annually. All graduate student offices are to always remain locked. Food products (other than packaged snack-type items) are not to be left in any graduate student office. Usage of tobacco or alcohol products are not permitted anywhere in Virginia Tech buildings.

3.6.4 Locks and Keys

The research professor responsible for lab and office use must approve all keys and access codes for funded graduate students. Any lost or misplaced keys must be reported to the ECE Facilities Manager immediately. Based on the facts of the case, authorization of replacement of the key may be granted, but such replacement is not automatic.

Access Codes for laboratories must be obtained from the faculty advisor or interim faculty advisor. The lock combinations are changed periodically, and students must acquire new access codes when this occurs. Keys for access to the outside doors are not issued to students.

Students must return keys to the ECE Facilities Manager upon completion of degree, departure from the university, or departure from a given office. Failure to return keys to the ECE Facilities Manager can result in a hold on the student's account, therefore denying access to official transcript and diploma.

3.6.5 Blacksburg Campus Building Access

Access to Whittemore and Durham Halls is via your VT Hokie Passport after 10pm. The card readers are located under breezeway connecting the buildings.

3.6.6 Northern Virginia Building Access

For access to facilities at Fall Church and VTRC-A, contact your Academic Advisor.

4   Master's Degree Program Requirements

The ECE Department offer a Master of Science (M.S.) degrees in both Electrical Engineering (EE) and Computer Engineering (CPE) with both Thesis and Non-thesis options. In addition, the department offers Master of Engineering (M.Eng.) degrees in both EE and CPE.

The M.S. Thesis degree and an M.S. Non-thesis degree are research-based degrees based on graduate coursework. The M.S. Thesis student participates in independent research done under the direct supervision of an ECE faculty member culminating in an M.S. thesis. The M.S. Non-thesis degree is a coursework only degree.

The M.Eng. degree is a professionally-oriented degree that offers graduate students a strong academic foundation in core ECE technological areas with a culminating, project-based learning experience. The M.Eng. degree is offered at the National Capital Region (NCR) and Virtual campuses.

All ECE master's degree require the approval of Plan of Study by the department and Graduate School that satisfying the degree requirements for the specific degree. This chapter details the degree requirements for each master's degree offer by the ECE Department.

4.1   General Restrictions on Master's Degree Coursework

The specific course requirements for the M.S. and M.Eng. degree programs differ. However, there are several limitations must be met regardless of which degree option is chosen. These restrictions are listed below. Some of these restrictions are Graduate School policy which we reiterate here. For a definitive description of Graduate School Polices always consult the Graduate School Catalog. If you have any questions regarding these restrictions consult your Academic Advisor.

- No more than 6 credit hours of 4000 level courses can be used for credit towards a master's degree. The courses 4974 (Independent Study) and 4994 (Undergraduate Research) cannot be counted toward a graduate degree.
- No more than 6 credit hours in total of 4984 or 5984 (Special Studies) and 5974 (Independent Study) can be counted toward a master's degree. No more than 3 of these credit hours may be for 5974. A 4984 or 5984 course will count as a course only in the area from which the course is submitted. Additional Special Study courses will be approved if they pertain to new departmental courses currently awaiting final university approval. In all other cases, requests for extra 5984 credit must be submitted by completion and submittal of the ECE General Petition Form (form is available from the ECE Graduate Advising Office) to the Graduate Committee for *advance* approval.
- All courses, except ECE 5974, must be taken on an A-F basis.
- Students must complete any required remedial background requirements.

4.2   M.S. Degree Program Requirements

The ECE Department offers both an M.S. Thesis and an M.S. Non-Thesis degree. For the M.S. Thesis degree, each plan of study is developed by the student in consultation with his or her faculty advisor satisfying the M.S. Thesis degree requirements and the defense of a thesis. The

M.S. Non-Thesis degree is a coursework-based master's degree. The degree requirements for each degree and the Electrical Engineering (EE) and Computer Engineering (CPE) programs are the following.

4.2.1 Master of Science (M.S.), Thesis, in EE

The M.S. thesis degree in EE requires 30 credit hours, and the following specific requirements must be met:

- 18 credit hours of senior and graduate-level coursework (coursework must satisfy the course restrictions for the M.S., Thesis, in EE)
- 9 credit hours of Thesis, ECE 5994
- 2 credit hours of Seminar, ECE 5944
- 1 credit hour of Graduate Student Success in Multicultural Environments, ENGE 5304
- An oral final examination consisting of a thesis defense must be passed. The exam must be scheduled through the Virginia Tech Graduate School *at least* two (2) weeks in advance using *ESS*
- The thesis must be submitted electronically (ETD) to the Graduate School within two (2) weeks of the oral final exam date.

4.2.1.1 Coursework Restrictions for the Master of Science (M.S.), Thesis, in EE

- At least 18 credit hours of senior and graduate-level coursework satisfying all of the following:
  - A minimum of 12 credit hours of ECE courses
  - At least 9 credit hours of electrical engineering courses
  - At least 6 credit hours consisting of out-of-area (see the tables that identify courses in the different areas of electrical engineering and computer engineering), and/or out-of-department courses, with no more than 3 credit hours below the 5000 level
  - Coursework must satisfy the General Restrictions on Master's Degree Coursework.

4.2.2 Master of Science (M.S.), Thesis, in CPE

The M.S. thesis degree in CPE requires 30 credit hours, and the following specific requirements must be met:

- 18 credit hours of senior and graduate-level coursework (coursework must satisfy the course restrictions for the M.S., Thesis, in CPE)
- 9 credit hours of Thesis, ECE 5994
- 2 credit hours of Seminar, ECE 5944
- 1 credit hour of Graduate Student Success in Multicultural Environments, ENGE 5304
- An oral final examination consisting of a thesis defense must be passed. The exam must be scheduled through the Virginia Tech Graduate School at least two (2) weeks in advance using ESS
- The thesis must be submitted electronically (ETD) to the Graduate School within two (2) weeks of the oral final exam date.

4.2.2.1 Coursework Restrictions for the Master of Science (M.S.), Thesis, in CPE

- At least 18 credit hours of senior and graduate-level coursework satisfying all of the following:
    - A minimum of 12 credit hours of ECE courses
    - At least 9 credit hours of computer engineering courses
    - At least 6 credit hours consisting of out-of-area (see the tables that identify courses in the different areas of electrical engineering and computer engineering), and/or out-of-department courses, with no more than 3 credit hours below the 5000 level.
    - Coursework must satisfy the General Restrictions on Master's Degree Coursework.

4.2.3 Master of Science (M.S.), Non-Thesis, in EE

The M.S. non-thesis degree program is a coursework-only degree that requires 30 credit hours, does not require a final examination, and the following specific requirements must be met:

- 27 credit hours of senior and graduate-level coursework (coursework must satisfy to M.S. Non-Thesis, in EE course restrictions)
- 2 credit hours of Seminar, ECE 5944
- 1 credit hour of Graduate Student Success in Multicultural Environments, ENGE 5304.

4.2.3.1 Coursework Restrictions for the Master of Science (M.S.), Non-Thesis, in EE

- At least 27 credit hours of senior and graduate-level coursework satisfying all of the following:
    - A minimum of 18 credit hours of ECE courses
    - At least 12 credit hours of electrical engineering courses
    - At least 9 credit hours consisting of out-of-area (see the tables that identify courses in the different areas of electrical engineering and computer engineering), and/or out-of-department courses, with no more than 3 credit hours below the 5000 level
    - All other elective courses are CPE, EE, CS, and other technical courses as approved by the student's advisory committee
    - Coursework must satisfy the General Restrictions on Master's Degree Coursework.

4.2.4 Master of Science (M.S.), Non-Thesis, in CPE

The M.S. non-thesis degree program is a coursework-only degree that requires 30 credit hours, does not require a final examination, and the following specific requirements must be met:

- 27 credit hours of senior and graduate-level coursework (coursework must satisfy to M.S. Non-Thesis, in EE course restrictions)
- 2 credit hours of Seminar, ECE 5944
- 1 credit hour of Graduate Student Success in Multicultural Environments, ENGE 5304.

- At least 27 credit hours of senior and graduate-level coursework satisfying all of the following:
    - A minimum of 18 credit hours of ECE courses
    - At least 12 credit hours of computer engineering courses
    - At least 9 credit hours consisting of out-of-area (see the tables that identify courses in the different areas of electrical engineering and computer engineering), and/or out-of-department courses, with no more than 3 credit hours below the 5000 level.
    - All other elective courses are CPE, EE, CS, and other technical courses as approved by the student's advisory committee
    - Coursework must satisfy the General Restrictions on Master's Degree Coursework.

4.3   M.Eng. Degree Program Requirements

The M.Eng. degree is a professionally-oriented degree that offers graduate students a strong academic foundation in core ECE technological areas with a culminating, project-based learning experience. The M.Eng. degree is offered at the National Capital Region (NCR) and Virtual campuses. The degree requirements for the M.Eng. degree in Electrical Engineering (EE) and Computer Engineering (CPE) programs are the following.

4.3.1   Master of Engineering, Project and Report, in EE

The M.Eng. degree, in EE, requires 30 credit hours, and the following specific requirements must be met:

- 27 credit hours of coursework (coursework must satisfy to M.Eng., in EE course restrictions) and project and report consisting of either:
    - 21 credit hours of senior and graduate-level coursework and 6 credit hours of Graduate Design Project and Report, ECE 5805 and 5806; or
    - 24 credit hours of senior and graduate-level coursework and 3 credit hours of Project and Report, ECE 5904
- 3 credit hours of seminar and coursework satisfying the Graduate School's Scholarly Ethics and Integrity Requirement and the Diversity and Inclusion Requirement consisting of either:
    - 2 credit hours of Seminar, ECE 5944 and 1 credit hour of Graduate Student Success in Multicultural Environments, ENGE 5304; or
    - 3 credit hours of ECE 5984 or 5044, Industry Topics and Professionalism
- A final examination consisting of the submission of a written project report and an oral presentation of this project to the student's advisory committee must be passed. The exam must be scheduled through the Virginia Tech Graduate School at least two (2) weeks in advance using ESS.

4.3.1.1   Coursework Restrictions for the Master of Engineering (M.Eng.), in EE

- At least 21 credit hours of senior and graduate-level coursework satisfying all of the following:

- o A minimum of 15 credit hours of ECE courses
- o At least 12 credit hours of electrical engineering courses
- o At least 6 credit hours consisting of out-of-area (see the tables that identify courses in the different areas of electrical engineering and computer engineering), and/or out-of-department courses, with no more than 3 credit hours below the 5000 level.
- o All other elective courses are CPE, EE, CS, and other technical courses as approved by the student's advisory committee
- o Coursework must satisfy the General Restrictions on Master's Degree Coursework.

4.3.2 Master of Engineering, Project and Report, in CPE

The M.Eng. degree, in CPE, requires 30 credit hours, and the following specific requirements must be met:

- 27 credit hours of coursework (coursework must satisfy to M.Eng., in CPE course restrictions) and project and report consisting of either:
  - o 21 credit hours of senior and graduate-level coursework and 6 credit hours of Graduate Design Project and Report, ECE 5805 and 5806; or
  - o 24 credit hours of senior and graduate-level coursework and 3 credit hours of Project and Report, ECE 5904
- 3 credit hours of seminar and coursework satisfying the Graduate School's Scholarly Ethics and Integrity Requirement and the Diversity and Inclusion Requirement consisting of either:
  - o 2 credit hours of Seminar, ECE 5944 and 1 credit hour of Graduate Student Success in Multicultural Environments, ENGE 5304; or
  - o 3 credit hours of ECE or 5044, Industry Topics and Professionalism
- A final examination consisting of the submission of a written project report and an oral presentation of this project to the student's advisory committee must be passed. The exam must be scheduled through the Virginia Tech Graduate School at least two (2) weeks in advance using ESS.

4.3.2.1 Coursework Restrictions for the Master of Engineering (M.Eng.), in CPE

- At least 21 credit hours of senior and graduate-level coursework satisfying all of the following:
  - o A minimum of 15 credit hours of ECE courses
  - o At least 12 credit hours of computer engineering courses
  - o At least 6 credit hours consisting of out-of-area (see the tables that identify courses in the different areas of electrical engineering and computer engineering), and/or out-of-department courses, with no more than 3 credit hours below the 5000 level.
  - o All other elective courses are CPE, EE, CS, and other technical courses as approved by the student's advisory committee
  - o Coursework must satisfy the General Restrictions on Master's Degree Coursework.

4.4 Summary of Master's Degree Requirements

The following table summarizes the credit hours required for each master's degree. Clarification of the interpretation of any of the master's degree requirements should be addressed with your Graduate Advisor before enrolling in course.

	M.S. Thesis	M.S. Non-Thesis	M.Eng.
Maximum Thesis, ECE 5994, credits	9	0	0
Maximum Project and Report, ECE 5904 or 5805/6, credits	0	0	3 or 6
Minimum course work credit hours†	18	27	24 or 21
Maximum 4XXX course work credit hours	6	6	6
Maximum 5974 and 5984 course work credit hours	6	6	6
Minimum Seminar and Diversity and Inclusion credits	3	3	3
Mandatory Final Oral Exam	Thesis Defense	No Final Exam	Project and Report Presentation

†*Note that there are specific course requirements for EE and CPE that must be met for the degree, not just this minimum. In addition, any background courses specified on your acceptance or by your advisory committee or Graduate Committee must be taken.*

4.5 Special Studies Courses and Core Requirements for a Master's Degree

To receive a master's degree and to ensure that the student's background in Electrical or Computer Engineering is reasonably broad, a candidate must successfully complete the area requirement of the degree (e.g., electrical engineering or computer engineering). Note that an ECE 5984 course only counts in the area that approved the course (the "9" does not count as a separate area), so if the Computer Area approves a 5984 course, it will count as a "5" or Computer Area course.

4.6 Switching from an ECE Master's Degree to another ECE Graduate Degree

ECE Master's degree students are allowed to switch to another ECE degree subject to the restrictions detailed in this section. If these restrictions are met, the correct form must be submitted to, and approved by, the ECE Graduate Students Services and the Graduate School (if necessary). The correct forms are the following:

- To switch between the M.S. Thesis and M.S. Non-Thesis degrees you must complete the "M.S. Thesis Option Change Request" form (available at this link under the "Miscellaneous" section).

- For any other degree changes, the Graduate School's "Change of Degree Level Request" form (available at this link under the "Status Changes/Student Record Updates" section) must be completed and submitted to the ECE Graduate Advising Office. The Change of Degree Level Request form must be submitted to the Graduate School by ECE Graduate Student Services two-weeks prior to the first day of classes for

the semester the change of status is to be effective. A student is allowed to make this change only one time.

Please meet with your ECE Graduate Advisor before submitting any change of degree form. In the following subsections we detail specific restrictions for graduate degree changes.

4.6.1 Switching from M.S., Thesis, to the M.S., Non-Thesis or M.Eng. Degree

Prior to the completion of 21 credit hours, an M.S., Thesis, student can request to switch to the M.S., Non-Thesis, or M.Eng. degree program subject to the following restrictions:

- Students that have been funded, or are currently funded, on ECE Graduate Teaching Assistantships **cannot** switch to the M.S., Non-Thesis, or M.Eng. degree program.
- Students that have been funded, or are funded, on Graduate Research Assistantships (and have never been funded on an ECE Graduate Teaching Assistantship) **must have** written approval from their faculty advisor (and, if different, their Graduate Research Assistantship sponsor) to switch to the M.S., Non-Thesis, or M.Eng. degree program.
- A Degree Level Request form (a Graduate School form) must be completed to switch from M.S. Thesis to the M.Eng. degree.
- An ECE M.S. Thesis Option Change Request form (an ECE departmental form) must be completed to switch from M.S. Thesis to the M.S. Non-Thesis degree.
- Students that have an approved Plan of Study, must do the following:
  - If switching from M.S. Thesis to M.Eng. the student must submit a new Plan of Study, or
  - If switching from M.S. Thesis to M.S. Non-Thesis the student must submit the following completed Graduate School forms: (1) a Thesis Option Change Request form; (2) a Plan of Study Change Request form; and (3) a Change of Committee/Advisor Request form.
- Students that have completed 21 or more hours of coursework **are not eligible** to switch to the M.S., Non-Thesis, or M.Eng. degree program.

4.6.2 Switching from M.Eng. to M.S.

A master's student enrolled in the M.Eng. degree program is allowed to change to an M.S. Degree Program (Thesis or Non-Thesis) subject to the ECE Graduate Advising Office's approval. ECE approval will be considered only upon completion of one semester, completion of 9 graded course credit hours, and an overall GPA of 3.3 or higher. A completed M.S. Plan of Study Form must accompany the completed Graduate School's "Request for Degree State Change" form (available at this [link](#)).

4.6.3 Switching from M.Eng. to Direct Ph.D.

A master's student enrolled in the M.Eng. degree program is not allowed to directly switch to the Direct PhD. Program. If an M.Eng. student would like to ultimately enroll in the Direct Ph.D. or PhD. degree programs, there are two possible routes.

1. The student can switch to the M.S. Thesis or M.S. Non-Thesis per the above stated policy. After enrolled as an M.S. Thesis or M.S. Non-Thesis student for a minimum of one semester, the student can request to switch to the Direct Ph.D. program provided they have: (a) a ECE graduate faculty member who has agreed to serve as the chair of

their Ph.D. advisory committee; (b) has developed a research plan for the proposed Ph.D. dissertation; and (c) has funding plan for the duration of their proposed Ph.D. work. The student should submit documents detailing (b) and (c) and signed by (a) to the Graduate Program Director, along with a completed Request for Degree Status Change form, to request the change to Direct Ph.D. program.

2. The student completes their M.Eng. degree and applies for the Ph.D. program as a new student beginning the semester following their degree completion date. The student should ensure that the ECE graduate faculty member with which they wish to work supplies a letter of recommendation with their Ph.D. application. The student should work with their faculty advisor to develop both research and funding plans for their Ph.D. program simultaneously with the submission of their Ph.D. application.

4.6.4 Including M.Eng. Specific Courses a Non-M.Eng. Plan of Study

The department offers several "M.Eng. only" courses—these courses are enumerated here. In certain cases, ECE graduate students can take these courses and count them on their plan of study. The policies for using these M.Eng. only courses on a non-M.Eng. plan of study are the following.

1. Any non-M.Eng. ECE graduate degree student who switched from the M.Eng. degree program may substitute the three credit hours of ECE 5984/5044, Industry Topics and Professionalism, for the two credit hours of seminar, ECE 5944, and one credit hour of ENGE 5304, Graduate Student Success in Multicultural Environments.
2. M.S. Non-Thesis students who switched from the M.Eng. degree program may use M.Eng. only courses as detailed below. Additionally, M.S. Non-Thesis students who are coming to ECE after some time in industry, or from a non-ECE degree, may use the M.Eng. only courses as "bridge" courses when first entering the ECE department—these students should only take these courses based on the recommendation of their interim faculty advisor.
   a. ECE 5024, Math Methods for ECE, may be used as an elective course on a student's M.S. Non-Thesis plan of study. This course cannot count as part of the "minimum of 18 credit hours of ECE courses" requirement for the M.S. Non-Thesis degree.
   b. ECE 5464, Applications of Machine Learning, may be used as an elective course on a student's M.S. Non-Thesis plan of study. This course cannot count as part of the "minimum of 18 credit hours of ECE courses" requirement for the M.S. Non-Thesis degree.
   c. ECE 5014, R&D Methods for Engineers, cannot be used on an M.S. Non-Thesis plan of study.
3. ECE M.S. Thesis and Ph.D. students may not use any of the M.Eng. only courses on their plan of study other than ECE 5044 as noted in (1) above.

4.7 The Master's Degree Advisory Committee

M.S. Non-Thesis students do not require an advisory committee—the M.S. Non-Thesis plan of study is signed by the M.S. Non-Thesis Program Director.

M.S., Thesis, and M.Eng. students must have an advisory committee. The chair of the advisory committee serves as the faculty advisor, and this person is not necessarily the initially appointed interim faculty advisor. The advisory committee will consist of three faculty members (including

the faculty advisor) with academic rank of Assistant Professor or higher and this committee is finalized at the time the plan of study is submitted to the ECE Graduate Advising Office.

For an ECE M.S., Thesis, committee, at least 2 of the committee members shall be tenured/tenure-track/collegiate/research ECE faculty with at most one of these 2 members by courtesy appointment, ECE collegiate, or from the ECE research faculty ranks (excluding postdocs).

For an ECE M.Eng. committee, at least 2 of the committee members shall be tenured/tenure-track/collegiate/research ECE faculty (excluding postdocs) with at most one of these 2 members by courtesy appointment.

A non-Virginia Tech person in higher education or industry may serve as a regular committee member and is permissible by completion and submittal of the Graduate Committee Service Approval Form submitted by the Graduate Advising Office. To complete the form, the Graduate Advising Office will require a short, NSF-style curriculum vitae (CV). The form must be submitted simultaneously with the Plan of Study Form. Once approved by ECE, the form will be submitted to the Dean of the Graduate School for university approval.

Participation in an advisory committee implies that, (a) the faculty member is willing to meet periodically with the advisee for the purpose of offering guidance and assistance in the work leading to their dissertation, and (b) the faculty member will be available for the Final Examination within reasonable bounds of a proposed target date.

Once a student's advisory committee has been constituted and approved by the Graduate School, it may be revised only with the full concurrence of all committee members, both new and old. The Graduate School's "Change of Committee/Advisor" form is required to request any change in membership. The form must be signed by each member, new and old, and submitted to the ECE Graduate Advising Office.

The Advisory Committee is recommended to the ECE Graduate Committee through the submission of the Ph.D. plan of study. The ECE Graduate Advising Office shall either approve the committee or recommend changes. Once approved by the department, the committee is formally appointed by the Dean of the Graduate School.

4.8   The Master's Degree Plan of Study

ECE policy requires that an M.S. and M.Eng. completed Plan of Study be submitted prior to April 1st for students entering the previous fall semester and prior to November 1st for students entering the previous spring semester. Students who have not submitted their Plans of Study by these deadlines will have a hold placed on their university academic record.

A Plan of Study is a contract detailing the minimum required course work for the degree being obtained. It is important to note that all courses taken while a graduate student will appear on the Virginia Tech graduate transcript but will not necessarily be listed on the plan of study. Students must receive at least a C- grade on courses shown on the plan of study as well as maintain an overall 3.0 GPA on the plan of study and on the graduate transcript (overall GPA). Pass/Fail courses, except for ECE 5974 and 5944, are not permitted on the plan of study.

Thesis students may use ECE 5994 to fill out the credit hour load to 12 hours per semester to maintain full-time status; however, an M.S., Thesis, student will be credited with a maximum of 9 hours total of ECE 5994 on their plan of study. Students are expected to perform research with the advisor for the ECE 5994 course credit. M.Eng. students may use ECE 5904 in a similar

manner to maintain full-time status, but only a maximum of 3 credit hours of ECE 5904 can appear on the plan of study.

The student should complete and submit the electronic ECE Plan of Study Form, available at the ECE Graduate Student Form web site at this link, to your ECE Graduate Academic Advisor for approval and processing. The form requires electronic signatures of the student's advisory committee. After necessary changes (if any) are made, the plan will be entered electronically, approved by the ECE Graduate Advising Office, and submitted to the Graduate School for final approval. Once entered, the plan of study can be viewed via Hokie Spa by the student and their faculty advisor.

Deviations from the originally filed plan of study should be approved by the student's advisory committee and must satisfy all ECE and university requirements. Plan changes are accumulated and filed on a Graduate School's "Request for Plan of Study Changes" form (available at this link) early in the last semester of enrollment in coursework.

4.9 Coursework Justification

The Plan of Study should consist of graduate coursework not older than five years at the time of approval by the Graduate School. A request for coursework taken prior to the five year limitation period can be justified with approval of the Graduate School's "Course Justification Request" form (available at this link). The course justification form must be submitted to the ECE Graduate Advising Office with the Plan of Study. The revalidation of courses requires a review of the student's knowledge on course material by the committee or a determination of the currency of the material to the current degree being obtained.

4.10 Transfer Courses

Students may transfer a maximum of 50% of the graded graduate coursework taken at other Virginia institutions, and these courses may be listed on their plan of study. A maximum of 6 course credit hours, graduate coursework, may transfer from institutions outside of Virginia for students not using the transfer of courses from Virginia institutions. Approved transfer courses are listed on the plan of study, with approval of the advisory committee, under the appropriate transfer course section. Senior-level courses are non-transferable so therefore not permitted to be listed on a student's Plan of Study.

4.11 Deviations from Minimum Master's Degree Requirements

Any deviations from the specified minimum requirements should be approved by the ECE Graduate Committee for consideration in advance of submission of the proposed plan of study. The student should document the reason(s) why the proposed deviations from the minimum requirements are more desirable than one satisfying the minimum standards and have the approval of the advisory committee for these deviations. This documentation is not required for plans that exceed the minimum requirements. Deviation from the minimum requirements should not be expected to be approved.

4.12 M.S., Thesis and M.Eng. Oral Final Exam

The M.S. Non-Thesis degree does not require an in-person final exam; however, M.S. Non-Thesis students must schedule a final exam on the final day semester with the Graduate School. This exam must be scheduled at least two (2) weeks in advance via ESS.

The ECE M.S. Graduate Program Director will approve the exam to attest departmental confirmation of completion of the M.S. Non-Thesis degree requirements. M.S. Non-Thesis students should meet with their ECE Graduate Advisor to confirm the date and time to schedule their final examination with the Graduate School.

All M.S., Thesis, and M.Eng. degree students must schedule a final exam with the Graduate School to satisfy university requirements. The exam must be scheduled at least two (2) weeks in advance via ESS. There are two registration statuses in which a student can hold their oral final exam and they are:

> Regular Status. Students enroll for three (3) or more credit hours for semester/session scheduling the oral final exam. Students in this status can hold the oral final exam any date prior to the deadline set forth by the Virginia Tech Graduate School.

> Start-of-Semester Defense Exception. This status is for enrollment of one (1) credit hour and the request for this exception must be submitted no later than by the Friday of the third week of classes or no later than three weeks prior to the exam, whichever comes first. For more information on requesting this exception consult this Graduate School link. Once approved, the Graduate School will add the one-credit hour Defending Student Status course to the student's class schedule once their form is in receipt. Therefore, students cannot add this course via the Hokie Spa add/drop system.

4.13 M.S., Thesis (ECE 5994)

Full-time, funded, M.S., Thesis, students must take 12 to 18 hours of credit hours each semester. An M.S., Thesis, student may use ECE 5994 to fill out the semester schedule to achieve the required credit hours. However, no more than 9 hours of ECE 5994 will be credited to an M.S., Thesis, plan of study. Students must enroll in ECE 5994 Thesis by the CRN number assigned to their Interim Faculty Advisor or Faculty Advisor. Students are required to inform the faculty of enrollment in their CRN number for ECE 5994, the total number of credit hours enrolled and determine the faculty's expectations to receive a grade of Equivalent Credit (EQ) for these hours. Students not fulfilling thesis obligations can be awarded a No Grade (NG) for these hours that count as a failing grade in the computation of a student's overall GPA.

4.14 The M.S. Thesis

The M.S. thesis should be submitted to the advisory committee must be submitted and read by the student's advisory committee prior to signing the examination scheduling request. The final thesis must be submitted electronically (ETD) to the Graduate School within two (2) weeks of the oral final exam date.

5   Ph.D. and Direct-Ph.D. Degree Program Requirements

The Doctor of Philosophy (Ph.D.) is the highest academic degree awarded by the University and is conferred upon a student who demonstrates outstanding original scholarship during advanced study. It signifies that the student is able to conduct independent research and has both a broad basic knowledge of all areas of the field and a comprehensive knowledge of one area. A student who wishes to qualify for the degree is expected to meet the requirements of both the Graduate School and the Department.

In this chapter, Ph.D. and direct-Ph.D. Program Requirements, provides the requirements for the Ph.D. degree in Electrical Engineering (EE) and Computer Engineering (CPE). The direct-Ph.D. program permits graduate students to earn an M.S., Thesis, or M.S., Non-Thesis, degree while in pursuit of the Ph.D. degree. This description augments the discussion of the general requirements as stated in the Graduate Catalog of the University.

5.1   The Ph.D. Degree Program

The ability to perform significant independent research is the prime requisite for the Ph.D. degree. This research must be done under the supervision of an appropriate faculty member. It is the student's responsibility to choose a research topic and find a faculty member who will act as the Graduate Advisor and Chair of the Ph.D. advisory committee. This is an important step and should be done early in the program to ensure the probability of successful completion. In fact, when possible, it is advisable for the student to select a dissertation topic and to find a Faculty Advisor before embarking upon a Ph.D. program.

5.2   The Ph.D. Advisory Committee

Every Ph.D. student must establish a Ph.D. Advisory Committee consisting of the Graduate Advisor (the committee Chair) and at least four additional faculty members. A non-Virginia Tech person in higher education or industry may serve as a regular committee member and is permissible by completion and submittal of the Graduate Committee Service Approval Form submitted by the Graduate Advising Office. To complete the form, the Graduate Advising Office will require a short, NSF-style curriculum vitae (CV). The form must be submitted simultaneously with the Graduate School's "Plan of Study" form (available at this link). Once approved by ECE, the form will be submitted to the Dean of the Graduate School for university approval. Participation in an advisory committee implies that, (a) the faculty member is willing to meet periodically with the advisee for the purpose of offering guidance and assistance in the work leading to their dissertation, and (b) the faculty member will be available for the Final Examination within reasonable bounds of a proposed target date.

All members of the Ph.D. Advisory Committee must have the academic rank of Assistant Professor or above (or equivalent). The Graduate Advisor will chair this committee. The Chair shall be an ECE tenured/tenure-track faculty member, a non-ECE tenured/tenure-track faculty member with an ECE courtesy appointment, or an approved ECE research full professor. A non-ECE Virginia Tech faculty member may be appointed as a co-Chair of the advisory committee with an ECE tenured/tenure-track faculty member serving as Chair with approval of

the ECE Graduate Program Director. Other Virginia Tech Institute faculty with ECE courtesy appointments or ECE collegiate and research professors may serve as co-Chair with approval of the ECE Graduate Program Director.

A diverse set of research experience should be included on the Advisory Committee. At least one of the committee members shall be an ECE tenured/tenure-track faculty with a different primary technical area from the Ph.D. student (an "out-of-area" member). In addition, one committee member must be a tenured/tenure-track faculty member from another academic department within Virginia Tech.

ECE research expertise must be represented in the Advisory Committee. For an ECE PhD committee, at least 3 of the committee members shall be tenured/tenure-track/collegiate/research professors of any rank with at most one of these 3 members by courtesy appointment, ECE collegiate, or from the ECE research professor ranks. This courtesy appointment can also satisfy the out-of-department requirement.

Participation by faculty in an Advisory Committee implies that, (a) the faculty member is willing to meet periodically with the advisee for the purpose of offering guidance and assistance in the dissertation, and (b) the faculty member will be available for a Final Oral Ph.D. Examination within reasonable bounds of a proposed target date.

The Ph.D. Advisory Committee is recommended to the ECE Graduate Committee through the submission of the Ph.D. plan of study to the Graduate Advising Office. The Graduate Committee shall either approve the committee or recommend changes. Once approved by the department, the committee is formally appointed by the Dean of the Graduate School. Once a Ph.D. Advisory Committee has been established and approved by the Graduate School, a request for change in membership may occur by completion of the Graduate School's "Change of Committee/Advisor" form (available at this link). This form requires full concurrence of all committee members and must be signed by each member, both new and old, and submitted to the ECE Graduate Advising Office.

The Ph.D. Advisory Committee has jurisdiction over the student's Ph.D. program (within the guidelines of the department), assesses the student's progress, and conducts the examinations (dissertation proposal and final oral) required by the Graduate School and the department, subject to approval by the Graduate Committee. The Ph.D. Qualifying Examination is conducted by the area in which the student's research is pursued.

5.3   The Ph.D. Plan of Study

After the establishment of the Ph.D. advisory committee, and by the end of the third semester of enrollment, a Ph.D. student must file a Ph.D. plan of study. The ECE plan of study form is available at this link.

5.4   The Degree Requirements for the Ph.D. in EE or CPE

Each Ph.D. student must complete a minimum of 90 credit hours beyond the baccalaureate. Courses which are offered on an A-F grading basis may not be taken as Pass/Fail. There is no

foreign language requirement for Ph.D. students. Additional requirements for coursework listed on the Ph.D. plan of study include the following.

- Ph.D. course work consists of 27 credit hours: a minimum of 24 course credit hours at the 5000-level or above.
- 2 credit hours of Seminar, ECE 5944 (These courses can be transferred from a Virginia Tech M.S. degree in Computer Engineering or Electrical Engineering).
- 1 credit hour of Graduate Student Success in Multicultural Environments, ENGE 5304. (This course can be transferred from a Virginia Tech M.S. degree in Computer Engineering or Electrical Engineering).
- A maximum of 3 credit hours of 4000-level courses may be listed on the Ph.D. Plan of Study. 3000-level or lower courses are not permitted.
- The Virginia Tech Residency Requirement requires course work at the Ph.D. academic levels 80, 90 from classes taken through the Blacksburg campus, Central (Dahlgren), and/or National Capital Region. Residency for the Ph.D. involves full-time enrollment during two consecutive semesters (the full summer is considered the equivalent of one academic semester) as a Ph.D. student at Virginia Tech.
- Previously completed graduate coursework may be included on the Ph.D. plan of study subject to the following restrictions (and subject to approval of a student's graduate advisory committee).
  - A maximum of 50% of graduate (5000 and 6000-level) coursework may transfer from a non-Virginia Tech Master's degree. Transfer credit hours must have a letter grade of B or higher. Courses not taken at Virginia Tech do not contribute to the Virginia Tech overall GPA and are not included in the calculation of the plan of study GPA.
  - A maximum of 21 credit hours of coursework from a Virginia Tech Master's degree plan of study may be used on the Ph.D. plan of study.
  - Previously completed coursework from **only one** of the above two cases can be used on the Ph.D. plan of study.
- 60 credit hours of ECE 7994, Dissertation.
- A maximum of 9 credit hours of 5984 (Special Studies) and 5974 (Independent Study) may be used on the Ph.D. plan of study. Of these hours, a maximum of 6 credit hours of 5974 can be used.
- An oral final examination consisting of a thesis defense must be passed. *The exam must be scheduled through the Virginia Tech Graduate School **at least** two (2) weeks in advance via* ESS.
- The thesis must be submitted electronically (ETD) to the Graduate School within two (2) weeks of the oral final exam date.

5.5 Obtaining an M.S. Degree as Part of the direct-Ph.D. Program

Students planning to pursue the Ph.D. under the direct-Ph.D. program must maintain continuous enrollment in these two degree programs. Each Ph.D. student must complete a minimum of 90 credit hours beyond the baccalaureate. Courses which are offered on an A-F grading basis may not be taken Pass/Fail.

5.5.1 M.S., Non-Thesis Degree: (30 credit hours)

Submit M.S., Non-Thesis plan of study prior to completion of 21 course credit hours (requirements are listed on the Summary of Graduate Student Requirements for M.S., Non-Thesis). As part of the Direct Ph.D. with the M.S., Non-Thesis degree option the student must:

- Complete an M.S. Non-Thesis degree in EE or CPE within the first two years of enrollment (the degree requirements are listed on the Summary of Graduate Student Requirements for M.S., Non-Thesis)

- Successfully pass the Ph.D. Qualifying Examination within the first two semesters of completion of 21 course credit hours. Failure to pass the Ph.D. Qualifying Examination within the time period stated will result in automatic dismissal from the direct-Ph.D. program and academic level will convert to the M.S., Thesis Degree, 70 Regular Masters.

5.5.2 M.S., Thesis Degree: (30 credit hours)

Submit M.S., Thesis plan of study prior to completion of 21 course credit hours (requirements are listed on the Summary of Graduate Student Requirements for M.S., Thesis). As part of the Direct Ph.D. with the M.S., Thesis degree option the student must:

- Complete an M.S. Thesis degree in EE or CPE within the first two years of enrollment (the degree requirements are listed on the Summary of Graduate Student Requirements for M.S., Non-Thesis).

- Successfully pass the Ph.D. Qualifying Examination within the first two semesters of completion of 21 course credit hours. Failure to pass the Ph.D. Qualifying Examination within the time period stated will result in automatic dismissal from the direct-Ph.D. program and academic level will convert to the M.S., Thesis Degree, 70 Regular Masters.

5.6   The Ph.D. Plan of Study for direct-Ph.D. Students

The following are restrictions for direct-Ph.D. students in pursuit of Ph.D. These are in addition of ones stated for a Ph.D.:

- The direct Ph.D. student must submit a Ph.D. plan of study upon completion of the M.S. degree at Virginia Tech
- All courses listed on the Ph.D. plan of study must be Virginia Tech courses
- The University Residency Requirement is automatically satisfied by courses taken at the Ph.D. and M.S. levels.

5.7   Ph.D. Coursework Justification

Academic work, including transfer credit, must meet the time limits specified below or be revalidated by the student's committee. The revalidation may require a review of the student's ability on course material by the committee or a determination of the currency of the material to the current degree being obtained. Course work may be revalidated by written and/or oral examination. To revalidate courses, students must complete and submit a Course Justification

Form simultaneously with the Ph.D. Plan of Study. The Plan of Study should only consist of graduate coursework not older than five years at the time of approval by the Graduate School. A request for coursework taken prior to the five year limitation period can be justified with approval of the Graduate School's "Course Justification Request" form (available at this link). Requests for revalidation of out-of-date courses must be submitted by the advisor and must include signatures of all members of the student's advisory committee. Course work that does not lie within the expertise of the committee members should be revalidated by a specialist in the area(s) involved. Revalidations are required in the following cases:

1. Course work more than five years old at the time of submission of the plan of study must be revalidated to count toward the masters or Ph.D.
2. Course work on the plan of study must be completed within five years after approval of the plan of study or revalidated if the preliminary exam for the doctoral degree has not been completed by then.

5.8   Ph.D. Examination Requirements

In addition to successfully completing the final oral defense of the Ph.D. dissertation, a Ph.D. student must also successfully meet two other examination requirements: (1) a Ph.D. Qualifying Examination; and (2) a Ph.D. Preliminary Examination. Students have Regular Post Masters status until completion of the Preliminary Exam, at which time they have doctoral (Ph.D.) candidate status.

5.9   The Ph.D. Qualifying Examination

All Ph.D. students are required to take a Ph.D. Qualifying Examination according to the following rules. Entering Ph.D. graduate students must pass the Ph.D. Qualifying Examination by the end of his or her third academic year semester i.e., not counting the summer terms. It is recommended that the student make the first attempt before the end of his or her second semester. Failure to pass the Ph.D. Qualifying Examination within the time period stated will result in automatic dismissal from the Graduate School at Virginia Tech. ECE does not approve extensions to the time period stated. The Exam shall consist of one or more of the following requirements:

a) The study of one or more publications in fields of interest to the candidate, with the requirement that the candidate report on the contents and application of those publications to his or her proposed research work
b) The conduct of open-ended research into one or more areas related to the proposed research of the candidate, with the requirement that the applicant report on his/her results.
c) For the case of a student from Virginia Tech or a U.S. peer institution with an M.S. degree in ECE, the competent presentation of results obtained in a student's previously completed M.S. thesis can suffice for the oral part of this Examination. The need for additional written work, as described in items (a) and (b) above shall be at the discretion of the Examination Committee.

The Exam Committee will be responsible for the format of the Exam, to be chosen from one or more of the items (a) - (c) above. The Exam shall have an oral part and a written part, so that the verbal communication and writing ability both can be judged. A well-written M.S. thesis may suffice for proof of writing ability but will have to be augmented by some written work and an oral examination if the Exam Committee judges that to be desirable. All student preparation for the

exam is subject to the usual Examination rules, and no help may be acquired from others, specifically from students and/or faculty members either at Virginia Tech or elsewhere. The outcome of the Exam shall be Pass, Pass with Remedial Measures, or Fail. Remedial measures may consist of one or more prescribed courses to be taken, or of further prescribed research efforts.

The Qualifying Exam may only be taken twice. In the event of two failures, the candidate is dismissed from the ECE Ph.D. program. If the student chooses, he/she can appeal an adverse recommendation, but such an appeal must be made to the Assistant Department Head for Graduate Education before the end of the semester in which the last failure of the Exam occurred.

A student initiates the Ph.D. Qualifying Examination (possibly in conjunction with his/her Faculty Advisor or Interim Faculty Advisor) by requesting the appropriate Area Committee Chair to appoint an Examination Committee. It is the student's responsibility to submit the "Ph.D. Qualifying Examination Request" form (available at this link) to the Chair of the Area Committee by November 1 (for fall enrollment) or March 1 (for spring enrollment). It is advisable but not mandatory that the student already has an advisory committee. The appropriate Area Chair shall appoint an Examination Committee that may consist of members of the Advisory Committee. The Examination Committee must contain at least one Area Committee member who is not also a member of the Advisory Committee. The Exam Committee shall consist of at least three members.

5.10 The Ph.D. Preliminary Examination

After the successful completion of the Ph.D. Qualifying Examination, and within one and one-half years, the Ph.D. student must take a Ph.D. Preliminary Examination. The purpose of the Ph.D. Preliminary Examination is to determine the student's ability to formulate a plan to conduct research leading to a Ph.D. The examination shall consist of an oral presentation of a specific research proposal for work leading to a Ph.D. dissertation. The presentation shall provide the advisory committee with an appropriate literature review, identification of the research problem, preliminary results and/or a discussion of specific problems leading up to the dissertation work. In any event it should indicate that the student has sufficient knowledge of the subject area, and that the topic can be expected to lead to a Ph.D. dissertation of suitable quality. Specific questions may be asked by members of the student's advisory committee (either in prior written form at least three weeks before the oral part of the exam, or at the oral exam) relating to the student's research proposal. Successful completion of the Ph.D. Preliminary Exam enters the student into Ph.D. Candidate status and the academic level will advance to 90, Doctoral.

The Preliminary Exam shall be passed no later than nine months before the final defense of the dissertation. The outcome of this examination shall be pass or fail. If the Preliminary Exam is failed a second time, the student will be dismissed from the Ph.D. program at Virginia Tech.

The Preliminary Exam must be scheduled through the Virginia Tech Graduate School at least two (2) weeks in advance via ESS. To pass the examination at most one negative vote may be recorded by the Advisory Committee. Only two opportunities to take the examination are permitted. See the Virginia Tech Graduate Catalog for additional details.

5.11 The Ph.D. Dissertation

Research carried out for the Ph.D. degree is credited to the student through registration in Dissertation, ECE 7994. The successful completion of the research at the Ph.D. level culminates in the Ph.D. Dissertation. This document is intended to summarize the execution and the results of the research effort in complete detail. The dissertation should be an expose of a problem that demonstrates the expertise of the writer, not simply a problem solution. Aspects which should be addressed include:

1. Originality of work
2. Significance of contribution
3. Ability to explain essence (not necessarily detail emphasis) of work and fundamental relationships to related work.

The goal is to demonstrate the student's expertise, not that of the advisor or other authors. The dissertation is a vehicle to an end, not the end itself. The writing style, grammar and spelling in the Ph.D. Dissertation should reflect a high level of skill in written communication. The student and the Ph.D. advisory committee bear complete responsibility for the style of the Ph.D. dissertation as well as the technical accuracy of the reported results. The dissertation should be submitted to the advisory committee in hard copy, unless the committee requests another form. The final submission to the Graduate School must be done electronically.

5.12 The Final Oral Ph.D. Examination

It is the responsibility of the student to allow all members of his or her Ph.D. advisory committee ample time to have input into the dissertation research proposal and to closely examine the Ph.D. dissertation to judge the creativity and adequacy of the research work. Therefore, nine months must lapse after the Ph.D. Preliminary Examination before the final dissertation defense shall take place and not until after the student has had an opportunity to discuss the details of the research work with all members of the committee.

All students must schedule a final oral exam with the Graduate School to satisfy university requirements. An oral final examination consisting of a dissertation defense must be passed. The exam must be scheduled through the Virginia Tech Graduate School at least two (2) weeks in advance via ESS.

Copies of the final draft of the dissertation, with all results and major conclusions, must be made available to all members of the Ph.D. advisory committee at least two weeks prior to the scheduled date for the final dissertation defense. At the same time, the student must submit to his or her Faculty Advisor the final hard copy draft of a technical paper based on the dissertation research. This paper must be suitable for publication in an appropriate professional journal.

The final oral Ph.D. examination is mainly a defense of the dissertation with respect to the following criteria:

1. Originality of content
2. Importance of the problem considered
3. Method of solution and/or analysis
4. Achievement of research objectives
5. Clarity of presentation.

The Ph.D. candidate should limit the presentation to approximately 45 minutes unless informed otherwise by the chair of the advisory committee. The essence of the dissertation should be presented in a manner analogous to that for a technical paper in a professional conference. The use of an overhead or computer projector is recommended. All needed materials are the responsibility of the student; none are provided by the department. Any student who fails the final oral Ph.D. examination will be required to eliminate the indicated deficiencies in the manner prescribed by the Ph.D. advisory committee. Any student failing the final oral Ph.D. exam twice will be dismissed from the Ph.D. program in ECE at Virginia Tech.

The dissertation must be submitted electronically (ETD) to the Graduate School within two (2) weeks of the oral final exam date.

5.13 Change of Degree Program from Ph.D. or direct-Ph.D. to M.S., Thesis Degree Within the Same Degree Program

Students accepted into an ECE Ph.D. degree program are expected to remain in the Ph.D. degree program, make annual progress toward obtaining the Ph.D., and ultimately obtain the Ph.D. degree. If, however, under extraordinary circumstances a student wishes to be considered for switching from the Ph.D. degree program to a master's degree program, the following conditions must be met.

- A letter of justification from the student's advisory committee must be submitted to the ECE Graduate Committee explaining, in detail, why an alternative degree to the Ph.D. is appropriate. The student¹s Ph.D. Advisory Committee must approve this letter of justification by signing the document.
- If a student has a previous master's degree, this letter must also address the differences in the educational focus among the proposed master's degrees and any previous degrees. These degrees must be distinct, offering a different educational experience (e.g., different research areas).
- A switch from the Ph.D. program to a master's degree program is an exception that must be approved on a case-by-case basis by the ECE Graduate Committee.
- A completed master's degree Plan of Study must accompany the Request for Degree Status Change form.

5.14 Changing Degree Program from the Ph.D. to the M.S., Non-Thesis or M.Eng.

In addition to the above requirements, a Ph.D. student can request to switch to the M.S., non-thesis, or M.Eng. degree programs subject to the following restrictions. Exceptions to these restrictions are not granted by the ECE department.

Students that have been funded, or are currently funded, on ECE Graduate Teaching Assistantships cannot switch to the M.S., Non-thesis, or M.Eng. degree programs.

Students that have been funded, or are funded, on Graduate Research Assistantships (and have never been funded on an ECE Graduate Teaching Assistantship) must have written approval from their faculty advisor (and, if different, their Graduate Research Assistantship sponsor) to switch to the M.S., Non-thesis, or M.Eng. degree program.

6 Financial Support

Students that are supported on a Graduate Research Assistantship (GRA), Graduate Teaching Assistantship (GTA), or Fellowship earn a semi-monthly stipend. These students also receive an in-state tuition scholarship, Academic Fee, Library Fee, and Engineering Fee for every semester the appointment is awarded. Students earning at least $4,000 in an academic year on an assistantship are eligible for the U.F. Differential Scholarship that pays the out-of-state tuition. Comprehensive Fees are paid by the student each semester. Non-resident students also pay the Capital and Equipment Fee.

6.1 Graduate Student Assistantships

6.1.1 Graduate Teaching Assistant (GTA)

Graduate Teaching Assistants (GTA) assist ECE faculty in teaching lower division courses, including laboratory teaching assignments, or in providing other appropriate professional assistance. A first year GTA with no prior experience will not be assigned full responsibility for a lecture course.

Continuing graduate students enrolled in the M.S., Thesis, direct-Ph.D., and Ph.D. Programs are eligible to compete for a Graduate Teaching Assistantship on a semester-by-semester basis. For continuing students, the Virginia Tech graduate GPA, number of course credit hours completed, and area of expertise are factored into the award decision.

6.1.2 Graduate Research Assistant (GRA)

Graduate Research Assistants are graduate students conducting academically significant research under the direction of a regular faculty member, who is generally a principal investigator on an external grant or contract.

Students interested in a Graduate Research Assistantship (GRA) are advised to directly contact ECE faculty that are in their area of expertise to inquire about their availability of research funding. Research award decisions are made by the individual faculty.

6.1.3 Work Assignments and Course Loads

Assistantship students are expected to be available for performance of their duties the entire period of the assistantship. Assistantship appointments require a work commitment of 20 hours per week. The duties of a GRA are determined by the Principal Investigator in charge of the research project, and the actual number of hours worked may vary, though an average of 20 hours each week is expected in direct support of the research project. Graduate Research Assistants are expected to work during normal university vacation periods, except for holidays.

The duties of GTAs are assigned by the ECE Assistant Department Head that handles GTA appointments for ECE. Students' class schedules requested at Registration are required to

make the GTA assignments. GTAs generally have contact with undergraduate students and may assist with lecture courses and/or teach laboratory courses under the direction of a faculty member or be assigned to grade papers or other support work for a faculty member.

GTAs and GRAs must take at least 12 but not more than 18 credit hours per semester. Note that all students working on a thesis degree or Ph.D. should add research hours by the add deadline to bring their credit load total to 12 credit hours per semester. Students will be held accountable only for research hours shown on the plan of study. Other students should register for 12 hours, if possible.

6.1.4 Continuing an Assistantship

The continuance or renewal of an assistantship is contingent on satisfactory academic progress, satisfactory performance of GTA or GRA duties, and professional and personal conduct of an exemplary nature. At the end of each semester, the faculty member directly supervising the student will evaluate the quality and quantity of work performed. The performance of GTAs is reviewed by the ECE Assistant Department Head for Undergraduate Education.

Students normally are expected to maintain a 3.0 GPA or higher in order to hold an assistantship. However, some students occasionally run into temporary difficulties. The ECE Department will usually terminate an assistantship appointment if a student's GPA falls below the required 3.0 cumulative for more than one semester.

6.1.5 Changing Between a GRA and a GTA

Students may change from a GTA position to a GRA position if they find a suitable research project and arrangements are made with the Principal Investigator in charge of that research project. This switch is permitted no later than two weeks prior to the employment date.

A student holding a GRA position, however, cannot be automatically switched to a GTA position. A formal request must be made to the Graduate Program Director during the semester preceding the semester in which the change is to be effective. In addition, the student should request that the Principal Investigator write a letter explaining the circumstances of the GRA termination and an assessment of the student's potential as a GTA. The final disposition of this matter depends on the availability of departmental funds, and the student's relative ranking among others who qualify for such funds at the time. This procedure applies to M.S., direct-Ph.D., and Ph.D. students.

6.2 Fellowships, Scholarships, and Awards

The ECE Department has several Fellowships, Scholarships and Awards available.

6.2.1 Bradley Fellowships

Bradley Fellowships are available each year to the outstanding U.S., direct-Ph.D. and Ph.D. applicants applying to the ECE Department. Fellowships are awarded as Bradley M.S., Bradley

Direct Ph.D., or as Bradley Ph.D. for from 2 to 3 years duration. The minimum GPA for consideration is 3.8 and thus a 3.5 must be maintained for renewal of fellowship each semester.

The Bradley Fellowship is the most prestigious award available within the ECE Department.

6.2.2 Outstanding International Graduate Student Award

This award is sponsored by the Center for Power Engineering at Virginia Tech. The competition is open to all international students in the Bradley Department of Electrical and Computer Engineering. The amount of the award is $1,000 and is based on the student's academic and research performance. This is awarded in the spring of each year.

6.2.3 Graduate Teaching Assistant Award

This award recognizes outstanding contributions to the Department's instructional program by a Graduate Teaching Assistant. The winner is selected based on student evaluations of teaching and faculty recommendations. The winner receives a $100 cash prize and a certificate. The winner is also usually nominated for the University GTA award.

6.2.4 William A. Blackwell Award

This award is presented annually to the ECE graduate student who is judged to have made the best research presentation during the year. The award is named in honor of Dr. William A. Blackwell who was a faculty member in the Bradley Department of Electrical and Computer Engineering from 1966 until his retirement in 1988, serving as Department Head from 1966 to 1981. Students are nominated by faculty, usually based on a presentation at one of the research area seminars within the Department. The winner receives a cash prize between $200 and $300 and a certificate.

6.2.5 The Rappaport Wireless Communication Scholarship

This endowed scholarship, established by Theodore S. Rappaport, a member of the faculty, and his wife, Brenda M. V. Rappaport, provides support to seniors or graduate students who are interested in pursuing a career or graduate studies in the wireless communication field. Applications are solicited during the spring semester. The Department's Awards Committee selects the winner. The dollar amount awarded each year may vary, but it is typically between $500 and $600. (For a listing of outside fellowships available, see the on-line link Graduate Funding Opportunities).

6.3 Health Insurance Premium Compensation

Virginia Tech offers a health insurance plan for graduate students that are funded through an assistantship or fellowship appointment. The program covers 90% of the cost of health insurance for full-time graduate students receiving a full or partial assistantship. Please contact the Student Medical Insurance Office for detailed information about the university's health insurance plan, coverage, costs, effective dates and other relevant information.

Student Services Building
Blacksburg, VA 24061
Phone: 1-888-234-0298 (toll free) or 540-231-6226, or 540-231-6303
Fax: 540-231-6237
E-mail: smi@vt.edu

Purchasing this plan is optional for U.S. citizens and permanent residents. International students are required to purchase insurance coverage for the duration of their stay.

6.4   Student Loans

Students can apply for Student Loans through the Office of Scholarship and Financial Aid located in 200 Student Services Building.

6.5   The Graduate Coop Program

International graduate students may apply for a Cooperative Education Program/Curriculum Practical Training, through the Virginia Tech Graduate School. This program grants opportunities for international graduate students to obtain on-the-job training through employment. The required Graduate School Form and detailed information is available from this link).

7 Appendix

7.1 ECE Administrative and Graduate Advising Personnel

Blacksburg Campus

Graduate Program Director: Paul Plassmann email(@vt.edu):pep3

Assistant Graduate Director for MS Programs: Creed Jones email(@vt.edu):crjones4

Assistant Graduate Director for Professional Degree Programs: Tim Talty email(@vt.edu):ttalty

Graduate Student Services Manager: Laura Villada email(@vt.edu):vlaura

Graduate Student Advisor: Nicole Sutphin email(@vt.edu):nsutphin

Graduate Student Specialist: Lisa Burns email(@vt.edu):lkburns

NCR and Virtual Campuses

Graduate Program Director, National Capital Region: Lamine Mili email(@vt.edu):lmili

7.2 ECE Administrative Personnel for GTA Assignments

Assistant Department Head for Undergraduate Education: Jaime De La Ree email(@vt.edu): jreelope

Administrative Assistant to the Assistant Department Head: Minerva Sanabria-Padilla email (@vt.edu):minervas

7.3 ECE Administrative Accounting/Payroll Personnel

ECE Business Manager: Kathy Atkins email (@vt.edu):atkins

ECE Payroll/Travel: Rebecca Semones email (@vt.edu):beckyc

ECE Accountant: Kimberly Medley email (@vt.edu):kkmedley

ECE Facilities Coordinator: Rick Johnston email (@vt.edu):rickj

7.4 ECE Administrative Area Committee Chairs

Computer Systems (CPE): Ryan Williams (@vt.edu):rywilli1

Networking (CPE): Tom Hou (@vt.edu):hou

Software & Machine Intelligence (CPE): Creed Jones (@vt.edu):crjones4

VLSI and Design Automation (CPE): Jeffrey Walling (@vt.edu):jswalling

Communications (EE): Harpreet Dhillon (@vt.edu):hdhillon

Electromagnetics (EE): Ahmad Safaai-Jazi (@vt.edu):ajazi

Electronics Components, Circuits, & Systems (EE): Xiaoting Jia (@vt.edu):xjia

Photonics (EE): Yizheng Zhu (@vt.edu):yizhu1

Power (EE): Chen-Ching Liu (@vt.edu):ccliu

Signals, Systems, & Control (EE): Dan Stilwell (@vt.edu):stilwell