DEPARTMENT OF
ELECTRICAL & COMPUTER
ENGINEERING

TEXAS TECH
Whitacre College of Engineering

WELCOME

Dear New and Returning Students,

Congratulations and welcome to Texas Tech University! We are excited that you are joining our vibrant graduate and professional student community.

We are here to ensure you find a stimulating intellectual and social community of students and scholars from across the department and university. The following handbook is a guide to the department's graduate degree requirements and resources, and is intended as an aid for you from your first semester through graduation.

Sincerely,

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2. MASTER'S PROGRAM

2.1 M.S.E.E. Thesis Option

Master's Thesis students must take 30 degree hours, plus 1 credit hour per semester of ECE 5120 Graduate Seminar. By the end of the program, students complete a thesis, and deliver a public oral defense of the results. The Master's Thesis option consists of 24 degree hours of coursework and 6 degree hours of ECE 6000 Master's Thesis. To declare the thesis option, students submit a Degree Plan to the Electrical and Computer Engineering (ECE) Department for approval by the Graduate Advisor and submission to the Graduate School.

Students must pass the National Council of Examiners for Engineering and Surveying (NCEES) Fundamentals of Engineering (FE) Examination in Electrical & Computer Engineering. It is highly recommended to pass the FE Examination within your first two semesters, as it focuses on material learned as an undergraduate engineering student.

Thesis Option Summary:

- Required Program GPA: 3.0 or above. The ECE Department expects graduate students to maintain a TTU GPA of 3.5 or above.
- Complete 30 degree hours. In addition to the 30 degree hours, 1 credit each semester of ECE 5120 Graduate Seminar is also required for all MS students.
- 24 of the 30 degree hours must be coursework.
- 6 of the 30 degree hours must be ECE 6000, Master's Thesis.
- Enroll in ECE 5120 Graduate Seminar every fall and spring semester.
- ECE 5371 Engineering Analysis is required of all ECE graduate students.
- Complete a MS Thesis Degree Plan to declare the Master's Thesis Option.
- At most, 3 of the 24 degree hours may be from approved non-ECE courses.
- At most, 3 of the 24 degree hours may be ECE 5331 Individual Studies.
- At most, 6 of the 24 degree hours may be transferred into the program from graduate-level coursework completed at another university (pending approval from the department). No courses with a grade lower than 'B', and no courses with a grade of pass/fail or satisfactory, are eligible for transfer.
- Complete a thesis and deliver a public oral defense of the results.
- Pass the Fundamentals of Engineering (FE) Examination in Electrical & Computer Engineering.

2.2 M.S.E.E. Non-Thesis Option

Master's Non-Thesis students must take 30 degree hours, plus 1 credit hour per semester of ECE 5120 Graduate Seminar. At most, 3 of the 30 degree hours may be from approved non-ECE courses, and 6 of the 30 degree hours may be taken as ECE 5331 Individual Studies.

Students must pass the National Council of Examiners for Engineering and Surveying (NCEES) Fundamentals of Engineering (FE) Examination in Electrical & Computer Engineering. It is highly recommended to pass the FE Examination within your first two semesters, as it focuses on material learned as an undergraduate engineering student.

Non-Thesis Option Summary:

- Required Program GPA: 3.0 or above. The ECE Department expects graduate students to maintain a TTU GPA of 3.5 or above.
- Complete 30 degree hours. In addition to the 30 degree hours, 1 credit each semester of ECE 5120 Graduate Seminar is also required for all MS students.
- Enroll in ECE 5120 Graduate Seminar every fall and spring semester.
- ECE 5371 Engineering Analysis is required of all graduate students.
- At most, 3 of the 30 degree hours may be taken from approved non-ECE courses.
- At most, 6 of the 30 degree hours may be taken as ECE 5331 Individual Studies.
- At most, 6 of the 30 degree hours can be transferred into the program from graduate-level coursework completed at another university (pending approval from the department). No courses with a grade lower than 'B', and no courses with a grade of pass/fail or satisfactory, are eligible for transfer.
- Pass the Fundamentals of Engineering (FE) Examination in Electrical & Computer Engineering.

2.3 Time Limit, Credit Limit

Work credited toward a master's degree must be completed within 6 years. This is a maximum time limit determined by the Graduate School, and scholarship eligibility as well as department expectations may require shorter time limits. Once a master's student has completed their degree credits and requirements, they may not enroll in additional spring or fall semesters.

3. PhD PROGRAM

The Electrical and Computer Engineering Department (ECE Department) offers a program of graduate study leading to the Doctor of Philosophy Degree. The program has three basic components:

- Selected courses, primarily in electrical engineering.
- Examinations, written and oral.
- Independent research culminating in a dissertation.

Each student's plan of study is individually formulated around these components through consultation with an Advisory Committee (also known as the PhD Dissertation Committee).

Funded research opportunities exist for doctoral students in the following multidisciplinary centers, laboratories, and industry−sponsored programs. For more information on these opportunities, please visit ECE Research Areas.

PhD Program Summary:

- Required Program GPA: 3.0 or above. The ECE Department expects all doctoral students to maintain a TTU GPA of 3.5 or above.
- Complete 72 degree hours.
- 60 of the degree hours must be coursework.
- 12 of the degree hours must be ECE 8000 Dissertation.
- At most, 30 degree hours of an earned master's degree from another institution may be transferred. No courses with a grade lower than 'B', and no courses with a grade of pass/fail or satisfactory, are eligible for transfer.
- At most, 27 of the 60 degree hours can be taken as ECE 5331 Individual Studies or ECE 7000 Research.
- At most, 18 degree hours can be taken as ECE 5331 Individual Studies.
- In addition to the 72 degree hours, 1 credit each fall and spring semester of ECE 5120 Graduate Seminar is also required for all PhD students until they become a PhD candidate.
- ECE 5371 Engineering Analysis is required, if not already completed as a master's student.
- Complete a Doctoral Degree Plan for submission to the Graduate School.
- PhD students must have at least 2 peer-reviewed journal publications before their final defense.
- Pass the Fundamentals of Engineering (FE) Examination in Electrical & Computer Engineering, if not already passed as a master's student.
- Complete a dissertation and deliver a public oral defense of the results.

3.1 Time Limit, Credit Limit

All requirements for the doctoral degree must be completed within a period of 8 consecutive calendar years or 4 years from admission to candidacy, whichever comes first. This is a maximum time limit determined by the Graduate School, and scholarship eligibility as well as advisor expectations may require shorter time limits. In addition, the doctoral degree must be completed within 99 credit hours.

3.2 PhD Candidacy and Qualifying Exam

Qualification for PhD Candidacy in the ECE Department consists of three components:

1. The nationally administered Fundamentals of Engineering Examination (FE), with the discipline−specific Electrical & Computer Engineering option. The ECE Department strongly encourages PhD students to pass the written examination within the first year of doctoral study. Students are required to provide evidence (a link provided by the National Council of Examiners for Engineering and Surveying - NCEES - with their results) to the ECE Department. Passing Electrical & Computer Engineering FE Exam results from previous years meet this requirement.

   The Fundamentals of Engineering Examination, as administered by NCEES, is a comprehensive and fair indication of the mastery of basics for our students and the department requires a passing score for the MSEE and PhD degree programs.

2. At least 1 peer-reviewed journal article, accepted or published, in the current research topic of the student's PhD dissertation. Alternatively, 2 published peer-reviewed conference papers may be substituted for up to 1 peer-reviewed journal article, pending approval by the Chair of the Advisory Committee. Conference abstracts will not meet this requirement.

3. A written dissertation proposal and an oral presentation of the proposal. The format of the written proposal is at the discretion of the Chair of the Advisory Committee, but the recommended length is at least one page. The student's Advisory Committee, chaired by the student's dissertation advisor, conducts the proposal defense. Notification of the subject of the examination and its time and place must be provided in advance to the ECE Department, so that any interested faculty members can attend.

   When a student passes the proposal defense and has met the other two candidacy requirements, they have completed the department's Qualifying Exam. The ECE department sends the "Qualifying Exam Report" form, signed by the Chair of the student's dissertation committee, to the Texas Tech University Graduate School to be "admitted to candidacy" for the PhD degree. This is a formal step that must be completed at least four months prior to the proposed graduation date.

3.3 Guidelines for Dissertation Defense

From the Texas Tech University Graduate School:

Scheduling and Announcement

The final oral examination over the general field of the dissertation is required of all ECE PhD candidates. The student should NOT be allowed to defend research without a finished dissertation; it is the dissertation document that is being defended by the student, NOT the research itself. The examination is a formal public affair; therefore, it should be held during weekday business hours when classes are in session and not during break periods. A defense may begin as late as 4:30 p.m. in the afternoon. The examination should be held in a University room conducive to attendance by faculty members and students or with facilities conducive for electronic participation if necessary.

Notification of the defense must be submitted to the Graduate School, using the Defense Notification Form, at least three weeks before the defense is held. The Dissertation Supervisor and the Dean's representative should be notified as soon as possible when it becomes necessary for a doctoral examination to be postponed.

Graduate Dean's Representative

The student and the committee recommend a Graduate Dean's representative to the Graduate School, and the Graduate School reserves the right to approve or disapprove of the student's choice of representative. The Dean's representative is a member of the Graduate Faculty whose responsibility is to observe the conduct of the final examination. The representative shall have access to the dissertation and may participate in questioning the candidate.

Representatives must be chosen from departments outside the student's program and department. The Dissertation Oral Defense Approval Form has a line for the representative to sign, signifying their approval of the conduct of the final exam. A Deans Representative's Report Form is available should a representative feel the need to comment on the examination.

Conduct of the Examination

The chairperson of the Advisory Committee should convene the examination by introducing the candidate, giving his or her background, and indicating the general format of the proceedings to follow.

Initially, the candidate should give an overview of his or her study for the benefit of those in attendance who have not read the dissertation. After this, under the guidance of the chairperson, the candidate may be questioned by members of his or her committee, the representative, and other audience members. As indicated earlier, the examination is a public affair, and the candidate should be prepared to defend her or his work before anyone who may question it. A copy of the dissertation (not necessarily in final form) should be available for reference during the examination.

When ample opportunity has been given for this discussion, those not on the doctoral committee should be excused while the committee and the Dean's representative ask further, possibly more detailed, questions regarding both the dissertation and its research procedures. The candidate should then be dismissed from the room while the committee comes to a decision concerning the results of the examination. When the decision is made, the chairperson should inform the candidate of the outcome and electronically submit the Dissertation Oral Defense Approval form to the Graduate School.

4. ACCELERATED BACHELOR'S TO MASTER'S PROGRAM

Computer Engineering or Electrical Engineering

Undergraduate students at Texas Tech University who are majoring in Electrical Engineering or Computer Engineering may apply to our Accelerated Bachelor's to Electrical Engineering Master's Program. This program is intended for our best undergraduates who wish to stay on for a master's degree. Students in the program get an early start on master's work by taking 3 graduate courses in their senior year, in place of 3 senior elective courses, to complete their B.S.E.E. or B.S. Comp. E. Degree. They then take graduate courses the following year and carry out their M.S.E.E. degree.

Students interested in the program are welcome to contact either the ECE Associate Chair for Graduate Studies, or the graduate program coordinator. It is highly recommended that students consult with their Computer Engineering or Electrical Engineering undergraduate advisor for the logistical details of enrolling in graduate level credits, etc., to ensure a smooth transition between undergraduate and graduate status.

5. PROGRAM AREAS

Graduate students can find thesis and dissertation topics in a variety of areas, with research conducted in the following multidisciplinary centers, laboratories, and industry-sponsored programs:

- Center for Pulsed Power and Power Electronics (P3E)
- Nano Photonics Center
- Nano Tech Center (NTC)
- Wireless Communication Systems Laboratory
- Biomedical Integrated Devices and Systems (BIDS)
- Applied Vision Laboratory (AVL)
- Micro-Electric-Mechanical Systems (MEMS)
- Neuroimaging, Cognition, and Engineering Laboratory (NICE)
- Microwave and Antenna Laboratory
- Program for Semiconductor Product Engineering (PSPE)
- Advanced Electronic Systems Engineering Program

6. SCHOLARSHIPS

Through the ECE Seacat Departmental Scholarship, selected Electrical Engineering master's students receive $1000 per academic year (for up to 2 years/30 degree credits). As a competitive scholarship, the Seacat Departmental Scholarship includes an out-of-state tuition waiver for non-resident awardees.

Seacat Departmental Scholarship awardees agree to the criteria designated by the ECE Graduate Committee:

- Submit a scholarship donor thank you letter to the ECE Department.
- Maintain a minimum 3.5 TTU GPA or higher.
- Maintain full-time enrollment during spring and fall semesters.
- Cannot be related to a member of the Texas Tech University Board of Regents.
- Pass the NCEES Fundamentals of Engineering Exam in Electrical & Computer Engineering before the end of the second semester in the program**.** NCEES passing results from previous years meet this requirement.

Scholarships will NOT be renewed for students who do not meet all the above criteria.

7. COURSE REGISTRATION

Class schedules can be located two ways:

- On Raiderlink under the "Look up Classes" link
- At registration.texastech.edu under the "Browse for Classes" link.

You may also choose to use the "Plan Ahead" feature which allows you to plan for an upcoming registration and use that plan when you become eligible to register.

Any late changes in course offerings (added or deleted, etc.) will be communicated by email and updated on Raiderlink.

See **Instructions for Registering for Classes Using CRNs**.

ECE 6000, ECE 7000, and ECE 8000 are variable credit courses, meaning students select the number of credit hours they wish to enroll in for those specific sections. See Instructions for Changing Variable Credit Hours

Requirements to Consider:

- Full-time status is a minimum enrollment of **9 hours** in a spring or fall semester.
- Full-time status during spring and fall semesters is required for international students.
- Students employed by the university as a RA, TA, or GPTI are required to enroll full- time during the term for which they are employed. This includes summers if they are employed during the summer (full-time enrollment in summer is 6 hours).
- ALL graduate students are required to enroll in ECE 5120 Graduate Seminar each semester. PhD students are required to enroll in Graduate Seminar until they become a candidate.
- Thesis or PhD students who have started enrollment in ECE 6000/ECE 8000 must remain continuously enrolled in the course each term until graduation. This includes summer semesters.

8. INTERNATIONAL STUDENTS: CPT, OPT

Off-campus internships for international students (Curricular Practical Training, CPT) cannot be obtained before completion of two regular semesters (spring and fall).

From the Texas Tech University Office of International Affairs:

Curricular Practical Training (CPT):

Curricular Practical Training is authorized by an International Student Counselor with an endorsement on your I-20 form. No application to DHS or an EAD card is required. The I-20 endorsement provides specific dates for beginning and ending authorization and specifies the employer and site of work. The endorsement must be obtained before work begins.

Curricular Practical Training can be either full-time, which does require at least a minimal enrollment, or part-time (up to 20 hours per week of work), which requires full-time enrollment. Full-time CPT of 12 months or more makes F-1 students ineligible for subsequent Optional Practical Training.

Application Procedures:

- Obtain an internship offer letter from the company that is offering you the position.
- Obtain an academic advisor's Letter for Curricular Practical Training on letterhead providing required CPT information. Required information includes a description of the work experience, name of employer, beginning and ending dates of employment, and explanation of how the experience will be monitored and graded. (A sample letter is available on the Office of International Affairs website)
- Obtain a new I-20 with the CPT authorization on page two from your international student counselor.

Optional Practical Training (OPT)

What is Optional Practical Training (OPT)?

Optional Practical Training is used by students to gain work experience in their field of study after completing a degree program. There are certain other situations in which OPT may be possible prior to the completion of a degree program.

How long can I do OPT?

Student Exchange Visitor Program (SEVP) regulations allow up to 12 months of OPT at each degree level for a student in F-1 status. Science, technology, engineering, and math (STEM)

students are eligible for an extension of 24 months of OPT.

When can I apply for OPT and How?

An application for post-completion OPT can be filed up to 90 days prior to the student's completion date and no later than 60 days after the student's program completion date.

How long does the OPT application process take?

It may take the government agency (United States Citizenship and Immigration Services or USCIS) up to 90 days or more to process an OPT application. Your International Student Counselor may be able to provide a current estimate of processing times. However, processing times are unpredictable so it is always best to apply early! You cannot begin working until you have received your Employment Authorization Card (EAD) in the mail from the government agency and until the start date listed on the EAD card. The ISSS office is not responsible for the length of time required to process your OPT application.

To learn more about the OPT Process, please review the OPT presentation video and information available on the Office of International Affairs website.

9. PROGRAM FORM SAMPLES

The following forms can also be found via the Electrical and Computer Engineering website under the Programs tab > Graduate Advising.