

# The Department of Electrical Engineering

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## Requirements for a Bachelor of Science Degree in Electrical Engineering

### Pre-Professional Courses

(All pre-professional courses must be completed before enrolling in professional program courses)

#### English

ENGL 1301, 1302.

#### Mathematics

1426 <sup>1</sup>, 2425, 2326, 3319.

#### Science

CHEM 1465 (or CHEM 1441 and CHEM 1442), PHYS 1443, PHYS 1444.

#### Engineering

CE 2312.

#### Computer Fundamentals and Programming

EE 2347, CSE 1311.

#### Electrical Engineering

1104, 1205, 2415, 2403, 2441.

## General Education Courses

### Literature

Three hours of English or modern and classical languages literature or other approved substitute.

### Liberal Arts Elective

For EE majors COMS 3302 must be used to satisfy this requirement.

### Fine Arts

Three hours from architecture, art, music, or theatre arts <sup>2</sup>.

### Social/Cultural Studies

For EE majors ECON 2305 must be used to satisfy this requirement.

### U.S. History

1311, 1312.

### U.S. Political Science

2311, 2312.

## Professional Courses

### Electrical Engineering

3407, 3417, 3318, 3330, 3446, 4340, 4349.

Electrical Engineering Core Electives

3302, 3310, 3444, 4314, 4330 (2 courses)

Electrical Engineering Electives

Two EE senior elective courses

### Engineering Elective <sup>2</sup>

Three hours (also includes Electrical Engineering).

**Mathematics or Science Elective**<sup>2</sup>

Three hours of 3000/4000 courses in Mathematics or Science.

**Thermal Engineering**

MAE 3309.

**Total (Pre-Engineering)**

59 hours.

**Total (General Education)**

24 hours.

**Total (Upper-Division)**

42 hours.

**Total (for degree)**<sup>3</sup>

125 hours.

<sup>1</sup>The Mathematics Department requires MATH 1323 or passing a placement test provided by the Mathematics Department before enrolling.

<sup>2</sup> A list of acceptable electives is available in the EE Dept. advising office.

<sup>3</sup> Total hours will depend upon prior preparation and academic qualifications. Also, students who do not have two units of high school foreign language will be required to take two courses of foreign language in addition to the previously listed requirements.

Refer to the College of Engineering section of this catalog for information concerning the following topics: Admission into Engineering, Admission into Pre-Engineering, Admission into the Professional Program, Counseling or Advising, Transfer and Change of Major Policies, Honors Program, Academic Regulations, Professional Engineering Registration, Cooperative Education, Academic Probation, Repeating Course Policy, and Academic Dishonesty.

The program is divided into a pre-professional program and a professional engineering program, with the division essentially occurring between the sophomore and junior years.

**Suggested Course Sequence: Pre-Professional Program**

The following suggested course sequences for the freshman and sophomore years reflect a concentration of preliminary science, mathematics, and engineering courses to prepare the student for professional program studies.

### Freshman Year

**First Semester:** EE 1104; EE 1205; MATH 1426; CHEM 1465; ENGL 1301-Total Credit 14 hours.

**Second Semester:** CSE 1311; PHYS 1443; MATH 2425; ENGL 1302; HIST 1311-Total Credit 17 hours.

### Sophomore Year

**First Semester:** EE 2415; PHYS 1444; MATH 3319; MATH 2326; HIST 1312-Total Credit 17 hours.

**Second Semester:** EE 2347; EE 2403; EE 2441; CE 2312; COMS 3302-Total Credit 17 hours.

### Suggested Course Sequence: Professional Program

The following suggested course sequences for the junior and senior years are tailored to guide the students to successful completion of their studies. Course prerequisites or concurrent enrollment in courses are considered.

### Junior Year

(Prerequisite: Admission to the Professional Program)

**First Semester:** EE 3407; EE 3417; EE 3446; MAE 3309 -Total Credit 15 hours.

**Second Semester:** EE 3318; EE 3330; ECON 2305; 2 EE Core electives, 6 or 7 hours (EE 3302, 3310, 3444, 4314, 4330)-Total Credit 15-16 hours.

### Senior Year

**First Semester:** EE 4340; EE Elective, 3 hours; ENGR Elective, 3 hours; POLS 2311; Fine Arts Elective, 3 hours-Total Credit 15 hours.

**Second Semester:** EE 4349; EE Elective, 3 hours; Math/Science Elective, 3 hours; English Literature Elective, 3 hours; POLS 2312-Total Credit 15 hours.

## Requirements for a Minor in Electrical Engineering

To receive a minor in Electrical Engineering, a student must complete the following five courses with a grade of C or better in each:

EE 2415 Circuit Analysis I

EE 2403 Electronics I

EE 2441 Digital Logic and Microprocessors I

EE 3407 Electromagnetics

EE 3417 Continuous Signals and Systems

## Overview of Electrical Engineering

Electrical Engineering is a broad field that includes power systems, control systems, microelectronics and nanoelectronics, microprocessors and computer networks, telecommunications (wire, wireless, satellite and fiber optic), remote sensing, signal processing, neural networks, medical devices, optics (electro-optics, optoelectronics and photonics) and other emerging technologies.

Electrical engineers must be prepared to apply fundamental concepts in the applications of new technologies and to contribute to the growth of these technologies. They must also have the skills to communicate their ideas and to manage projects within a schedule and budget. Because of the broad nature of the field, electrical engineers are involved in a wide range of engineering design projects and they must be able to employ knowledge from other disciplines in electrical engineering designs. They must also be prepared to support engineers in other disciplines.

Engineering designs are a team effort and require good communication skills, both oral and written. Therefore it is important that each student develops these necessary communication skills.

The benefit of having an education in electrical engineering is that the student is prepared for a career not only in technical areas but also for further training in other disciplines such as medicine, law, public policy, business, economics, management, and teaching.

## Educational Objectives of the Undergraduate Program

The Educational Objectives are to produce graduates who:

- Possess a broad yet practical knowledge in electrical engineering, science, and mathematics with particular depth in electromagnetics, circuits, electronics, and controls.
- Possess a practical knowledge in other key areas such as thermal engineering, mechanics, and economics.
- Are skilled in applying mathematical tools and engineering judgment to professional design, analysis, and problem solving; work well either individually or in multidisciplinary teams; and can effectively articulate technical ideas to both technical and non-technical audiences.

- Understand the importance of lifelong learning, ethics and professional accountability, and their role as leaders in society.

## Program Outcomes of the Undergraduate Program

From these Program Educational Objectives, the department designed its baccalaureate program to offer its graduates:

- an ability to apply knowledge of mathematics, science, and engineering
- an ability to design and conduct experiments, as well as to analyze and interpret data
- an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- an ability to function on multi-disciplinary teams
- an ability to identify, formulate, and solve engineering problems
- an understanding of professional and ethical responsibility
- an ability to communicate effectively
- the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- a recognition of the need for, and an ability to engage in life-long learning
- a knowledge of contemporary issues
- an ability to use the techniques, skills and modern engineering tools necessary for engineering practice

The program is accredited by the Engineering Accreditation Commission (EAC) of ABET, formerly the Accreditation Board for Engineering and Technology.

## Admission Requirements

Requirements for admission as an EE major are governed by the requirements as stated in the [College of Engineering section](#) of this catalog. EE majors are only allowed to enroll in pre-professional courses until they meet the requirements for the professional program as outlined below.

## Undergraduate Advising

General academic advising for new students (excluding transfer course evaluation) is done during the scheduled orientation period prior to registration. Academic advising for continuing students will be done during each semester prior to registration. The dates for advising new and continuing students will be listed in the appropriate schedule of classes. Personal academic advising is available in the office of the Undergraduate Advisor during the semester by appointment. To graduate, the student must have an approved degree plan on file in the Registrar's Office.

The students can use the course sequences described above to plan their studies. Recommended electives are listed in the advising office and on the Web site

at [www.uta.edu/engineering/ee](http://www.uta.edu/engineering/ee). A supplemental EE Undergraduate Program Guide is available in the Advising Office; it provides more details of the different areas of specialization in Electrical Engineering as well as on other matters relevant to completing the BSEE degree.

## Admission to the Professional Program

Requirements for admission to the professional program in Electrical Engineering are in accordance with those of the College of Engineering with the following added stipulations:

- Application to the professional program is to be made to the Undergraduate Advisor during the semester that the advancement requirements are being completed.
- No professional electrical engineering courses may be taken until the student is admitted into the professional program or obtains the written consent of the Undergraduate Advisor.
- Each student must complete all pre-professional courses stipulated under "Requirements for a Bachelor of Science Degree in Electrical Engineering" with a minimum grade of C in each course and a minimum GPA of 2.25 in (1) all courses, (2) in all math, science, and engineering courses, and (3) in all EE courses.

To graduate, the student must be admitted to the professional program and have an approved degree plan on file in the Registrar's office. The degree plan is generated upon entry to the professional program. Graduating seniors should apply to graduate during the next-to-last semester. Each student must complete all professional level electrical engineering courses stipulated under "Requirements for a Bachelor of Science Degree in Electrical Engineering" with a minimum grade of C in each course. All engineering courses used on the BSEE degree plan must be C or better.

## Program Features

The pre-professional program reflects a concentration of preliminary science, mathematics, and engineering courses to prepare the student for the professional engineering program. EE students are admitted to the professional program as described above. The pre-professional program consists of core courses in electronics; digital systems, microprocessors, and computer programming; electromagnetics; power systems and energy conversion; continuous and discrete time systems; controls; and communications. The core curriculum provides the needed foundation for a variety of technical areas in electrical engineering. The design experience is emphasized throughout the program, with particular emphasis on the team concept in the engineering design courses. Through careful selection of technical electives, the student may specialize in certain fields of electrical engineering. Information on these areas is available in the Electrical Engineering Department Advising Office. In addition, there are opportunities to participate in ongoing research projects of the faculty in Electrical Engineering. Independent study credit can be obtained through EE 4391 Advanced Problems in Electrical Engineering

## Cooperative Education Program

Cooperative education opportunities are plentiful for EE students. Interested students should contact the Cooperative Education Office in the College of Engineering.

## Master's Degree Path

The electrical engineering field is continually evolving in all areas from power systems to optics. To stay current in technical areas requires a commitment to lifelong learning. Completing a master's degree certainly gives the student a head start on this.

Those students graduating with a GPA of 3.0 or higher and GRE scores of 350 Verbal or higher and 700 quantitative or higher can be admitted to the EE master's program upon application. Interested students should contact the graduate advisor. Students can take a project course, EE 4391, as one of their technical electives to begin their studies on a topic that they may use for their MS research and thesis. Also, students that require less than 12 hours to graduate can dual enroll in the graduate program in the last semester of their BS program.

## Competence in Oral Communication and Computer Use

Electrical Engineering students will satisfy the University Competence in Oral Presentations requirement by completing the course COMS 3302, Professional and Technical Communication. They will satisfy the University Competence in Computer Use requirement by completing EE 2347, Mathematical Foundations of Electrical Engineering.

## Electrical Engineering Faculty

### Chair

Professor Bredow

### Professors

Alavi, Butler, Carter, Celik-Butler, Chiao, Devarajan, Kondraske, Lee, Lewis, Liang, Magnusson, Manry, Rao, Stephanou, Tao, Yeung

### Associate Professors

Davis, Dillon, Jung, Lu, Oraintara, Popa, Tjuatja, Vasilyev, Zhou

### Assistant Professors

Davoudi, Iqbal, Wetz

### Senior Lecturers

Gibbs, Kenarangui, Russell

Lecturer

Kearny

Professors Emeritus

Chen, Fitzer, Fung, Prabhu, Shoults, Smith, Spradlin

## Course Descriptions

View Course Descriptions for:

[Electrical Engineering \(EE\)](#)