ELECTRICAL ENGINEERING MAJOR

Electrical engineers create innovative technology solutions in a wide range of areas, from handheld communications to solar panels; from cardiac pace makers to autonomous robots; from wireless networks to bio-engineered sensors that detect dangerous pathogens; and intelligent surveillance systems that perform face and motion recognition. Employers visiting campus seek out electrical engineering students for recruitment more than any other major at the University of Maryland.

Electrical engineers have been uniquely responsible for developing many of the innovations that have brought us modern life and are urgently needed today to help solve a variety of global problems, including challenges related to energy, communications, health care, global warming, and national security. Electrical engineering underpins all other engineering disciplines, encompassing biomedical devices technology, micro- and nanoelectronics, information systems, wireless communications and signal processing, power systems, lasers and optics, electronic devices, computer software-hardware integration, and control systems. Electrical engineers led revolutions in the music and telecommunications industries, and are poised to lead the next revolutionary innovations in nanotechnology, robotics, and other advanced technologies.

The Bachelor of Science degree in Electrical Engineering is accredited by the Engineering Accreditation Commission of ABET, www.abet.org (http://www.abet.org).

Program Objectives

Broadly stated, the Program Educational Objectives (PEOs) for the undergraduate major in electrical engineering pertain to the accomplishments and performance of our students 3-5 years after graduation. These objectives are determined in consultation with the various constituencies of the electrical engineering program and agreed upon and approved by a consensus of the faculty.

1. Advance to a leadership position in a reputable industry or government institution.
2. Earn a graduate degree from a top ranked graduate program in Electrical Engineering or related field.
3. Have our graduates become an innovator and/or entrepreneur in an Electrical Engineering or related space.

Program Learning Outcomes

A comprehensive set of Student Learning Outcomes (SLOs) has been derived from the Program Educational Objectives (PEOs). These SLOs comprise the knowledge and skills all Electrical Engineering students are expected to possess by the time they graduate so the PEOs can be accomplished. The SLOs are:

1. An ability to apply knowledge of mathematics, science, and engineering
2. An ability to design and conduct experiments, as well as analyze and interpret data
3. 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
4. An ability to function on multi-disciplinary teams
5. An ability to identify, formulate, and solve engineering problems
6. An understanding of professional and ethical responsibility
7. An ability to communicate effectively
8. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
9. A recognition of the need for, and an ability to engage in, life-long learning
10. A knowledge of contemporary issues
11. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice
12. Program specific outcome: an ability to apply knowledge of probability and statistics in electrical engineering

Requirements

Requirements for the Electrical Engineering major include thorough preparation in mathematics, physics, chemistry, and engineering science. Elective courses must include both Electrical Engineering courses and technical courses outside the department. Students must earn a grade of ‘C’ or higher in all engineering, mathematics, and science courses, as well as the prerequisites for these courses. A sample program is shown below.
**TECHNICAL ELECTIVE REQUIREMENTS**

*Effective Fall 2008, all entering BSEE students must:*

1. Distribute their 13 credits of EE technical electives among the following course categories:

<table>
<thead>
<tr>
<th>Category</th>
<th>Electives</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category A</td>
<td>Advanced Theory and Applications</td>
<td>minimum of 3 credits</td>
</tr>
<tr>
<td>Category B</td>
<td>Advanced Laboratory</td>
<td>minimum of 2 credits</td>
</tr>
<tr>
<td>Category C</td>
<td>Capstone Design</td>
<td>minimum of 3 credits</td>
</tr>
</tbody>
</table>

Note: ENEE499, Senior Projects in Electrical and Computer Engineering, may be used to satisfy either the Category A or the Category B requirement subject to approval by the faculty supervisor and the Associate Chair; it cannot be used as a Category C course. The maximum number of ENEE499 credits that may be applied towards EE technical elective requirements is five.

2. Distribute their 9 credits of general technical electives as follows:
   a. They may be any upper-level course (300 level or higher) from the math, engineering, and basic science disciplines whose courses start with the following prefixes and who do not appear on the list of unacceptable courses available from the Undergraduate Studies Office: AMSC, BCHM, BIOE, BSCI, CHEM, CMSC, ENAE, ENCE, ENCH, ENEE, ENES, ENFP, ENMA, ENME, ENNU, ENRE, MATH, PHYS, and STAT. The most up-to-date list of approved and unacceptable courses will always be available from the Undergraduate Studies Office and on the ECE website.
   b. They may be any upper-level course (300 level or higher) whose prefix is not given in the list above, assuming that the student:
      i. completes the application to allow the course to count as a general elective,
      ii. demonstrates how this course complements the student’s professional goals, and
      iii. receives the signed approval of the Associate Chair for Undergraduate Education. If more than one course is taken via this option, all of those courses must have a closely-related theme.

3. Have two courses from the same ENEE specialty area. A list of courses grouped according to specialty area is available from the Undergraduate Studies Office and on the ECE website.

If you have any questions about how these requirements affect your current selection of senior EE electives, please contact an advisor.

*Technical electives for students admitted Spring 2001 - Spring 2008:*

The 13 credits of EE technical electives among the following course categories:

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<td>Capstone Design</td>
<td>minimum of 3</td>
</tr>
</tbody>
</table>

Please read carefully, and make a note of, the following special cases and other items:

1. The required Advanced Laboratory, Advanced Theory and Applications courses grouped according to specialty area are available from the Undergraduate Studies Office and on the ECE website.

Four Year Plan

Click here ([https://eng.umd.edu/four-year-plans/](https://eng.umd.edu/four-year-plans/)) for roadmaps for four-year plans in the A. James Clark School of Engineering.

Additional information on developing a four-year academic plan can be found on the following pages:

- 4yearplans.umd.edu ([http://4yearplans.umd.edu/](http://4yearplans.umd.edu/))
- the Student Academic Success-Degree Completion Policy ([https://academiccatalog.umd.edu/undergraduate/registration-academic-requirements-regulations/academic-advising/](https://academiccatalog.umd.edu/undergraduate/registration-academic-requirements-regulations/academic-advising/)) section of this catalog