



Academic Learning Compact

Electrical Engineering

Program Mission Statement

The mission of the School of Engineering is to provide diverse learning opportunities in the technical and professional aspects of engineering that prepare all participants to thrive in an evolving world.

The electrical engineering program education objectives are to produce graduates with:
sound engineering fundamentals,
strong team and leadership skills,
strong problem solving skill,
an ability to learn and advance, and
effective communication skills.

Electrical Engineering Faculty currently produce scholarship in the following areas:

- Embedded Controls
- Cyber security and Network Operations
- Systems on a Chip
- Micro Mechanical Systems
- Optical Communications
- Wireless Communications
- Imaging and Signal Processing Applications
- Rehabilitation Engineering

As part of the BSEE degree, all students are required to complete a capstone design course. This course requires students to work with a local engineering or non-profit partner on a real-world design problem. Additionally undergraduate research projects and technical electives have worked with community partners. Since 2012 the list of external partners has included:

- Mercedes Benz USA
- Johnson & Johnson Vision Care
- Johnson & Johnson 3D Printing Center
- SAFT Batteries
- Inspired Energy
- Gerdau Ameristeel
- Medtronic
- Stenner Pumps
- GEM Products
- E3 Sparkplugs
- ICS
- Mayo Clinic
- Jacksonville Zoo and Gardens
- Brooks Rehabilitation
- Clay County Sheriffs Office

Student Learning Outcomes

Graduates will be able

Content/Discipline-Specific Knowledge/Skills

- Students should be able to utilize techniques and tools based on the principles of mathematics and science for engineering practice, design, and problem solving. These techniques and tools can be used for theoretical problems, engineering design, experimental techniques, and for data analysis and interpretation. These outcomes are measured using the following ABET Program Evaluation Outcomes:

ABET (a) - an ability to apply knowledge of mathematics, science, and engineering

ABET (e) - an ability to identify, formulate, and solve engineering problems

ABET (k) - an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

Communication Skills

- Students will communicate technical data and design information effectively using visual, written, and oral communication.

Critical Thinking Skills

- Students will apply their knowledge of the scientific method, mathematics and engineering science to solve real-world engineering problems and analyze the quality of their solutions.

Critical Thinking is assessed twice in the curriculum using the School of Engineering Critical Thinking Rubric.

Assessment Approaches

The electrical engineering program utilizes a number of direct and indirect assessment measures, in agreement with our accreditation agency ABET, to assess proficiency of course outcomes and student outcomes. Direct assessment tools include course design projects, senior capstone design projects, and assessment of course learning outcomes in each course, using assessment rubrics as appropriate. Indirect assessment tools include graduating senior surveys, alumni surveys, and employer surveys.

The electrical engineering program assesses Critical Thinking, Content and Communication for assessment purposes.

Critical Thinking:

Critical Thinking is assessed using both Direct and Indirect Methods. The School of Engineering (SoE) has determined that for engineering students, critical thinking is best assessed using an engineering design definition of critical thinking. Throughout the curriculum, students perform engineering design, which is a decision making process (often iterative), in which the basic sciences, mathematics, and the engineering sciences are applied to convert resources optimally to meet stated needs. Based on this, the SoE developed a design-based critical thinking rubric to assess students with respect to five different elements of critical thinking (Comprehension, Application, Analysis, Synthesis and Evaluation). Critical Thinking is assessed twice as students move through the BSEE curriculum. The first assessment point occurs in EEL3172L (Introduction to Digital Design Lab). This course is assessed because this is the first design integrated courses that electrical engineering students take (sophomore year for FTICs). Students' critical thinking will be assessed using the SoE Critical Thinking Rubric and student laboratory reports. The second assessment point occurs in EEL4915 (Senior Capstone Design II). This course is the final design intensive course that all electrical engineering students complete. Students' critical thinking will be assessed using the SoE Critical Thinking Rubric and final Senior Capstone Design written reports.

Indirect assessment of content occurs through the use of the graduating senior exit survey administered to seniors enrolled in EEL4915 (Senior Capstone Design II) each spring semester.

Content:

Content is assessed using both direct and indirect methods. Direct assessment occurs through the assessment of course learning outcomes (CLOs) assigned to each required undergraduate electrical engineering course. Each individual CLO is then mapped to a Program Educational Outcome as defined by ABET accreditation. For direct assessment of content, the following Program Educational Outcomes are used:

Outcome (a): an ability to apply knowledge of mathematics, science, and engineering

Outcome (e): an ability to identify, formulate, and solve engineering problems

Outcome (k): an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

Indirect assessment of content occurs through the use of the graduating senior exit survey administered to seniors enrolled in EEL4915 (Senior Capstone Design II) each spring semester.

Communication:

Communication is assessed using both direct and indirect methods. Communication is directly assessed to verify that students are able to communicate technical data and design information effectively using visual, written, and oral forms of communication. Written communication and graphical communication will be assessed twice in the BSEE curriculum. In both cases, written communication and graphical communication will be assessed using a Written Communication VALUE Rubric from the Association of American Colleges and Universities. Indirect assessment of content occurs through the use of the graduating senior exit survey administered to seniors enrolled in EEL4915 (Senior Capstone Design II) each spring semester.