Electrical Engineering BSEE with Bioelectrical Engineering Concentration

Overview

The Bachelor of Science in Electrical Engineering is offered by the Department of Electrical and Computer Engineering. The program prepares students for careers as practicing engineers in areas such as digital systems, embedded processor applications, digital communications, control systems, sensor networks, biomedical signal processing, microelectronics, computer security and power networks. These careers are in applications, development, research, and design of electric and electronic systems and devices. Electrical Engineers are involved in the design and development of telecommunications networks, cellular telephones, computer and other microprocessor-based devices, consumer electronics, control systems for space vehicles and robots, and in many aspects of the power and automotive industries.

Electrical Engineering students may complete one or more optional concentrations in

- Bioelectrical Engineering,
- Computer Engineering, and/or
- Cooperative Education Program.

Bioelectrical Engineering Concentration

The concentration in Bioelectrical Engineering prepares students for careers in the emerging areas of biomedical signal and image processing, assistive devices for the impaired, and bioelectronics. The Bioelectrical Engineering concentration utilizes courses in Biology, and Mammalian Anatomy and Physiology from the Department of Kinesiology at Temple University as part of the curriculum.

Campus Location: Main

Program Code: EN-ECE-BSEE

Accreditation

The Electrical Engineering (BS) program is accredited by the Engineering Accreditation Commission of ABET, https://www.abet.org, under the General Criteria and Program Criteria for Electrical, Computer, Communications, Telecommunication(s) and Similarly Named Engineering Programs. ABET is a non-profit and non-governmental accrediting agency for academic programs in the disciplines of applied science, computing, engineering, and engineering technology recognized by the Council for Higher Education Accreditation (CHEA).

+1 Bachelor to Master’s Accelerated Degree Program

High-achieving undergraduates can earn both a bachelor's degree and a master's degree within five years. Students apply for this program in sophomore year, and four graduate-level courses are taken in place of undergraduate requirements during junior and senior years. After the bachelor's degree is earned, one graduate-level course is taken in the summer followed by full-time study in the subsequent Fall and Spring semesters to complete the master's degree study. The following accelerated program is available:

- Bachelor of Science in Electrical Engineering and Master of Science in Electrical Engineering

Contact Information

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lbai@temple.edu

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215-204-8737
brian.thomson@temple.edu

Learn more about the Bachelor of Science in Electrical Engineering.

These requirements are for students who matriculated in academic year 2023-2024. Students who matriculated prior to fall 2023 should refer to the Archives to view the requirements for their Bulletin year.
Summary of Degree Requirements

University Requirements

All new students are required to complete the university's General Education (GenEd) curriculum.

All Temple students must take a minimum of two writing-intensive courses for a total of at least six credits. The writing-intensive course credits are counted as part of the major; they are not General Education (GenEd) or elective credits. The writing-intensive courses must be completed at Temple University and students may not transfer in credits to satisfy this requirement. The specific writing-intensive courses required for this major are:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGR 2196</td>
<td>Technical Communication</td>
<td>3</td>
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<tr>
<td>or ENGR 2996</td>
<td>Honors Technical Communication</td>
<td></td>
</tr>
<tr>
<td>ENGR 4296</td>
<td>Capstone Senior Design Project</td>
<td>3</td>
</tr>
<tr>
<td>or ENGR 4996</td>
<td>Honors Capstone Senior Design Project</td>
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College Requirements

The degree of Bachelor of Science in Electrical Engineering with a concentration in Bioelectrical Engineering may be conferred upon satisfactory completion of a minimum of 128 semester hours of credit with a minimum GPA of 2.0 overall and in the major. Students must also score a minimum grade of C- in each of the following courses before they can take other junior and senior level courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>ECE 2342</td>
<td>Circuits and Electronics I</td>
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<td>ECE 2612</td>
<td>Digital Circuit Design</td>
<td>3</td>
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<tr>
<td>ECE 3516</td>
<td>Signals and Systems</td>
<td>5</td>
</tr>
<tr>
<td>or ECE 3916</td>
<td>Honors Signals and Systems</td>
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Program Requirements

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<td></td>
<td>Required Math &amp; Basic Science Courses</td>
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<td>MATH 1041</td>
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<td>or MATH 1941</td>
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<td>MATH 1042</td>
<td>Calculus II</td>
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<td>or MATH 1942</td>
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<td>MATH 2041</td>
<td>Differential Equations I</td>
<td>3</td>
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<tr>
<td>or MATH 2941</td>
<td>Honors Differential Equations I</td>
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<tr>
<td>ECE 3522</td>
<td>Stochastic Processes in Signals and Systems</td>
<td>3</td>
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<tr>
<td>ENGR 2011</td>
<td>Engineering Analysis &amp; Applications</td>
<td>3</td>
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<td>ENGR 2013</td>
<td>Engineering Analysis and Applications Lab</td>
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<td>PHYS 1061</td>
<td>Elementary Classical Physics I</td>
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<td>or PHYS 1961</td>
<td>Honors Elementary Classical Physics I</td>
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</tr>
<tr>
<td>PHYS 1062</td>
<td>Elementary Classical Physics II</td>
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<td>or PHYS 1962</td>
<td>Honors Elementary Classical Physics II</td>
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<td>CHEM 1035</td>
<td>Chemistry for Engineers</td>
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<tr>
<td>CHEM 1033</td>
<td>General Chemistry Laboratory I</td>
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</tr>
<tr>
<td>or CHEM 1953</td>
<td>Honors Chemical Science Laboratory I</td>
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<tr>
<td>BIOL 1012</td>
<td>General Biology II</td>
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<td>Required General Education Courses</td>
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<td>ENG 0802</td>
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<tr>
<td>ENG 0812</td>
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<td>ENG 0902</td>
<td>Honors Writing About Literature</td>
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<tr>
<td>IH 0851</td>
<td>Intellectual Heritage I: The Good Life</td>
<td>3</td>
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</table>
**Electrical Engineering BSEE with Bioelectrical Engineering Concentration**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>or IH 0951</td>
<td>Honors Intellectual Heritage I: The Good Life</td>
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<tr>
<td>IH 0852</td>
<td>Intellectual Heritage II: The Common Good</td>
<td>3</td>
</tr>
<tr>
<td>or IH 0952</td>
<td>Honors Intellectual Heritage II: The Common Good</td>
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<tr>
<td>GenEd 08xx or 09xx (U.S. Society)</td>
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<tr>
<td>GenEd 08xx or 09xx (Global/World Society)</td>
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<td>GenEd 08xx or 09xx (Human Behavior)</td>
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<tr>
<td>GenEd 08xx or 09xx (The Arts)</td>
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<td>GenEd 08xx or 09xx (Race and Diversity)</td>
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**Required Electrical and Bioelectrical Engineering Courses**

<table>
<thead>
<tr>
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<th>Course Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>ECE 1111</td>
<td>Engineering Computation I</td>
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<tr>
<td>ECE 2342</td>
<td>Circuits and Electronics I</td>
<td>5</td>
</tr>
<tr>
<td>ECE 2352</td>
<td>Circuits and Electronics II</td>
<td>5</td>
</tr>
<tr>
<td>ECE 2612</td>
<td>Digital Circuit Design</td>
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</tr>
<tr>
<td>ECE 2613</td>
<td>Digital Circuit Design Laboratory</td>
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</tr>
<tr>
<td>ECE 3612</td>
<td>Processor Systems</td>
<td>3</td>
</tr>
<tr>
<td>or ECE 3914</td>
<td>Honors Microprocessor Systems</td>
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</tr>
<tr>
<td>ECE 3613</td>
<td>Processor Systems Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>or ECE 3915</td>
<td>Honors Microprocessor Systems Lab</td>
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<tr>
<td>ECE 3516</td>
<td>Signals and Systems</td>
<td>5</td>
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<td>or ECE 3916</td>
<td>Honors Signals and Systems</td>
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<tr>
<td>ECE 3712</td>
<td>Introduction to Electromagnetic Fields and Waves</td>
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<td>Engineering Computation II</td>
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<td>Digital Signal Processing</td>
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<td>Human Anatomy and Physiology I</td>
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<td>Human Anatomy and Physiology II</td>
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**Required Engineering Courses**

<table>
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<tr>
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<th>Course Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>ENGR 1001</td>
<td>College of Engineering First Year Seminar</td>
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<tr>
<td>ENGR 1101</td>
<td>Introduction to Engineering &amp; Engineering Technology</td>
<td>3</td>
</tr>
<tr>
<td>or ENGR 1901</td>
<td>Honors Introduction to Engineering</td>
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</tr>
<tr>
<td>ENGR 1102</td>
<td>Introduction to Engineering Problem Solving</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 2196</td>
<td>Technical Communication (WI)</td>
<td>3</td>
</tr>
<tr>
<td>or ENGR 2996</td>
<td>Honors Technical Communication</td>
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</tr>
<tr>
<td>ECE 4176</td>
<td>Senior Design Project I: ECE</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 4296</td>
<td>Capstone Senior Design Project (WI)</td>
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<td>or ENGR 4996</td>
<td>Honors Capstone Senior Design Project</td>
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**Required Electives**

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<tr>
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<tbody>
<tr>
<td>ECE Technical Elective</td>
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<td>Math, Science, or Engineering Elective</td>
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<tr>
<td>Free Elective</td>
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</table>

**Total Credit Hours**

128

**Suggested Academic Plan**

Please note that this is a **suggested** academic plan. Depending on your situation, your academic plan may look different.

**Bachelor of Science in Electrical Engineering with Concentration in Bioelectrical Engineering**

**Suggested Plan for New Students Starting in the 2023-2024 Academic Year**

**Year 1**

<table>
<thead>
<tr>
<th>Term</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>Fall</td>
<td>MATH 1041</td>
<td>Calculus I</td>
<td>4</td>
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<tr>
<td>or MATH 1941</td>
<td>Honors Calculus I</td>
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</tr>
<tr>
<td>PHYS 1061</td>
<td>Elementary Classical Physics I</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>or PHYS 1961</td>
<td>Honors Elementary Classical Physics I</td>
<td></td>
<td></td>
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<tr>
<td>Course</td>
<td>Title</td>
<td>Credits</td>
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<td>--------</td>
<td>-------</td>
<td>---------</td>
<td></td>
</tr>
<tr>
<td>ENGR 1101 or ENGR 1901</td>
<td>Introduction to Engineering &amp; Engineering Technology or Honors Introduction to Engineering</td>
<td>3</td>
<td></td>
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<tr>
<td>ENGR 1001</td>
<td>College of Engineering First Year Seminar</td>
<td>1</td>
<td></td>
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<tr>
<td>ENG 0802 or ENG 0812 or ENG 0902</td>
<td>Analytical Reading and Writing or Analytical Reading and Writing: ESL or Honors Writing About Literature</td>
<td>4</td>
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Credit Hours: 16

**Spring**

<table>
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<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MATH 1042 or MATH 1942</td>
<td>Calculus II or Honors Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 1062 or PHYS 1962</td>
<td>Elementary Classical Physics II or Honors Elementary Classical Physics II</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 1035</td>
<td>Chemistry for Engineers</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 1033 or CHEM 1953</td>
<td>General Chemistry Laboratory I or Honors Chemical Science Laboratory I</td>
<td>1</td>
</tr>
<tr>
<td>ENGR 1102</td>
<td>Introduction to Engineering Problem Solving</td>
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Credit Hours: 15

**Year 2**

**Fall**

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<tr>
<td>ENGR 2011</td>
<td>Engineering Analysis &amp; Applications</td>
<td>3</td>
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<tr>
<td>ENGR 2013</td>
<td>Engineering Analysis and Applications Lab</td>
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<tr>
<td>ECE 1111</td>
<td>Engineering Computation I</td>
<td>4</td>
</tr>
<tr>
<td>ECE 2342</td>
<td>Circuits and Electronics I</td>
<td>5</td>
</tr>
<tr>
<td>IH 0851 or IH 0951</td>
<td>Intellectual Heritage I: The Good Life or Honors Intellectual Heritage I: The Good Life</td>
<td>3</td>
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Credit Hours: 16

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MATH 2041 or MATH 2941</td>
<td>Differential Equations I or Honors Differential Equations I</td>
<td>3</td>
</tr>
<tr>
<td>ECE 2612</td>
<td>Digital Circuit Design</td>
<td>3</td>
</tr>
<tr>
<td>ECE 2613</td>
<td>Digital Circuit Design Laboratory</td>
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</tr>
<tr>
<td>ECE 2352</td>
<td>Circuits and Electronics II</td>
<td>5</td>
</tr>
<tr>
<td>IH 0852 or IH 0952</td>
<td>Intellectual Heritage II: The Common Good or Honors Intellectual Heritage II: The Common Good</td>
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Credit Hours: 15

**Year 3**

**Fall**

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<th>Course</th>
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<tbody>
<tr>
<td>ECE 3612 or ECE 3914</td>
<td>Processor Systems or Honors Microprocessor Systems</td>
<td>3</td>
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<tr>
<td>ECE 3613 or ECE 3915</td>
<td>Processor Systems Laboratory or Honors Microprocessor Systems Lab</td>
<td>1</td>
</tr>
<tr>
<td>ECE 3516 or ECE 3916</td>
<td>Signals and Systems or Honors Signals and Systems</td>
<td>5</td>
</tr>
<tr>
<td>ENGR 2196 or ENGR 2996</td>
<td>Technical Communication or Honors Technical Communication</td>
<td>3</td>
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<tr>
<td>GenEd Breadth Course</td>
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<tr>
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Credit Hours: 18

**Spring**

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<tr>
<td>ECE 3522</td>
<td>Stochastic Processes in Signals and Systems</td>
<td>3</td>
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<tr>
<td>ECE 3712</td>
<td>Introduction to Electromagnetic Fields and Waves</td>
<td>3</td>
</tr>
<tr>
<td>ECE 3822</td>
<td>Engineering Computation II</td>
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<tr>
<td>BIOL 1012</td>
<td>General Biology II</td>
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Electrical Engineering BSEE with Bioelectrical Engineering Concentration

Year 4

Fall

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<tr>
<td>ECE 4176</td>
<td>Senior Design Project I: ECE</td>
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<tr>
<td>ECE 4522</td>
<td>Digital Signal Processing</td>
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</tr>
<tr>
<td>KINS 1223</td>
<td>Human Anatomy and Physiology I</td>
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</tr>
<tr>
<td>ECE Technical Elective</td>
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<td>GenEd Breadth Course</td>
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Credit Hours: 16

Spring

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<th>Course Title</th>
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<tr>
<td>ENGR 4296</td>
<td>Capstone Senior Design Project</td>
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<tr>
<td>or ENGR 4996</td>
<td>or Honors Capstone Senior Design Project</td>
<td>3</td>
</tr>
<tr>
<td>KINS 1224</td>
<td>Human Anatomy and Physiology II</td>
<td>4</td>
</tr>
<tr>
<td>Math, Science, or Engineering Elective</td>
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<td>GenEd Breadth Course</td>
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Credit Hours: 17

Total Credit Hours: 128

ECE Technical Electives

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<tr>
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<tbody>
<tr>
<td>ECE 3412</td>
<td>Classical Control Systems</td>
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<td>Classical Control Laboratory</td>
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<td>ECE 3432</td>
<td>Robotic Control using Robotic Operating System (ROS)</td>
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<td>ECE 3614</td>
<td>Printed Circuit Board Design</td>
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<td>ECE 3622</td>
<td>Embedded System Design</td>
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<td>ECE 3623</td>
<td>Embedded System Design Laboratory</td>
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<td>ECE 3732</td>
<td>Electromechanical Energy Systems</td>
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<td>ECE 3733</td>
<td>Electromechanical Energy Systems Laboratory</td>
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<td>ECE 3824</td>
<td>Engineering Computation III</td>
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<tr>
<td>ECE 4110</td>
<td>Special Topics</td>
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<td>ECE 4312</td>
<td>Microelectronics II</td>
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<td>ECE 4322</td>
<td>VLSI Systems Design</td>
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<td>ECE 4412</td>
<td>Modern Control Theory</td>
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<td>Digital Control Systems</td>
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<td>ECE 4512</td>
<td>Digital Communication Systems</td>
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<td>Digital Communication Systems Laboratory</td>
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<tr>
<td>ECE 4527</td>
<td>Introduction to Machine Learning and Pattern Recognition</td>
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<td>Data and Computer Communication</td>
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<td>Telecommunications Engineering</td>
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<tr>
<td>ECE 4612</td>
<td>Advanced Processor Systems</td>
<td>3</td>
</tr>
<tr>
<td>ECE 4712</td>
<td>Power System Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ECE 4722</td>
<td>Power Electronics</td>
<td>3</td>
</tr>
<tr>
<td>ECE 4822</td>
<td>Engineering Computation IV</td>
<td>3</td>
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Math, Science, or Engineering Electives

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
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<tbody>
<tr>
<td>Any course 2000-level or above from the College of Science and Technology (CST), excluding MATH 2101, MATH 2103, CIS 3715, CIS 4526.</td>
<td>3</td>
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<tr>
<td>Any course 2000-level or above from the College of Engineering.</td>
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