Bachelor of Science in Electrical Engineering

The Bachelor of Science (BS) in Electrical Engineering prepares students for a career in electrical engineering and associated professional fields. The program provides a state-of-the-art education, research experience and project-based learning from a broad range of focus areas as well as numerous opportunities to work in interdisciplinary fields. The undergraduate electrical engineering degree provides opportunities for employment with various industries including power systems, renewable energy, communications, robotics, or any other entity requiring advanced data processing or system design.

The BS in Electrical Engineering is accredited by the Engineering Accreditation Commission of ABET (https://www.abet.org).

Licensure and/or Certification

Graduates of the Bachelor of Science in Electrical Engineering gain four years of education credit toward obtaining a Professional Engineer license in Alaska.

Please go to UAA's Authorization by State (https://www.uaa.alaska.edu/academics/office-of-academic-affairs/provost_office/uaa-state-authorization/authorization.cshtml/) website for information about licensure or certification in a state other than Alaska.

Admission Requirements

- Complete the Admission Requirements for Baccalaureate Degrees. (http://catalog.uaa.alaska.edu/academicpoliciesprocesses/admissions/undergraduate/)

Special Considerations

- BS in Electrical Engineering students must meet with their faculty advisor at least once per semester to review their academic progress and future course plan.
- Students who intend to enroll in this degree of study are strongly encouraged to complete the following content in high school with a grade of C or better: Trigonometry (1/2 year), Physics (1 year), Algebra (2 years), Chemistry (1 year), and English (3 years). Insufficient preparation may increase the number of semesters required to complete the degree.

Graduation Requirements

- Complete the General University Requirements for Baccalaureate Degrees. (http://catalog.uaa.alaska.edu/undergraduateprograms/baccalaureate要求ments/)
- Complete the General Education Requirements for Baccalaureate Degrees. (http://catalog.uaa.alaska.edu/undergraduateprograms/baccalaureate要求ments/ger/)
  - The 3 credit Tier 1 Quantitative Skills GER will be met and exceeded by the following degree requirements: MATH A251, MATH A252, and MATH A253.
  - The 7 credit Natural Science GER will be met and exceeded by the following degree requirements: CHEM A105, CHEM A105L, PHYS A211, PHYS A211L, PHYS A212, and PHYS A212L.
  - For 3 credits of Tier 2 Humanities GER choose PHIL A305.
  - Complete the following major requirements with a minimum grade of C:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM A105 &amp; A105L</td>
<td>General Chemistry I and General Chemistry I Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>CSCE A201 or CSE A205</td>
<td>Computer Programming I and Introduction to C Programming for Engineers</td>
<td>3-4</td>
</tr>
<tr>
<td>CSCE A248</td>
<td>Computer Organization and Assembly Language Programming</td>
<td>3</td>
</tr>
<tr>
<td>EE A203</td>
<td>Fundamentals of Electrical Engineering I</td>
<td>4</td>
</tr>
<tr>
<td>EE/CSCE A241</td>
<td>Computer Hardware Concepts</td>
<td>4</td>
</tr>
<tr>
<td>ES A261</td>
<td>Introduction to Engineering Computation</td>
<td>3</td>
</tr>
<tr>
<td>EE A307</td>
<td>Introduction to Power Systems</td>
<td>3</td>
</tr>
<tr>
<td>EE/ME A308</td>
<td>Instrumentation and Measurement</td>
<td>3</td>
</tr>
<tr>
<td>EE/PYHS A314</td>
<td>Electromagnetics</td>
<td>3</td>
</tr>
<tr>
<td>EE/PYHS A324</td>
<td>Electromagnetics II</td>
<td>3</td>
</tr>
<tr>
<td>EE A324L</td>
<td>Electromagnetics Laboratory II</td>
<td>1</td>
</tr>
<tr>
<td>EE A333</td>
<td>Electronic Devices</td>
<td>4</td>
</tr>
<tr>
<td>EE A353 &amp; A353L</td>
<td>Circuit Theory and Circuit Theory Lab</td>
<td>4</td>
</tr>
<tr>
<td>EE A354</td>
<td>Engineering Signal Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EE A438</td>
<td>Design of Electrical Engineering Systems</td>
<td>3</td>
</tr>
<tr>
<td>EE/ME A471</td>
<td>Automatic Control</td>
<td>3</td>
</tr>
<tr>
<td>EE A451</td>
<td>Digital Signal Processing</td>
<td>3</td>
</tr>
<tr>
<td>ENGR A151</td>
<td>Introduction to Engineering</td>
<td>1</td>
</tr>
<tr>
<td>ES A209</td>
<td>Statics</td>
<td>3</td>
</tr>
<tr>
<td>ES A210</td>
<td>Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>ES A302</td>
<td>Engineering Data Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ESM A450</td>
<td>Economic Analysis and Operations</td>
<td>3</td>
</tr>
<tr>
<td>MATH A251</td>
<td>Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>MATH A252</td>
<td>Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>MATH A253</td>
<td>Calculus III</td>
<td>4</td>
</tr>
<tr>
<td>MATH A302</td>
<td>Ordinary Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>PHIL A305</td>
<td>Professional Ethics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS A211 &amp; A211L</td>
<td>General Physics I and General Physics I Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>PHYS A212 &amp; A212L</td>
<td>General Physics II and General Physics II Laboratory</td>
<td>4</td>
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Advanced Mathematics Electives

Select 3 credits from the following: 3
Bachelor of Science in Electrical Engineering

<table>
<thead>
<tr>
<th>Course Code</th>
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</tr>
</thead>
<tbody>
<tr>
<td>MATH A314</td>
<td>Linear Algebra</td>
</tr>
<tr>
<td>MATH A371</td>
<td>Stochastic Processes</td>
</tr>
<tr>
<td>MATH A407</td>
<td>Mathematical Statistics</td>
</tr>
<tr>
<td>MATH A410</td>
<td>Introduction to Complex Analysis</td>
</tr>
<tr>
<td>MATH A424</td>
<td>Advanced Engineering Mathematics: Linear Algebra and Numerical Analysis</td>
</tr>
<tr>
<td>MATH A425</td>
<td>Advanced Engineering Mathematics: Partial Differential Equations and Complex Variables</td>
</tr>
<tr>
<td>MATH A426</td>
<td>Numerical Analysis</td>
</tr>
<tr>
<td>MATH A432</td>
<td>Partial Differential Equations</td>
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</tbody>
</table>

**Advanced Engineering Electives**

Complete 12 credits, including at least 6 credits of EE courses, from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
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</thead>
<tbody>
<tr>
<td>CSCE A365</td>
<td>Computer Networks</td>
</tr>
<tr>
<td>CSCE A465</td>
<td>Computer and Network Security</td>
</tr>
<tr>
<td>EE A407</td>
<td>Power</td>
</tr>
<tr>
<td>EE A465</td>
<td>Telecommunications</td>
</tr>
<tr>
<td>EE A417</td>
<td>Green Electrical Energy Systems</td>
</tr>
<tr>
<td>EE A441</td>
<td>Integrated Circuit Design</td>
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<tr>
<td>EE A447</td>
<td>Power Electronics</td>
</tr>
<tr>
<td>EE A458</td>
<td>Antenna Theory</td>
</tr>
<tr>
<td>EE A462</td>
<td>Communication Systems</td>
</tr>
<tr>
<td>EE A472</td>
<td>Advanced Linear Systems</td>
</tr>
<tr>
<td>EE A495</td>
<td>Electrical Engineering Internship</td>
</tr>
<tr>
<td>PHYS A303</td>
<td>Modern Physics</td>
</tr>
</tbody>
</table>

**Total 12 credits**

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

A minimum of 129 credits is required for the degree.

**Honors in Electrical Engineering**

The BS in Electrical Engineering recognizes distinguished achievement by conferring programmatic honors in electrical engineering. In order to receive honors in electrical engineering, a student must meet the following requirements:

- Complete all program requirements.
- Be an active member for at least one year of both a national and an on-campus student chapter of a professional engineering society that addresses issues relevant to the engineering profession.
- Earn a GPA of 3.50 or above in the courses required for the major.
- Gain approval for, complete and present a design/research project prior to applying for graduation. The project proposal, presentation and final written report must be approved by the program faculty.

**Program Student Learning Outcomes**

Students graduating with a BS in Electrical Engineering will have: