Bachelor of Science in Mechanical Engineering

Licensure and/or Certification
Graduates of the Bachelor of Science in Mechanical 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.csh.html) website for information about licensure or certification in a state other than Alaska.

Admission Requirements
In addition to the Application and Admission Requirements for Baccalaureate Programs (http://catalog.uaa.alaska.edu/academicpoliciesprocesses/admissions/undergraduate/), complete the high school preparation courses (http://catalog.uaa.alaska.edu/undergraduateprograms/coeng/mechanicalengineering/) (or their university equivalents) with minimum grades of C.

Academic Requirements
All prerequisites for engineering courses must be completed with a minimum grade of C, and all courses listed in the major requirements must be completed with a grade of C or higher. A student who is unable to earn a grade of C or higher in a program course offered by the College of Engineering will be required to meet with a department faculty advisor to develop a plan for improvement of academic performance before continuing in the program. A student who fails to earn a grade of C or higher on the second attempt will be required to meet with an academic advisor and a member of the College of Engineering professional advising staff to develop a plan for improvement of academic performance before continuing in the program. A student who fails to earn a grade of C or higher on the third attempt will be removed from the program. Re-admittance requires a letter of appeal from the student requesting re-admittance with an explanation of any mitigating factors and how these factors have been addressed. Re-admittance is subject to approval by the faculty of the program and is communicated by the department chair.

Academic Integrity
The program requires its students to abide by the principles of academic integrity described in the Student Code of Conduct. Should suspected cases of academic misconduct occur, these cases may be submitted to the UAA Dean of Students Office, where the assistant director of student conduct reviews all allegations of academic misconduct. At the conclusion of the review, the assistant director of student conduct issues a notification of the findings and conclusions to the reporting faculty member, department chair and dean. Should a student from the program be found responsible for a case of academic misconduct by the UAA Dean of Students Office on two separate occasions, that student will be removed from the program. Re-admittance requires a letter of appeal from the student requesting re-admittance with an explanation of any mitigating factors and how these factors have been addressed. Re-admittance is subject to approval by the faculty of the program and is communicated by the department chair.

Graduation Requirements
- Complete the General University Requirements for Baccalaureate Degrees (http://catalog.uaa.alaska.edu/undergraduateprograms/baccalaureaterequirements/).
- Complete the General Education Requirements (GER) for Baccalaureate Degrees (http://catalog.uaa.alaska.edu/undergraduateprograms/baccalaureaterequirements/ger/). Some courses listed as major requirements may also be used to satisfy GERs.
- Complete the major requirements below with a minimum grade of C.

Major Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Courses</td>
<td></td>
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</tr>
<tr>
<td>CHEM A105 &amp; A105L</td>
<td>General Chemistry I and General Chemistry I Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>CHEM A106 &amp; A106L</td>
<td>General Chemistry II and General Chemistry II Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>ENGR A105A</td>
<td>Engineering Graphics</td>
<td>1</td>
</tr>
<tr>
<td>ENGR A105B</td>
<td>Computer-Aided Graphics</td>
<td>1</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 A261</td>
<td>Introduction to Engineering Computation</td>
<td>3</td>
</tr>
<tr>
<td>ES A302</td>
<td>Engineering Data Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ES A309</td>
<td>Elements of Electrical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>ES A331</td>
<td>Mechanics of Materials</td>
<td>3</td>
</tr>
<tr>
<td>ES A341 &amp; A341L</td>
<td>Fluid Mechanics and Fluid Mechanics Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>ES A346</td>
<td>Introduction to Thermodynamics</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>ME A280</td>
<td>Solid Modeling for Engineers</td>
<td>3</td>
</tr>
<tr>
<td>ME/EE A306</td>
<td>Dynamics of Systems</td>
<td>3</td>
</tr>
<tr>
<td>ME/EE A308</td>
<td>Instrumentation and Measurement</td>
<td>3</td>
</tr>
<tr>
<td>ME A313</td>
<td>Mechanical Engineering Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>ME A334 &amp; A334L</td>
<td>Materials Science and Materials Science Laboratory</td>
<td>4</td>
</tr>
</tbody>
</table>
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ME A403  Machine Design  3
ME A414  Thermal System Design  4
& A414L  and Thermal System Design Lab
ME A438  Design of Mechanical Engineering Systems  3
ME A441  Heat and Mass Transfer  4
& A441L  and Heat and Mass Transfer Lab
PHYS A211  General Physics I  4
& A211L  and General Physics I Laboratory
PHYS A212  General Physics II  4
& A212L  and General Physics II Laboratory
WRTG A212  Writing and the Professions  3

Advanced Mathematics Electives
Complete one of the following:  3
MATH A314  Linear Algebra
MATH A371  Stochastic Processes
MATH A407  Mathematical Statistics
MATH A410  Introduction to Complex Analysis
MATH A424  Advanced Engineering Mathematics: Linear Algebra and Numerical Analysis
MATH A425  Advanced Engineering Mathematics: Partial Differential Equations and Complex Variables
MATH A426  Numerical Analysis
MATH A432  Partial Differential Equations

Advanced Engineering Electives
Complete 12 credits, including at least 6 credits of ME courses, from the following:  12
ME A408  Mechanical Vibrations
or ME A608  Mechanical Vibrations
ME A415  Composite Materials
or ME A615  Composite Materials
ME A420  Automotive Engineering
ME A421  Engineering Finite Element Analysis
or ME A621  Engineering Finite Element Analysis
ME A442  Advanced Fluid Mechanics
or ME A642  Advanced Fluid Mechanics
ME A451  Aerodynamics
or ME A651  Aerodynamics
ME A454  Manufacturing Design
ME A455  HVAC Systems Optimization
or ME A655  HVAC Systems Optimization
ME A459  Fracture Mechanics
or ME A659  Fracture Mechanics
ME A460  Turbomachinery
or ME A660  Turbomachinery
ME/EE A471  Automatic Control
ME A630  Advanced Mechanics of Materials

ME A664  Corrosion Processes and Engineering

Total  110

A minimum of 131 credits is required for the degree, of which 42 credits must be upper-division.

Honors in Mechanical Engineering

Undergraduate students in the program may be recognized for exceptional performance by earning departmental honors. The award will be noted on their permanent university transcript. In order to receive departmental honors, a student must meet each of the following requirements.

1. Complete all program requirements.
2. Earn a GPA of 3.50 or above in the courses required for the major.
3. 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

It is expected that graduates from the program will have:

• An ability to apply knowledge of mathematics, science, and engineering.
• An ability to design and conduct experiments, as well as 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 multidisciplinary 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 the ability to engage in, lifelong learning.
• A knowledge of contemporary issues.
• An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.