Bachelor of Science in Civil Engineering

The Department of Civil Engineering offers a Bachelor of Science in Civil Engineering. The first two years of the program apply to most other branches of engineering.

Licensure and/or Certification

Graduates of the Bachelor of Science (BS) in Civil 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

Applicants for admission who, in addition to the Application and Admission Requirements for Baccalaureate Programs (http://catalog.uaa.alaska.edu/academicpoliciesprocesses/admissions/undergraduate/), have completed the high school preparation curriculum listed below (or their university equivalents) with minimum grades of C will be admitted to the civil engineering program.

High School Preparation Curriculum

While in high school, students can prepare for entering and succeeding in the civil engineering program. In order to be the best prepared, students should complete the following high school curriculum with minimum grades of C:

- Algebra - 2 years
- Chemistry - 1 year
- English - 3 years
- Physics - 1 year
- Trigonometry - 1/2 year

Students successfully completing the above curriculum will be prepared to enroll in the first year of courses that count toward the engineering degree. Students without the above preparatory curriculum will need to take equivalent university courses before taking some of the first-year courses that count toward the engineering degree. Students are encouraged to work with their faculty advisors for developing a course plan.

Advising

All undergraduate students, as a part of the mandatory advising plan of the department, must meet with their faculty advisor at least once in an academic year to review their academic progress and future course plan. It is particularly important for students to meet with their faculty advisor whenever academic difficulties arise.

Academic Requirements

Any given CE or ES course may only be taken when prerequisites for the course are met with a grade of C or higher. A student who is unable to earn a minimum grade of C in a CE or ES prerequisite course may attempt to earn a satisfactory grade one additional time on a space-available basis. Failure to earn a minimum grade of C on the second attempt may result in removal from the civil engineering program.

A student who has a semester GPA in engineering courses below 2.00 will be placed on academic warning by the College of Engineering. A student on academic warning that receives a semester GPA in engineering courses of at least 2.00 will be removed from academic warning status by the college. Otherwise, they will be removed from the civil engineering program and will not be permitted to enroll in CE and ES courses.

Graduation Requirements

- Complete the General University Requirements for Baccalaureate Degrees (http://catalog.uaa.alaska.edu/undergraduateprograms/baccalaureaterequirements/).
- Complete the General Education Requirements for Baccalaureate Degrees (http://catalog.uaa.alaska.edu/undergraduateprograms/baccalaureaterequirements/gers/).
- Complete the following major requirements:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE A201</td>
<td>Introduction to Civil Engineering</td>
<td>1</td>
</tr>
<tr>
<td>CE A310</td>
<td>Introduction to Geotechnical Engineering</td>
<td>4</td>
</tr>
<tr>
<td>&amp; A310L</td>
<td>and Introduction to Geotechnical Engineering Lab</td>
<td></td>
</tr>
<tr>
<td>CE A334</td>
<td>Properties of Materials and Properties of Materials Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>&amp; A334L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CE A341</td>
<td>Environmental Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CE A351</td>
<td>Structural Analysis</td>
<td>3</td>
</tr>
<tr>
<td>CE A403</td>
<td>Arctic Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CE A420</td>
<td>Fundamentals of Transportation Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CE A437</td>
<td>Project Planning</td>
<td>1</td>
</tr>
<tr>
<td>CE A438</td>
<td>Design of Civil Engineering Systems</td>
<td>3</td>
</tr>
<tr>
<td>CE A461</td>
<td>Hydraulic Analysis and Design</td>
<td>3</td>
</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 A151</td>
<td>Introduction to Engineering</td>
<td>1</td>
</tr>
<tr>
<td>ES A103</td>
<td>Engineering Graphics</td>
<td>3</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>Course Code</td>
<td>Course Title</td>
<td>Credits</td>
</tr>
<tr>
<td>------------</td>
<td>--------------------------------------------------</td>
<td>---------</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 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>ESM A450</td>
<td>Economic Analysis and Operations</td>
<td>3</td>
</tr>
<tr>
<td>GEO A155</td>
<td>Introduction to Surveying</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>
</tr>
<tr>
<td>or PHYS A214 &amp; A214L</td>
<td>Waves, Thermodynamics and Electricity Laboratory</td>
<td></td>
</tr>
<tr>
<td>WRTG A212</td>
<td>Writing and the Professions</td>
<td>3</td>
</tr>
</tbody>
</table>

**Discipline-Specific Courses**

Complete 12 credits of discipline-specific courses from the following list in the disciplines of environmental, geotechnical, structural, transportation and water resources engineering. At least one course must be taken in four of the five disciplines.

**Environmental Engineering**
- CE A442 Environmental Engineering Design

**Geotechnical Engineering**
- CE A410 Foundation Engineering

**Structural Engineering**
- CE A432 Steel Design
- CE A433 Reinforced Concrete Design

**Transportation Engineering**
- CE A421 Design of Highways

**Water Resources Engineering**
- CE A464 Hydrologic Analysis and Design

**Basic Science Elective**
Select one of the following:
- BIOL/GEOL A178 Introduction to Oceanography
- BIOL A271 Principles of Ecology
- GEOL A111 Physical Geology
- GEOL A115 Environmental Geology

**Technical Electives**
Complete 6 credits of technical elective courses from the following list. Graduate courses may not be applied to both a baccalaureate and master degree.

**Environmental Engineering**
- AEST A601 Aquatic Process Chemistry
- CE A445 Chemical and Physical Water and Wastewater Treatment Processes

**Geotechnical Engineering**
- CE A414 Soil Strength and Slope Stability
- CE A611 Geotechnical Earthquake Engineering
- CE A612 Advanced Foundation Design

**Structural Engineering**
- CE A432 Steel Design
- CE A433 Reinforced Concrete Design
- CE A451 Advanced Structural Analysis
- CE A454 Timber Design
- CE A631 Structural Finite Elements
- CE A652 Advanced Steel Design

**Transportation Engineering**
- CE A423 Traffic Engineering
- CE A424 Pavement Design
- CE A425 Highway Engineering

**Water Resources Engineering**
- CE A462 Surface Water Dynamics
- CE A475 Design of Ports and Harbors
- CE A476 Coastal Engineering
- CE A479 Sediment Transport and Coastal Processes
- CE A663 Ground Water Dynamics

\[ \text{Total Credit} = 114 \]

1. Must be completed with a minimum grade of C.
2. Students are encouraged to take 6 credits from a single subdiscipline.
3. Either CE A432 or CE A433 may be chosen as a technical elective if not applied to satisfy the requirements described above.

A minimum of 132 credits is required for the degree, of which 42 credits must be upper-division.

**Honors in Civil Engineering**

Undergraduate civil engineering students may be recognized for exceptional performance by earning departmental honors in civil engineering. In order to receive honors in civil engineering, a student must meet each of the following requirements:

- Complete all requirements for a BS in Civil Engineering. A minimum of 30 credits applicable to the civil engineering degree must be completed at UAA.
- 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 civil engineering profession.
- Have a GPA of 3.30 or higher in courses applicable to the BS in Civil Engineering.
• Gain approval for a departmental honors design or research project prior to applying for graduation. Present an oral presentation and written report of project results eight weeks prior to scheduled graduation. The project proposal and final written report must be approved by the student’s academic advisor and the chair of the Department of Civil Engineering.
• Pass the Fundamentals of Engineering Examination in or prior to the fall semester of the senior year.
• Document a minimum of eight weeks of work experience in an engineering or engineering-related position.

Program Student Learning Outcomes
Graduates of the UAA civil engineering program will have an ability to:

• Identify, formulate, and solve complex civil engineering problems by applying principles of engineering, science, and mathematics;
• Apply civil engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as cold regions, global, cultural, social, environmental, and economic factors;
• Communicate effectively with a range of audiences;
• 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;
• Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives;
• Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions; and
• Acquire and apply new knowledge as needed, using appropriate learning strategies.