

Bachelor of Science in Civil Engineering

The Bachelor of Science (BS) in Civil Engineering prepares students for a career in Civil Engineering and associated professional fields. Civil engineering is the design, construction, and maintenance of the built environment, including roads, bridges, buildings, harbors and other public works. The Civil Engineering program partners with local consulting firms, government agencies and non-profit organizations to offer students hands-on experience designing real-world projects that make a difference in our community.

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

Licensure and/or Certification

Graduates of the BS in Civil Engineering gain four years of education credit toward obtaining a Professional Engineer (P.E.) license. It also fulfills the “Arctic Engineering” requirement for registration as a P.E. in Alaska as set forth in 12 AAC 36.110.

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

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

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/>).

- For 3 credits of Tier 1 Quantitative Skills, choose MATH A251.
- For 3 credits of Tier 2 Humanities, choose PHIL A305.
- Complete the following major requirements:

Code	Title	Credits
CE A201	Introduction to Civil Engineering ¹	1
CE A206	Civil Engineering 3D Modeling	1
CE A310 & A310L	Introduction to Geotechnical Engineering and Introduction to Geotechnical Engineering Lab ¹	4
CE A334 & A334L	Properties of Materials and Properties of Materials Laboratory ¹	3
CE A341	Environmental Engineering ¹	3
CE A351	Structural Analysis ¹	3
CE A403	Arctic Engineering	3
CE A420	Fundamentals of Transportation Engineering ¹	3
CE A437	Project Planning ¹	1
CE A438	Design of Civil Engineering Systems	3
CE A461	Hydraulic Analysis and Design	3
CHEM A105 & A105L	General Chemistry I and General Chemistry I Laboratory ¹	4
CHEM A106 & A106L	General Chemistry II and General Chemistry II Laboratory ¹	4
ENGR A151	Introduction to Engineering ¹	1
ES A106	Engineering Graphics	2
ES A209	Statics ¹	3
ES A210	Dynamics ¹	3
ES A261	Introduction to Engineering Computation ¹	3
ES A302	Engineering Data Analysis ¹	3
ES A331	Mechanics of Materials ¹	3
ES A341 & A341L	Fluid Mechanics and Fluid Mechanics Laboratory ¹	4
ESM A450	Economic Analysis and Operations ¹	3
GEO A155	Introduction to Surveying ¹	3
MATH A251	Calculus I ¹	4
MATH A252	Calculus II ¹	4
MATH A253	Calculus III ¹	4
MATH A302	Ordinary Differential Equations ¹	3
PHIL A305	Professional Ethics	3
PHYS A211 & A211L	General Physics I and General Physics I Laboratory ¹	4

PHYS A212 & A212L	General Physics II and General Physics II Laboratory 1	4
or PHYS A214 & A214L	Waves, Thermodynamics and Electricity and Waves, Thermodynamics and Electricity Laboratory	

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. 12

Environmental Engineering

CE A442	Environmental Engineering Design
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Geotechnical Engineering

CE A410	Foundation Engineering
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Structural Engineering

CE A432	Steel Design ²
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CE A433	Reinforced Concrete Design
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Transportation Engineering

CE A421	Design of Highways
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Water Resources Engineering

CE A464	Hydrologic Analysis and Design
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Basic Science Elective

Select one of the following: 3

BIOL/GEOL A178	Introduction to Oceanography
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BIOL A271	Principles of Ecology
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GEOL A111	Physical Geology
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GEOL A115	Environmental Geology
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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. Students are encouraged to take 6 credits from a single subdiscipline.³ 6

Environmental Engineering

AEST A601	Aquatic Process Chemistry
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CE A445	Chemical and Physical Water and Wastewater Treatment Processes
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Geotechnical Engineering

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

CE A432	Steel Design ²
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or CE A433	Reinforced Concrete Design
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CE A451	Advanced Structural Analysis
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CE A454	Timber Design
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CE A631	Structural Finite Elements
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CE A652	Advanced Steel Design
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Transportation Engineering

CE A423	Traffic Engineering
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CE A424	Pavement Design
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CE A425	Highway Engineering
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Water Resources Engineering

CE A462	Surface Water Dynamics
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CE A475	Design of Ports and Harbors
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CE A476	Coastal Engineering
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CE A479	Sediment Transport and Coastal Processes
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CE A663	Ground Water Dynamics
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Total**111**

¹ Must be completed with a minimum grade of C.

² Either CE A432 or CE A433 may be chosen as a technical elective if not applied to satisfy the requirements described above.

³ Three credits of technical electives may be substituted for one discipline-specific course, provided the following criteria are met: all 9 credits of technical electives are completed in the same discipline, and the student has a minimum GPA of 3.0 prior to enrolling in the 3rd technical elective.

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

Honors in Civil Engineering

The Bachelor of Science in Civil Engineering recognizes distinguished achievement by conferring programmatic honors in civil engineering. In order to receive honors in civil engineering, a student must meet 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.
- Complete one of the following:
 - Complete an approved design or research project (other than projects completed in CE A438) prior to applying for graduation. Gain project approval through a written proposal submitted to the project advisor no later than the semester prior to applying for graduation. Present an oral presentation and written report of project results four weeks prior to graduation. The project proposal and final written report must be approved by the student's project advisor and acknowledged by the chair of the Department of Civil Engineering.
 - Document a minimum of eight weeks of work experience in an engineering or engineering-related position and pass the Fundamentals of Engineering Examination prior to applying for graduation.

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 local, regional, 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.