B.S./M.S., CIVIL ENGINEERING

Accelerated B.S./M.S. Degrees

The civil engineering integrated B.S./M.S. program allows qualified and dedicated students to complete both B.S. and M.S. degrees in a shorter time (typically, five years instead of six) than traditional B.S. plus M.S. degrees and with less cost than earning the degrees individually. This is accomplished by having 12 credits of 400- and 600-level courses count toward both degrees. The B.S. degree is accredited by the Accreditation Board for Engineering and Technology (ABET). Students will need to apply for the B.S./M.S. option at the start of their third year in the B.S. program, and form a graduate committee by the fourth year. For the M.S. portion of this integrated B.S./M.S. degree, students will select one of two tracks: environmental/water resources or civil infrastructure.

To complete the M.S. portion of this program, students will complete a research thesis or a project in addition to the coursework. This will allow students to tailor their graduate studies to meet their interests and prospective career needs. Students admitted to the B.S./M.S. program typically begin their research thesis or project during their third year. This early research start allows students to develop technical skills and to become familiar with their potential M.S. project early on in their program. Students pursuing an M.S. with a research thesis will conduct field/laboratory research and produce a thesis generally equivalent to a manuscript for a peer-reviewed journal. Students pursuing an M.S. with a project will conduct a research project that may be based solely or partly on technical analysis, meta-analysis, or literature review and synthesis. This can include writing a technical report, review article, or a different activity as decided by the faculty advisor and the student committee. To ensure the success of students in this program, students will need to closely work with their faculty advisor and the graduate committee.

Minimum Requirements for Civil Engineering B.S./M.S. Degrees: 143 credits

College of Engineering and Mines
Department of Civil and Environmental Engineering (https://cem.uaf.edu/cee/)
907-474-7241

Admission Requirements

Complete the following admission requirements:

- CE major (junior preferred) or senior standing.
- A GPA 3.25 or above (based on a minimum of 24 credits in CE major requirements) is required for admission. Students must maintain a cumulative GPA of at least 3.0 to remain in the program.
- Submit three letters of reference.
- Submit GRE (general) scores.
- Submit a study goal statement.
- Submit a UAF graduate application for admission.

Program Requirements

Minimum Requirements for Civil Engineering B.S./M.S. Degree: 143 credits

Students must satisfy the General University Requirements for minimum grades for the respective B.S. or M.S. program (major) requirements.

Code	Title	Credits
General University Requirements		
Complete the general university requirements. (http://catalog.uaf.edu/bachelors/)		
General Education Requirements		
Complete the general education requirements. (http://catalog.uaf.edu/bachelors/general-education-requirements/)		
As part of the general education requirements, complete:		
CHEM F105X	General Chemistry I	4
CHEM F106X	General Chemistry II	4
MATH F251X	Calculus I	4
B.S. Degree Requirements		
Complete the B.S. degree requirements. (http://catalog.uaf.edu/bachelors/summary-of-bachelors-degree-reqs/#bachelorofsciencetext)		
As part of the B.S. degree requirements, complete:		
MATH F252X	Calculus II	4
PHYS F211X	General Physics I	4
PHYS F212X	General Physics II	4
Undergraduate Civil Engineering Program Requirements		
CE F112	Elementary Surveying	2-3
or MIN F202	Surveying and CAD for Engineers	
CE F302	Fundamentals of Transportation Engineering	3
CE F326	Introduction to Geotechnical Engineering and Foundations	4
CE F331	Structural Analysis	3
CE F334	Properties of Materials	3
CE F341	Introduction to Environmental Engineering	4
CE F344	Water Resources Engineering	3
CE F432	Steel Design	3
DRT F210	Intermediate CAD	3
ES F101	Introduction to Engineering	3
ES F201	Computer Techniques	3
ES F208	Mechanics	4
ES F301	Engineering Analysis	3
ES F331	Mechanics of Materials	3
ES F341	Fluid Mechanics	4
ESM F450	Economic Analysis and Operations	3
GE F261	General Geology for Engineers	3
MATH F253X	Calculus III	4
MATH F302	Differential Equations	3
Fundamentals of Engineering (FE) Examination		
Complete the Fundamentals of Engineering (FE) examination administered by the State of Alaska.		
Master's Degree Requirements		
Complete the master's degree requirements. (http://catalog.uaf.edu/graduate/#Masters)		
Complete comprehensive exam		
Complete the thesis or the non-thesis (project) option:		
CE F699	Thesis	9
CE F698	Non-thesis Research/Project	6
Complete one of the following concentrations		**21-24**

Environmental/Water Resources

Civil Infrastructure

CONCENTRATIONS

Environmental/water resources

Code	Title	Credits
Complete the following (required courses):		
CE F438	Design of Engineered Systems [1]	3
CE F442	Water and Wastewater Treatment Design [2]	3
or ENVE F643	Air Pollution Management	
CE F661	Advanced Water Resources Engineering	3
or CE F683	Arctic Hydrology and Hydraulic Engineering	
or CHEM F609	Aquatic and Environmental Geochemistry	
CE F662	Open Channel and River Engineering	3
or CE F663	Groundwater Hydrology	
Approved electives from the Environmental/Water Resources concentration area course list below (9 credits for thesis, 12 credits for project), or as approved by the committee [3]		9-12

Civil Infrastructure

Code	Title	Credits
Complete the following:		
CE F438	Design of Engineered Systems [1]	3
CE F433	Reinforced Concrete Design [2]	3
CE F635	Numerical Methods for Geomechanics and Soil-Structure Interaction	3
CE F622	Foundations and Retaining Structures	3
or CE F605	Pavement Design	
Approved electives from the Civil Infrastructure concentration area course list below (9 credits for thesis, 12 credits for project), or as approved by the committee [3]		9-12

1 Fulfills the baccalaureate capstone requirement

2 Fulfills the ABET requirement (for the B.S. degree) of one upper-level course in the field of environmental engineering, construction, or transportation.

3 Only one course (3 credits) can be at the 400 level

Recommended Elective Courses for Concentration Areas

Environmental/Water Resources

Code	Title	Credits
CE F442	Water and Wastewater Treatment Design	3
CE F401	Arctic Engineering	3
CE F445	Hydrologic Analysis and Design	3
CE F601	Engineering Research Communication	3
CE F624	Permafrost Engineering	3
CE F661	Advanced Water Resources Engineering	3
CE F662	Open Channel and River Engineering	3
CE F663	Groundwater Hydrology	3
CE F664	Sediment Transport	3
CE F665	Introduction to Watershed Hydrology	3
CE F683	Arctic Hydrology and Hydraulic Engineering	3
CE F684	Arctic Utility Distribution	3
ENVE F641	Aquatic Chemistry	3
ENVE F642	Contaminant Hydrology	3
ENVE F643	Air Pollution Management	3
ENVE F644	Environmental Management and Permitting	3
ENVE F645	Unit Processes: Chemical and Physical	3
ENVE F646	Biological Unit Processes	3
ENVE F647	Biotechnology	3
ENVE F649	Hazardous and Toxic Waste Management	3
ENVE F651	Environmental Risk Assessment	3
ENVE F652	Introduction to Toxicology for Engineers and Scientists	3
ENVE F653	Environmental Measurements Laboratory	1
ME F658	Energy and the Environment	3
BIOL F657	Environmental Microbiology	3
CHEM F609	Aquatic and Environmental Geochemistry	3
CHEM F631	Environmental Fate and Transport	3
CHEM F655	Environmental Toxicology	3
GEOS F616	Permafrost	3
GEOS F617	Glaciers	3

Civil Infrastructure

Code	Title	Credits
CE F401	Arctic Engineering	3
CE F405	Design of Highways and Streets	3
CE F422	Foundation Engineering	3
CE F434	Timber Design	3
CE F451	Construction Cost Estimating and Bid Preparation	3
CE F605	Pavement Design	3
CE F607	GIS Applications in Civil Engineering	3
CE F622	Foundations and Retaining Structures	3
CE F624	Permafrost Engineering	3
CE F625	Soil Stabilization and Embankment Design	3
CE F626	Thermal Geotechnics	3
CE F627	Geotechnical Earthquake Engineering	3
CE F628	Unsaturated Soils Mechanics	3
CE F630	Advanced Structural Mechanics	3
CE F631	Advanced Structural Analysis	3
CE F633	Theory of Elastic Stability	3
CE F634	Structural Dynamics	3
CE F635	Numerical Methods for Geomechanics and Soil-Structure Interaction	3
CE F637	Earthquakes: Seismic Response of Structures	3

CE F640	Prestressed Concrete	3
CE F646	Structural Composites	3
CE F650	Bridge Engineering	3
CE F682	Ice Engineering	3
CE F683	Arctic Hydrology and Hydraulic Engineering	3
CE F684	Arctic Utility Distribution	3
CE F685	Topics in Frozen Ground Engineering	3
ESM F621	Operations Research	3
GE F440	Slope Stability	3
ME F601	Finite Element Analysis in Engineering	3
ME F631	Advanced Mechanics of Materials	3
ME F642	Advanced Heat Transfer	3
ME F685	Arctic Heat and Mass Transfer	3