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 research 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, Geological 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.

B.S. Degree Requirements

Complete the B.S. degree requirements. (http://catalog.uaf.edu/bachelors/#bachelorofsciencetext)

As part of the B.S. degree requirements, complete:

CHEM F105X General Chemistry I 4
CHEM F106X General Chemistry II 4
MATH F251X Calculus I 4

Undergraduate Civil Engineering Program Requirements

Complete the general education requirements.

Complete the general university requirements.

Complete the B.S. degree requirements.

Complete the master's degree requirements. (http://catalog.uaf.edu/graduate/#Masters)

Complete one of the following concentrations 21-24

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

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CE F438</td>
<td>Design of Engineered Systems 1</td>
<td>3</td>
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<tr>
<td>CE F442</td>
<td>Water and Wastewater Treatment Design 2</td>
<td>3</td>
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<tr>
<td>or ENVE F643</td>
<td>Air Pollution Management</td>
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<tr>
<td>CE F661</td>
<td>Advanced Water Resources Engineering</td>
<td>3</td>
</tr>
<tr>
<td>or CE F683</td>
<td>Arctic Hydrology and Hydraulic Engineering</td>
<td></td>
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<tr>
<td>or CHEM F609</td>
<td>Aqueous and Environmental Geochemistry</td>
<td></td>
</tr>
<tr>
<td>CE F662</td>
<td>Open Channel and River Engineering</td>
<td>3</td>
</tr>
<tr>
<td>or CE F663</td>
<td>Groundwater Hydrology</td>
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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

<table>
<thead>
<tr>
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<td>CE F665</td>
<td>Watershed Hydrology</td>
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<td>CE F683</td>
<td>Arctic Hydrology and Hydraulic Engineering</td>
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<tr>
<td>CE F684</td>
<td>Arctic Utility Distribution</td>
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<tr>
<td>ENVE F641</td>
<td>Aquatic Chemistry</td>
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<tr>
<td>ENVE F642</td>
<td>Contaminant Hydrology</td>
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<td>ENVE F643</td>
<td>Air Pollution Management</td>
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<td>ENVE F644</td>
<td>Environmental Management and Permitting</td>
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<tr>
<td>ENVE F645</td>
<td>Unit Processes: Chemical and Physical</td>
<td>3</td>
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<tr>
<td>ENVE F646</td>
<td>Biological Unit Processes</td>
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<tr>
<td>ENVE F647</td>
<td>Biotechnology</td>
<td>3</td>
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<tr>
<td>ENVE F649</td>
<td>Hazardous and Toxic Waste Management</td>
<td>3</td>
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<td>ENVE F651</td>
<td>Environmental Risk Assessment</td>
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<tr>
<td>ENVE F652</td>
<td>Introduction to Toxicology for Engineers and Scientists</td>
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<td>ENVE F653</td>
<td>Environmental Measurements Laboratory</td>
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<td>ME F658</td>
<td>Energy and the Environment</td>
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<td>BIOL F657</td>
<td>Environmental Microbiology</td>
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<td>CHEM F609</td>
<td>Aqueous and Environmental Geochemistry</td>
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<tr>
<td>CHEM F631</td>
<td>Environmental Fate and Transport</td>
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<td>CHEM F655</td>
<td>Environmental Toxicology</td>
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<tr>
<td>GEOS F616</td>
<td>Permafrost</td>
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<tr>
<td>GEOS F617</td>
<td>Glaciers</td>
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CIVIL INFRASTRUCTURE

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<tbody>
<tr>
<td>CE F438</td>
<td>Design of Engineered Systems 1</td>
<td>3</td>
</tr>
<tr>
<td>CE F433</td>
<td>Reinforced Concrete Design 2</td>
<td>3</td>
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<tr>
<td>CE F635</td>
<td>Numerical Methods for Geomechanics and Soil-Structure Interaction</td>
<td>3</td>
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<tr>
<td>CE F622</td>
<td>Foundations and Retaining Structures 3</td>
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<tr>
<td>or CE F605</td>
<td>Pavement Design</td>
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</table>

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

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

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<tr>
<td>CE F442</td>
<td>Water and Wastewater Treatment Design</td>
<td>3</td>
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<tr>
<td>CE F401</td>
<td>Arctic Engineering</td>
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<tr>
<td>CE F445</td>
<td>Hydrologic Analysis and Design</td>
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<tr>
<td>CE F601</td>
<td>Engineering Research Communication</td>
<td>3</td>
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<tr>
<td>CE F624</td>
<td>Permafrost Engineering</td>
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<tr>
<td>CE F661</td>
<td>Advanced Water Resources Engineering</td>
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<tr>
<td>CE F662</td>
<td>Open Channel and River Engineering</td>
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<tr>
<td>CE F663</td>
<td>Groundwater Hydrology</td>
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<tr>
<td>CE F664</td>
<td>Sediment Transport</td>
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<tr>
<td>CE F625</td>
<td>Soil Stabilization and Embankment Design</td>
<td>3</td>
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<tr>
<td>CE F626</td>
<td>Thermal Geotechnics</td>
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<tr>
<td>CE F627</td>
<td>Geotechnical Earthquake Engineering</td>
<td>3</td>
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<tr>
<td>CE F628</td>
<td>Unsaturated Soils Mechanics</td>
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<tr>
<td>CE F630</td>
<td>Advanced Structural Mechanics</td>
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<tr>
<td>CE F631</td>
<td>Advanced Structural Analysis</td>
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<tr>
<td>CE F633</td>
<td>Theory of Elastic Stability</td>
<td>3</td>
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<tr>
<td>CE F634</td>
<td>Structural Dynamics</td>
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<tr>
<td>CE F635</td>
<td>Numerical Methods for Geomechanics and Soil-Structure Interaction</td>
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<tr>
<td>CE F637</td>
<td>Earthquakes: Seismic Response of Structures</td>
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<td>CE F640</td>
<td>Prestressed Concrete</td>
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<tr>
<td>CE F646</td>
<td>Structural Composites</td>
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<td>CE F650</td>
<td>Bridge Engineering</td>
<td>3</td>
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<tr>
<td>CE F682</td>
<td>Ice Engineering</td>
<td>3</td>
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<tr>
<td>CE F683</td>
<td>Arctic Hydrology and Hydraulic Engineering</td>
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</tr>
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<td>CE F684</td>
<td>Arctic Utility Distribution</td>
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<tr>
<td>CE F685</td>
<td>Topics in Frozen Ground Engineering</td>
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<tr>
<td>ESM F621</td>
<td>Operations Research</td>
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<tr>
<td>GE F440</td>
<td>Slope Stability</td>
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<td>ME F601</td>
<td>Finite Element Analysis in Engineering</td>
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<td>ME F631</td>
<td>Advanced Mechanics of Materials</td>
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<td>ME F642</td>
<td>Advanced Heat Transfer</td>
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<tr>
<td>ME F685</td>
<td>Arctic Heat and Mass Transfer</td>
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