Civil and Environmental Engineering, ME, PhD, MS

Specialization(s): Environmental Engineering; Fluid Mechanics and Hydraulic Engineering; Geotechnical Engineering; Structural Engineering and Mechanics; Transportation Engineering; Water Resources Engineering and Hydrology
Department: Civil and Environmental Engineering Department
College: College of Engineering

Overview

About This Degree

Civil and environmental engineering is concerned with planning, designing, constructing, and operating various physical works; developing and utilizing natural resources in an environmentally sound manner; providing the infrastructure which supports the highest quality of life; and protecting public health and renovating impacted terrestrial and aquatic systems from the mismanagement of toxic and hazardous waste. The graduate degrees offered at USU are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

The Department of Civil and Environmental Engineering has five divisions: Environmental Engineering, Geotechnical Engineering, Structural Engineering, Transportation Engineering, and Water Engineering.

Concurrent Bachelor's/Master's Program:

The department also offers a concurrent bachelor's/master's program, which allows USU engineering students to begin taking graduate classes during their senior year as an undergraduate and to complete requirements for both the bachelor's degree (civil engineering or environmental engineering) and the master's degree concurrently over two years.

Career Options

Environmental Engineering Specialization

Graduates with this specialization work in the following areas:

- Drinking water treatment
- Wastewater treatment
- Air quality and air pollution control
- Solid and hazardous waste management
- Pollution prevention
- Water quality modeling
- Fate and transport of environmental contaminants
- Natural systems engineering
- Wildlife protection

Geotechnical Engineering Specialization

All master's graduates work as geotechnical engineers in the areas listed below, while PhD graduates work in academia or pursue research positions at consulting firms or research organizations.

- Consulting firm
- State and government agencies, primarily the Army Corps of Engineers, state highway departments, and the Federal Highway Administration
- Geotechnical specialty contractors

Hazardous Waste Management

Structural Engineering and Mechanics Specialization

Graduates with this specialization have many potential career paths. The following is a partial list:

- Structural consulting firms
- Additional education in engineering, architecture, or other professional fields such as business, medicine, law, etc.
- Professor (teaching and research)

Transportation Engineering Specialization

Graduates in this specialization work as transportation engineers in the following areas:

- Federal Highway Administration
- State Department of Transportation
- Metropolitan Planning Organization
- City, county, and state engineers
- Private consulting in transportation and logistics
- Research institutes and universities
- Railroads, trucking firms, etc.

Fluid Mechanics and Hydraulic Engineering Specialization or Water Resources Engineering and Hydrology Specialization

Graduates can work as engineers in the following capacities:

- Consulting in water resources, hydraulics, or hydrology
- Engineers for consulting and construction companies
- University professors (PhD)
- Research engineers

What it takes

Admissions Requirements

Students without undergraduate civil and environmental engineering backgrounds may be required to complete select undergraduate courses prior to admission as a graduate student. This is determined by the committee on a case-to-case basis.

Application Requirements:

- Complete the online application
- Pay the $55 application fee
- Score at or above the 40th percentile on the GRE
- Have a 3.0 or higher GPA on your last 60 semester or 90 quarter credits
- Provide transcripts of all college/university credits
- Provide three contacts for letters of recommendation

International students have additional admissions requirements.

Admissions Deadlines

The department has the following deadlines:

- Fall semester – June 15
- Spring semester – October 15
- Summer semester – March 15 (This date also serves as first review of applications for available financial assistance.)

Master's Degree Plan Options

Students can receive the MS or the ME by pursuing one of three options:

- In the **Plan A** option, students complete graduate-level coursework and must write a thesis.
- The **Plan B** option requires the production of a paper or creative work of art and is expected to reflect equivalent scholarship standards as a thesis.
- A third option, **Plan C**, does not involve a thesis or a defense meeting and is comprised of coursework only.

Financial Assistance

Financial assistance in the form of graduate research assistantships are awarded on a competitive basis. These enable students to work with faculty on specific research projects. Prospective students are encouraged to contact faculty members directly with questions regarding ongoing research projects and possibilities for research assistantships.

A variety of additional funding opportunities are available, including fellowships, scholarships, tuition awards, and travel support. Additionally, students may be eligible for subsidized health insurance through qualifying assistantships.

Program Requirements

Click here to see course requirements for the **Master of Engineering**.

Click here to see course requirements for the **Doctor of Philosophy**.

Click here to see course requirements for the **Master of Science**.

PhD Qualifying Exams:

Environmental Engineering Specialization:

- PhD students must take a comprehensive exam once core classes are completed and no later than the end of the fourth semester. The content and format of the comprehensive exam will be determined by each student's supervisory committee.

Geotechnical Engineering Specialization:

- PhD qualifying exams are generally taken within the first few semesters and cover topics from master's-level coursework and early PhD coursework. A dissertation proposal and defense are also required.

Hazardous Waste Management Specialization:

Structural Engineering and Mechanics Specialization:

- PhD candidates must take a qualifying exam and defense of proposed dissertation topic within the first two years of PhD study. Content of the qualifying exam and dissertation proposal defense are determined by the student's graduate supervisory committee.

Transportation Engineering Specialization:

- PhD qualifying exams consists of a written and an oral examination, which are held after the second semester and prior to the beginning of the third semester of graduate study. The written examination will be in the form of an eight-hour exam comprised of questions from the required courses in transportation systems engineering. Upon successful completion of the written examination, the student will present and defend the dissertation proposal at an oral examination.

Fluid Mechanics and Hydraulic Engineering Specialization:

Water Resources Engineering and Hydrology Specialization:

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Get Involved

Professional Organizations, Honor Societies, and Clubs

Air and Waste Management Association: AWMA is a nonprofit, nonpartisan professional organization that enhances knowledge and expertise by providing a neutral forum for information exchange, professional development, networking opportunities, public education, and outreach. Its mission is to promote global environmental responsibility through education.

American Society of Agricultural and Biological Engineers: Thisis a professional society of people interested in the engineering approach to food, agriculture, and biological concerns. ASABE seeks methods for the development of producing food and renewable resources.

American Society of Civil Engineers: ASCE is a professional organization representing members of the civil engineering profession worldwide. It is the oldest national engineering society in the United States. ASCE's vision is to have engineers positioned as global leaders who strive toward building a better quality of life.

American Society for Photogrammetry and Remote Sensing: ASPRS is a scientific association serving more than 7,000 professional members around the world. Its mission is to advance knowledge and improve understanding of mapping sciences to promote the responsible applications of photogrammetry, remote sensing, geographic information systems, and supporting technologies.

American Water Works Association: AWWA is an international nonprofit educational association dedicated to safe water. Founded in 1881 as a forum for water professionals to share information and learn from each other for the common good, AWWA is the authoritative resource for knowledge, information, and advocacy for improving the quality and supply of water in North America and beyond. Students can participate in activities of the Intermountain Section of AWWA, as well as compete for scholarships sponsored by the Section.

Earthquake Engineering Research Institute: EERI is a national, nonprofit, technical society of engineers, geoscientists, architects, planners, public officials, and social scientists. EERI members include researchers, practicing professionals, educators, government officials, and building code regulators. The objective of the Earthquake Engineering Research Institute is to reduce earthquake risk by advancing the science and practice of earthquake engineering; improving understanding of the impact of earthquakes on the physical, social, economic, political, and cultural environment; and advocating comprehensive and realistic measures for reducing the harmful effects of earthquakes.

Engineers Without Borders: The purpose of the student chapter of Engineers Without Borders at USU is to identify and solve engineering and humanitarian problems for impoverished orphanages and communities. The principal activities include providing clean water and solar power, improving sanitary conditions, enhancing educational programs, improving classroom structures, and assisting with other tasks requested by the local people.

Institute of Transportation Engineers: ITE, an international educational and scientific association, is one of the largest and fastest-growing professional transportation organizations in the world. ITE members include traffic engineers, transportation planners, and other professionals who are responsible for meeting society's needs for safe and efficient surface transportation.

Structural Engineers Association of Utah: SEAU is an organization for structural engineers across the state. SEAU’s aims are to increase acquaintance and understanding among structural engineers, advance technical expertise and high standards in the profession, promote legislation and codes, and increase public awareness of structural engineering.

Water Environment Association of Utah: WEAU is the state of Utah affiliate of the Water Environment Federation. It is a member association comprised of water quality professionals, including public works staff, treatment plant operators, engineers, scientists, and planners working to preserve and enhance water quality and the global water environment.

Labs, Centers, Research

AggieAir Flying Circus: AggieAir Flying Circus provides high-resolution, multispectral aerial imagery using a small, unmanned aerial system. The system is able to map small areas quicker, more frequently, at greater resolution, and at a smaller cost than conventional remote sensing. Some applications for AggieAir include monitoring of soil moisture and evapotranspiration in agriculture, riparian habitat mapping, road and highway surface monitoring, wetland mapping, and fish and wildlife tracking.

Buried Structures Laboratory: The Buried Structures Laboratory conducts research into the performance of buried pipes. The lab has performed research on both flexible and rigid pipes.

Energy Laboratory: This lab seeks to develop solutions to America's most intractable energy problems through scientific and technological innovation. It provides a cohesive framework permitting faculty, students, and

partnering institutions to focus on contemporary energy-related research issues.

Environmental Management Research Group: EMRG is a research unit of the Utah Water Research Laboratory focused on integrated watershed management and systems analysis of environmental problems. EMRG provides software development, watershed and water quality modeling, and GIS data analysis service to internal and external entities directed at solving integrated watershed and environmental management-related problems of a variety of scales.

Environmental Quality Laboratory: The EQL is located at the Utah Water Research Lab and is equipped for analyses of organic and inorganic constituents in air, water, and soil. The EQL consists of chemistry, microbiology, radiological and analytical instrumentation laboratories, two constant-temperature rooms, and research project areas.

Institute for Dam Safety Risk Management: The IDSRM conducts research to advance the state of practice in risk-informed approaches to dam safety management. Approaches developed by the institute are now used by engineers, private and government dam owners, and regulators in many countries. These approaches help improve the understanding and management of the risks associated with owning and operating dams, with the goal of improving public safety, reducing economic, environmental, and societal risks, and reducing the owner's liability.

Institute for Natural Systems Engineering: The INSE is a recognized leader in the development, testing, and application of multi-disciplinary assessment methods for aquatic ecosystems and instream flow assessment methodologies.

International Irrigation Center: The IIC was established in a response to an increasing need for providing training and research to enhance the capabilities of professionals and scientists outside the United States for improving irrigated agriculture in their countries.

Utah Botanical Center: The UBC, located in Kaysville, Utah, is home to research and demonstration projects focused on sustainable living in the Intermountain West. Studies of water conservation, horticulture, water quality enhancement, wetland ecology, integrated pest management, urban forestry, agriculture, fish and wildlife, highway enhancement, and storm-water management combine to make the center a living laboratory.

Utah Center for Water Resources Research: The UCWRR facilitates water research, outreach, design, and testing elements within a university environment that supports student education and citizen training.

Utah Local Technical Assistance Program: LTAP specializes in projects such as road-surface management, asset management, traffic operations, highway safety, innovative contracting, infrastructure management, and other transportation challenges.

Utah On-Site Wastewater Training Center: This center provides education, training, and technology transfer to installers, inspectors, regulators, and homeowners within the Rocky Mountain Region on the proper design and use of wastewater treatment systems.

Utah Transportation Center: The UTC uses its expertise in natural hazards to research congestion chokepoints, evacuation occurrences, infrastructure renewal, and operations as it relates to multi-modal transportation.

Utah Water Research Laboratory: The UWRL works on nearly 250 water-related projects a year and has projects in all of Utah's 29 counties and more than 40 countries. The lab is one of the go-to places that addresses the technical and societal aspects of water-related issues, including quality, quantity, and distribution of water.

Water Initiative: Utah State University supports a broad community of students and faculty engaged in water education, research, and outreach. The USU Water Initiative provides an overarching umbrella for the activities of this community aimed at fostering interdisciplinary collaboration and collegial sharing of ideas related to water across the departments and colleges of USU.