Civil and Environmental Engineering, M.S.

Graduate study in civil and environmental engineering prepares students for professional careers and further study. The principal concentration areas are environmental engineering and environmental science; hydraulics, hydrology, and water resources; structures, mechanics, and materials; sustainable water development; and transportation.

Research and Study Areas

Environmental Engineering and Science

The environmental engineering and science curriculum provides a comprehensive base of course work and research in the areas of air- and water-quality management, environmental chemistry and microbiology, natural systems modeling, and processes for water supply, pollution control, and solid and hazardous waste management. Interdisciplinary specialization and study are conducted with programs including IIHR—Hydroscience & Engineering, the Center for Global and Regional Environmental Research, the Center for Health Effects of Environmental Contamination, the Hazardous Substances Research Center, the Center for Biocatalysis and Bioprocessing; the Departments of Chemical and Biochemical Engineering, Earth and Environmental Sciences, Geographical and Sustainability Sciences, Microbiology and Immunology, Occupational and Environmental Health; and the School of Urban and Regional Planning. New areas of interdisciplinary focus include groundwater contamination, biotechnology, global climate change, and hazardous substances.

Hydraulics, Hydrology, and Water Resources

The hydraulics, hydrology, and water resources curriculum is associated with IIHR—Hydroscience & Engineering, a world-renowned research institute. Senior staff members of the institute are professors in the program; they devote about half of their time to teaching. IIHR offers unique opportunities for students to participate actively in the research, analysis, and design aspects of real-world problems. Considerable attention is given to the use of computers in mathematical modeling and in data acquisition and processing. IIHR high-speed computer facilities and advanced graphics and communication software complement the hydrology, hydraulics, and water resources curriculum.

Structures, Mechanics, and Materials

The structures, mechanics, and materials curriculum is designed for students who wish to gain knowledge and skill in the mechanics of solids and structures that they can apply to civil infrastructure systems and other fields. The program concentrates on developing appropriate methodologies for tackling broad, complex issues related to civil infrastructure systems, and on educating engineers in the implementation and application of methodologies to actual engineering projects. Faculty members have expertise in structural engineering, design optimization, solid mechanics, and computational methods.

Sustainable Water Development

The sustainable water development curriculum is a revolutionary new approach to graduate education. This program is focused on training interdisciplinary professional engineers, researchers, educators, and those who are ready to meet the water resource challenges of communities most in need. Students are encouraged to tailor the curriculum to fit unique interests and career goals—everything from politics to public health, chemistry to microbiology, and informatics to entrepreneurship. Students involve themselves with innovative research at the food, energy, and water nexus, focusing on the impacts of climate change, resource recovery from waste, and technologies for sustainable and healthy communities, among other areas. Community service and professional development, including immersive internships with diverse project partners, complement transformative research.

Transportation Engineering

The transportation engineering curriculum aims toward students interested in developing specialized knowledge and skills applicable to the diverse set of issues associated with transportation. Faculty members have expertise in traffic engineering, infrastructure management systems, pavement engineering, advanced construction materials, dynamic load and pavement simulation, optimal design, winter highway maintenance, real-time simulation, human factors, intelligent sensors, nondestructive testing, transportation planning, and travel demand modeling.

Requirements

The Master of Science program in civil and environmental engineering requires a minimum of 30 s.h. of graduate credit, with or without thesis. The program enables students to concentrate in one or more areas of their choice. Students who choose the thesis program may earn up to 6 s.h. for the thesis.

With the approval of their advisor, students develop a study plan that satisfies the requirements of their chosen curriculum. All M.S. students must maintain a g.p.a. of at least 2.75, pass an oral examination, and in some program options, a written examination.

Consult the department’s Graduate Student Manual for more detailed information about the M.S. program in civil and environmental engineering.

Admission

Applicants must meet the admission requirements of the Graduate College; see the Manual of Rules and Regulations of the Graduate College.

Each of the program’s curricula is flexible; students may be admitted from all disciplines of engineering as well as from the mathematical and basic sciences.

Applicants to the M.S. program should have a cumulative undergraduate g.p.a. of at least 3.00. Applicants whose grade-point average is slightly lower should contact the department.

Applicants should have a combined verbal and quantitative score of at least 301 on the Graduate Record Examination (GRE) General Test. Lower scores are considered with other evidence of academic promise (recommendation letters,
grade-point average). GRE General Test scores also are used in financial aid decisions.

### Financial Support

A significant number of research assistantships are available on a variety of research projects, as are a limited number of teaching assistantships. Selection of recipients usually is based on scholastic achievement and research interest.

### Career Advancement

Current and projected demand for M.S. graduates is excellent. Graduates are placed in advanced technical positions in industry, consulting firms, or government, or they may continue their graduate study. On average, 93-98 percent of graduates are employed in their field of study or pursuing advanced education within seven months of graduation.

Engineering Professional Development (EPD) develops and promotes experiential education and professional opportunities for students. Professional staff coordinate the college's co-op and internship program, engage in employer outreach, and provide opportunities for students to network with employers, including an engineering career fair and other career-development programming each semester.

EPD also offers individual advising and class presentations on résumé and cover letter preparation, job and internship search strategies, interviewing skills, and job offer evaluation.