Water Resources Engineering

Typical Schedule
M.S., Civil Engineering
M.S., Environmental Engineering

Requirements

Each student’s class schedule and thesis topic are designed and agreed upon by the student and their advisor. Students pursuing a research degree typically balance their coursework and research credits as follows:

- Coursework credits: 20-28 credits (≥ 12 cr. above 5000-level; ≤ 12 cr. 3000-4000 level)
- Research and thesis/report: 2-10 credits (6-10 credits for thesis; 2-4 credits for report)

Students pursuing a coursework-only degree must meet the following requirements:

- Coursework credits: 30 credits (≥ 18 cr. above 5000-level; ≤ 12 cr. 3000-4000 level)

Core Coursework

Students specializing in water resources engineering may pursue either the M.S. in Civil Engineering or the M.S. in Environmental Engineering degree. Students pursuing the M.S.En.E. are strongly encouraged to take ENVE 5501: Environmental Process Engineering, a course that introduces concepts in reactor design and chemical kinetics fundamental to all environmental engineering disciplines. Beyond this, students may develop a strong foundation in water resources based on courses offered by Drs. Barkdoll, Griffis, Mayer and Watkins.

- CE 5620 Stochastic Hydrology (Spring; 3 credits)
- CE 5665 Stream Restoration (Fall, Spring; 3 credits)
- CE 5666 Water Resources Planning and Management (Fall; 3 credits)
- GE 5800 Mathematical Modeling of Earth Systems (On Demand; 3 credits)
- GE 5810 Flow and Transport in Subsurface Systems (On Demand; 3 credits)
- GE 5850 Advanced Groundwater Engineering and Remediation (On Demand; 3 credits)

In addition, at the 4000-level, students may also take the following:

- CE 4620 River & Floodplain Hydraulics (Fall; 3 credits)
- CE 4640 Stormwater Management & Low Impact Development (Spring; 3 credits)
- CE 4760 Optimization Methods & Applications (Fall; 3 credits)
- CE 4507 Water Distribution & Wastewater Collection Systems
- ENVE 4508 Water & Wastewater Treatment
- GE 4800 Groundwater Engineering

Students who do not have a background in hydraulics and hydrology will first need to take CE 3620 Water Resources Engineering (Fall, Spring; 4 credits) as a pre-requisite.
**Breadth and Depth**

Students have the opportunity to select additional courses, tailoring their schedule to individual interests and backgrounds as well as to the needs of their research project(s). For instance, students in water resources may seek additional depth in related areas such as surface water quality for the M.S.En.E. degree. Courses available in the CEE department include:

- ENVE 4501 Environmental Chemical Processes (Fall; 3 credits)
- ENVE 4505 Surface Water Quality Engineering (Fall; 3 credits)
- ENVE 5501 Environmental Process Engineering (Fall; 3 credits)
- ENVE 5504 Surface Water Quality Modeling (Spring; 3 credits)

A variety of courses are available in other areas. The course clusters presented below outline these opportunities but are not intended to cover all possibilities.

**Ecology**

- BL 4450 Limnology (Fall; 4 credits)
- BL 5451 Aquatic Ecology (Fall; 4 credits)
- BL 5460 Advanced Ecology: Ecosystems (Spring; 3 credits)
- FW 4220 Wetlands (Fall; 4 credits)
- FW 5230 Ecohydrology

**Environmental Policy**

- SS 5200 Environmental Decision Making (Spring; 3 credits)
- SS 5300 Environmental Policy & Politics (Fall; 3 credits)
- SS 5350 Environmental Policy Analysis (Spring; 3 credits)
- SS 5400 Sociology of the Environment (Fall; 3 credits)
- SS/ENG 5510 Sustainable Futures I (Fall; 3 credits)

**GIS and Remote Sensing**

- BL 5520 Satellite Limnology (On Demand; 3 credits)
- FW 4540 Remote Sensing of the Environment (Fall; 3 credits)
- GL 4250 Fundamentals of Remote Sensing (Spring; 3 credits)
- FW 5550 GIS for Resource Management (Fall, 4 credits)

**Math and Statistics**

- BL 4470 Analysis of Biological Data (Spring; 4 credits)
- FW 5411 Applied Regression Analysis
- FW 5412 Regression with the R Environment for Statistical Computing
- MA 4710 Regression Analysis (Spring; 3 credits)
- MA 4720 Design and Analysis of Experiments (Fall; 3 credits)
- MA 4750 Applied Multivariate Statistics (Fall; 3 credits)
- MA 4760 Mathematical Statistics I (Fall; 3 credits)
- MA 4770 Mathematical Statistics II (Spring; 3 credits)
- MA 5701 Statistical Methods (Fall; 3 credits)
- MA 5721 Stochastic Processes (Fall; 3 credits)