Water Resources Engineering

Typical Schedule
M.S., Environmental Engineering
M.S., Civil 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 ($\geq$ 12 cr. above 5000-level; $\leq$ 12 cr. 3000-4000 level)
- Research and thesis/report: 2-10 credits (6-10 credits for thesis; 2-4 credits for report)

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 CE5501: 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.

- CE5610 Civil & Environmental Engineering Systems Analysis (Fall; 3 credits)
- CE5620 Stochastic Hydrology (Spring; 3 credits)
- CE5665 Stream Restoration (Fall, Spring; 3 credits)
- CE5666 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 CE4620 River & Floodplain Hydraulics (Fall; 3 credits), CE4640 Stormwater Management & Low Impact Development (Spring; 3 credits), and CE4507 Water Distribution & Wastewater Collection Systems. 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 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. Courses available in the CEE department include:

- CE4505 Surface Water Quality Engineering (Fall; 3 credits)
- CE5501 Environmental Process Engineering (Fall; 3 credits)

- CE5504 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
- BL4450 Limnology (Fall; 4 credits)
- BL5451 Aquatic Ecology (Fall; 4 credits)
- BL5460 Advanced Ecology: Ecosystems (Spring; 3 credits)
- FW4220 Wetlands (Fall; 4 credits)

Environmental Policy
- SS3620 International Environmental Technology Policy (Fall, Spring; 3 credits)
- SS3800 Energy Technology and Policy (Spring; 3 credits)
- SS5200 Environmental Decision Making (Spring; 3 credits)
- SS5300 Environmental Policy & Politics (Fall; 3 credits)
- SS5350 Environmental Policy analysis (Spring; 3 credits)
- SS5400 Sociology of the Environment (Fall; 3 credits)
- SS5510 Sustainable Futures I (Fall; 3 credits)

GIS and Remote Sensing
- BL5520 Satellite Limnology (On Demand; 3 credits)
- FW4540 Remote Sensing of the Environment (Fall; 3 credits)
- GL4250 Fundamentals of Remote Sensing (Spring; 3 credits)
- FW5550 GIS for Resource Management (Fall, 4 credits)

Math and Statistics
- BL4470 Analysis of Biological Data (Spring; 4 credits)
- MA4710 Regression Analysis (Spring; 3 credits)
- MA4720 Design and Analysis of Experiments (Fall; 3 credits)
- MA4750 Applied Multivariate Statistics (Fall; 3 credits)
- MA4760 Mathematical Statistics I (Fall; 3 credits)
- MA4770 Mathematical Statistics II (Spring; 3 credits)
- MA5701 Statistical Methods (Fall; 3 credits)
- MA5721 Stochastic Processes (Fall; 3 credits)