

## ERE Professional Master's of Science Program Curriculum

Students in the Environmental Resources Engineering Professional Master's of Science (PERE-MS) will be required to complete a minimum of 30 units of coursework for the M.S. degree. The coursework for the students is divided into core program requirements, engineering design courses in an area of specialization, and elective courses. Table 1 provides an example schedule for a generic PERE-MS student. A strong focus on client-based service learning which combines experiential education with complementary direct instruction is a key innovative aspect of the curriculum. The program also includes an emphasis on the development of professional tools that are often neglected in graduate engineering education, including economics, policy, communication, and professional/research ethics.

**Core Requirements:** Core program requirements include a graduate colloquium, a resource economics course, and a policy course with an energy or water focus.

*Colloquium (1 unit):* The colloquium will emphasize the development of communication skills for academic and professional work, including proposal writing, oral presentations, and poster presentations. Curriculum will include direct instruction for conducting ethical research.

*Economics and Policy Courses (8 units):* The economics and policy course requirements are designed to provide students with foundational tools for the analysis of energy and water related resource issues. They are also intended to provide students with knowledge about the broader policy context for their respective professional fields.

*Summer Internship:* Professional partners and PERE-MS students will be paired based on interest and ability. The internship is expected to be the focus of the PERE-MS master's project. Students will begin preparation for their internship in the second semester and then finish their project in the third semester, with support from courses described below. We anticipate students will receive compensation for the summer internship in most cases.

*Professional Preparation & Master's Project (4 units):* Two new courses will be developed for the PERE-MS program to leverage the maximum benefit from the students' summer internship with a professional partner. The first course will occur before the internship and provide direct instruction on professional skills such as professional ethics, client interactions and literature review methods. Professional partners will provide guest lectures and will assist in the development of the new curriculum. After the summer internship, the second course will provide writing and technical guidance for completing the Master's project.

**Engineering Design Course Requirements (9 units):** Students will be required to complete at least three **graduate level engineering design courses** (see Table 2). These courses are intended to allow students to develop engineering design skills in an area of specialization (renewable energy systems, water resources, water quality, and energy conservation).

**Elective Courses (9 units):** Students must choose three upper division or graduate level elective courses in consultation with their academic adviser. The courses should be in engineering or natural science disciplines. In general, these courses will be used to complement the engineering design coursework in each student's area of specialization.

**Table 1. Generic PERE-MS Program 3 Semester Course Schedule**

	<b>Units</b>
<b>Semester 1</b>	
Graduate Colloquium (SCI 698)	1
Economics Course #1	4
Engineering Design Course #1	3
Elective Course #1	3
<b>Semester 1 Total Units</b>	<b>11</b>
<b>Semester 2</b>	
Policy Course #1	4
Engineering Design Course #2	3
Professional Development in Engineering (ENGR 700)	1
Elective Course #2	3
<b>Semester 2 Total Units</b>	<b>11</b>
<b>Summer</b>	
Internship Work Experience	
<b>Semester 3</b>	
Engineering Design Course #3	3
Elective Course #3	3
Professional Development in Engineering (ENGR 700)	3
<b>Semester 3 Total Units</b>	<b>9</b>
<b>Program Total Units</b>	<b>31</b>

**Table 2. List of Approved Graduate Level Engineering Courses\***

Engr 501 – Environmental Systems Analysis I	Engr 548 – River Hydraulics
Engr 518 – Applied Hydraulics	Engr 551 – Water and Wastewater Design
Engr 521 – Advanced Numerical Methods for Engineers	Engr 555 – Engineered Natural Treatment Systems
Engr 531 – Air Quality Management	Engr 571 – Advanced Thermodynamics and Energy Systems
Engr 541 – Hydrology II	Engr 573 – Building Energy Analysis
Engr 543 – Groundwater Systems	Engr 575 – Renewable Energy Power Systems
Engr 545 – Water Resources Planning and Management	Engr 577 – Solar Thermal Engineering

\*Most of these courses are cross listed with the BS senior engineering design electives to ensure sufficient student enrollments. Graduate students enroll in a 500-level course and undergraduates enroll in a 400-level course. Additional course assignments and a higher performance level are required for graduate enrollees.

\*Engineering Design Electives are taught on a two-year rotation. Not all courses are taught each year. Check department website for design course rotation.

\*Econ 550: Economics of Energy and Climate Policy – offered every other fall

\*Students taking Econ 423 should also take Econ 423 D