



## Graduate Full-time and Part-time Graduate Studies in Environmental and Water Resources Engineering

**Master of Science in Civil Engineering:** Normally for students with an undergraduate degree in Civil Engineering.

**Master of Science in Water Resources and Environmental Engineering:** Normally for students with an undergraduate degree in basic or applied sciences or in other branches of engineering.

<http://www.villanova.edu/engineering/departments/civil/graduate/>

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### Program Overview

The primary goal of the graduate program is to provide advanced level courses of study in environmental and water resources engineering. The curriculum presents an engineering view of these fields, although students with science backgrounds constitute a significant portion of the total enrollment. Students may also develop an interdisciplinary program that includes geotechnical engineering courses. Nearly all of the courses are now offered through Distance Education providing students with the option to obtain their degree via DE. Certificate programs and enrolment in selected graduate courses as a special student are available for those who do not intend to earn the full degree.

### Program Requirements

A minimum of 30 earned semester credits of graduate work is required. Of these 30 credits, minimum of 21 graduate credits must be in Civil and Environmental Engineering courses. Up to two qualified graduate courses, equivalent of 6 credits, may be transferred from another institution. Guided by faculty advisor, a student may select a plan of study consisting of: 1) thirty credits of graduate courses, 2) a thesis track consisting of twenty-one credits of graduate courses, a three-credit research/investigation course and a six-credit thesis, or 3) twenty-seven credits of graduate courses, and a three-credit research/investigation course. Full-time students can finish degree requirements in one year. Required courses for the degree are listed on the following page.

### Laboratory Facilities

The CEE Department has state-of-the-art laboratories supporting Environmental, Water Resources, Hydraulics, and Geotechnical engineering research and teaching. Covering over 5,000-ft<sup>2</sup> space, these laboratories are equipped with the latest analytical instruments including GCs, GC/MS, HPLC/MS/MS, AA and UV/Vis spectrophotometers, epifluorescent microscope, and real-time PCR. The College recently established the interdisciplinary Core Genomics Laboratory that allows environmental engineering faculty and students to incorporate molecular tools, such as q-PCR and FISH, into their research. In addition, the Nanotechnology Laboratory within the College has extensive surface characterization capabilities (e.g., TEM-EDS, SEM-EDAX, Mössbauer spectroscopy, AFM).

### Green Infrastructure Stormwater Research Park

The campus is utilized as a research laboratory, with multiple instrumented green infrastructure control measures to include a green roof, multiple bio-infiltration raingardens, pervious pavements, infiltration trench and a stormwater wetland.

### Financial Assistance

Financial assistance for qualified graduate students includes full graduate assistantship (GA) and research assistantship (RA) that provide tuition waiver and stipend, as well as tuition scholarship. Students in need of financial aid should contact the faculty to find out available financial assistance opportunities.

## Graduate Course Offerings

		2011			2012			2013			2014		
		Spring	Summer	Fall	Spring	Summer	Fall	Spring	Summer	Fall	Spring	Summer	Fall
<b>Environmental Engineering Courses</b>													
CEE 7011	Hazardous Waste Management												
CEE 7502 DE	Introduction to Environmental Eng. Processes*												
CEE 7511 DE	Microbiology for Environmental Engineers												
CEE 7513 DE	Fate and Transport of Contaminants												
CEE 7514 DE	Sustainable Manufacturing and Industrial Pol. Pre.												
CEE 7701 DE	Aquatic Chemistry for Environmental Engineers												
CEE 7829 DE	Principles of Sustainable Development												
CEE 8707 DE	Physical/Chemical Treatment Processes												
CEE 8708 DE	Biological Treatment Processes												

### Water Resources Courses

CEE 7010 DE	Lake, Stream, and Wetland Ecology											
CEE 7111 DE	Introduction to Hydraulic Eng. and Hydrology*											
CEE 7211 DE	Water Resource Planning and Management											
CEE 8501 DE	Surface Water Hydrology											
CEE 8502 DE	Watershed Modeling											
CEE 8503 DE	Open Channel Hydraulics											
CEE 8512 DE	River Mechanics and Engineering											
CEE 8507 DE	Environmental Flow											
CEE 8508 DE	Urban Hydrology and Storm Water Management											
CEE 8510 DE	Groundwater Hydrology											

### Geotechnical Courses

CEE 8103	Geosynthetics											
CEE 8104	Geoenvironmental Engineering											

### Other Courses

CEE 7001 DE	Business Basics for Engineers											
CEE 7002 DE	Management for Engineers											
CEE 8601	Special Topics in Engineering	TBA										
CEE 9030	CEE Research/Investigation	TBA										
CEE 9031	Thesis I	TBA										
CEE 9032	Thesis II	TBA										

*TBA: To be arranged; DE: Synchronous distance education course (offered concurrently with in class sections)*

The minimum requirements for a MSWREE degree are:

EE requirements: 2 courses from the following; 7511, 7513, 7701, 8707, 8708

WRE requirements: 2 courses from the following; CEE 7111\*, 8501, 8502, 8503, 8507, 8510

All students are required to take one of the following; CEE 8502, 8507, 8707, 8708

\*CEE 7111 and CEE 7502 are mostly for students who do not have a BS in civil engineering

An interdisciplinary plan of study leading to a MSCE degree can be developed with the help of a faculty advisor.

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