CIVIL AND ENVIRONMENTAL ENGINEERING PH.D.

All students must meet the Requirements for the Doctor of Philosophy Degree

OVERVIEW

A graduate program in Civil and Environmental Engineering (CEE) that leads to the doctor of philosophy degree is offered. The curricular and research programs emphasize engineering related to environmental and hydrological processes, sustainable transportation systems, materials, and geotechnical, geoenvironmental and structural engineering.

Research includes: groundwater contamination modeling and remediation including optimal remediation design; environmental restoration and ecological engineering; hydrological processes; air pollution and related health effects; modeling of contaminant fate and transport in the environment; materials; geotechnical and geoenvironmental engineering; dynamic behavior of soils, structures and structural health monitoring; geo-energy; and sustainable transportation systems.

Graduate students of CEE can concurrently pursue certificates of graduate education in sustainable transportation systems, complex systems, and ecological economics.

SPECIFIC REQUIREMENTS

Requirements for Admission to Graduate Studies for the Degree of Doctor of Philosophy

A Master of Science or Bachelor of Science degree in engineering is preferred, but applicants with a M.S. or B.S. degree in one of the sciences are often accepted. The latter, however, should have a minimum of the following mathematics and science course work prior to admission: three semesters of calculus, one semester of differential equations, one semester of calculus-based physics, and one semester of chemistry. Satisfactory academic performance as measured by grades and scores on the Graduate Record Exam are required. Applicants whose native language is not English or who have not received their education in English must present satisfactory results from the TOEFL or IELTS examination. Completed applications are due February 1.

Minimum Requirements for the Degree of Doctor of Philosophy

In addition to advancement to candidacy, the student must:

- Present at least seventy-five credits in approved course work and research (including those required for advancement to candidacy), of which at least thirty-five credits are in research and six credits are in course work in disciplines ancillary to Civil and Environmental Engineering
- Write and successfully defend an acceptable dissertation

Comprehensive Examination

A comprehensive examination is required of all Ph.D. students and should be completed by the end of their second year in the doctoral program when they have taken at least 24 credits of graduate coursework in different topical areas. Some or all of the 24 credits required may be transferred in from their Masters degree if desired.

The comprehensive examination, successful proposal presentation, and one year of residency at UVM are needed for advancement to candidacy.

The comprehensive examination covers five topics or courses, from three topical areas. The three areas are described below.

Area 1. One topic from the following three;
   1. Advanced Mathematical Methods
   2. Advanced Statistical Methods
   3. Probabilistic Methods

Area 2. Two topics from the following nine;
   1. Water and Wastewater Engineering
   2. Air Pollution, Hazardous Waste
   3. Hydrology
   4. Groundwater
   5. Advanced Fluids
   6. Advanced Structural Analysis
   7. Advanced Soils
   8. Transportation Systems
   9. Advanced Materials

Area 3. Two topics from the following four;
   1. Numerical Methods
   2. Computational Modeling
   3. Information Technology Applications
   4. Optional Area subject to approval by Studies Committee

Five members of the Comprehensive Examination Committee will test the student in five appropriate topics selected from the previous list. Each faculty member will be responsible for one of the five topics. Students generally select from courses that they have had at UVM, but occasionally a student may select a faculty member that they did not have, but covers a topic that they have taken. The students and their Advisor select and recommend to the Graduate Student Coordinator the Comprehensive Examination Committee.
The examination takes place in two days and covers a written part (day 1) and an oral part (day 2). Each committee member makes up a written question or questions for the student that will take about an hour. The written examination is 6 hours long. The questions can be closed book or open book. This is determined by each committee member. The student should talk to each committee member prior to the examination to determine the format and scope.

The oral examination is usually given two days after the written examination. The oral examination requires three consecutive hours, a half an hour per examiner and a half an hour for the committee to reassemble and to decide if the student passed or failed the examination. The student is responsible for coordinating the dates for the written and oral examination with their committee members, at least one month prior to the examination date. Students will coordinate with the office of the Dean of the college or Program administrative assistant to find a room for the oral examination. The student then gives to the Graduate Program Coordinator the list of members with email addresses and phone numbers, and the dates of the examinations.

The Comprehensive Examination must be passed at least 6 months before submitting the dissertation. Success in the Comprehensive Examination is prerequisite for an oral Dissertation Defense Examination.

The examination may be retaken once if the student does not pass it on the first attempt.

**Requirements for Advancement to Candidacy for the Degree of Doctor of Philosophy**

It is ordinarily expected that a student will complete the following requirements for advancement to candidacy prior to the end of the second year in the program:

- One year of residency at UVM
- Teaching experience in one course
- At least twelve credits of research
- At least fifteen credits of course work at the graduate level acceptable to the student's graduate studies committee
- Satisfactory performance on a comprehensive examination that includes a written part and an oral part
- Satisfactory record of performance in courses and in teaching and research assignments