

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 in the department addresses critical issues facing the world related to sustainability and energy; infrastructure systems; climate change, hazard mitigation and adaptation; and environmental and public health. A wide range of research methods are employed from state-of-the-art laboratory and field testing to sensing to computational modeling to artificial intelligence. Example projects include groundwater contamination modeling and remediation, environmental restoration and ecological engineering, hydrological processes, air pollution related health effects, sustainable materials, soil and structural dynamics, geo-energy, and sustainable transportation systems.

CEE graduate students can concurrently pursue certificates of graduate study in Data Analytics in Water Resources, Complex Systems, Ecological Economics, and Community Resilience & Planning, among others.

SPECIFIC REQUIREMENTS

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

A M.S. or B.S. degree in engineering is preferred, but applicants with a M.S. or B.S. in 1 of the sciences are often accepted. The latter, however, should have a minimum of the following mathematics and science course work prior to admission: calculus through differential equations (UVM's MATH 3201 equivalent), calculus-based physics (UVM's PHYS 1500 equivalent), and chemistry (UVM's CHEM 1400 equivalent). Specific course work may be required of those who lack a sufficiently strong engineering background. GRE is waived for all applicants, but it can be voluntarily submitted. Applicants whose native language is not English or who have not received their education in English must present satisfactory results from the TOEFL, IELTS or Duolingo examination.

Minimum Requirements for the Degree of Doctor of Philosophy

In addition to advancement to candidacy, the student must:

- Present at least 75 credits in approved course work and research (including those required for advancement to candidacy), of which at least 35 credits are in research, at least 30 credits are in coursework, 15 of which must be graded at UVM and at least

9 of which must be at the 6000-level or above. A minimum of 15 credits of coursework (taken at UVM or transferred or a combination) must be in Civil and Environmental Engineering (CEE).

- Write and successfully defend an acceptable dissertation
- Gain significant teaching experience

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 1 year of residency at UVM are needed for advancement to candidacy.

The comprehensive examination covers 5 courses, from 2 topical areas are described below.

Area One. 3 topics from the following:

1. Advanced Mathematical Methods
2. Advanced Statistical Methods
3. Probabilistic Methods
4. Numerical Methods
5. Computational Modeling
6. Optional Area subject to approval by Studies Committee

Area Two. 2 topics from Civil and Environmental Engineering

5 members of the Comprehensive Examination Committee will test the student in 5 appropriate topics selected from the previous list. Each faculty member will be responsible for 1 of the 5 topics. The students and their Advisor select and recommend to the Graduate Program Director the Comprehensive Examination Committee.

The examination takes place in 2 days and covers a written part (day 1) and an oral part (day 2). The written part typically consists of questions prepared by each member of the Comprehensive Examination Committee on their respective topic. The oral examination is usually given 2 days after the written examination and it tests the candidate's ability to present a cogent defense of the written 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:

- 1 year of residency at UVM
- At least 12 credits of research

- At least 15 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