

CIVIL AND ENVIRONMENTAL ENGINEERING, PHD

The mission of the civil and environmental engineering (CEE) program is to develop leaders in education, industry, and government who can use their acquired skills to improve society. The academic program provides a comprehensive framework of courses in the broad area of civil and environmental engineering with opportunities to develop specialized expertise. It also emphasizes the development of integrated teamwork abilities, communication, leadership, entrepreneurship, and creative research skills.

Graduate study in the department offers an opportunity to undertake advanced study and research in various areas of specialization including:

- **Construction engineering and management:** construction labor productivity management, integrated lean project delivery systems, risk management, advanced computer applications to construction, and change management
- **Environmental engineering:** water supply, water quality, water treatment, wastewater treatment, solid and hazardous waste management, air pollution, biotechnology, and alternative energy
- **Geo and pavement engineering:** geotechnical and geological engineering, pavement materials and design, asphalt binders and mixtures, geosynthetics, in-situ testing and engineering geophysics, recycled materials in sustainable construction
- **Structural engineering:** behavior, analysis and design of reinforced/prestressed concrete, steel, and wood structures; design for earthquake and wind loading; seismic rehabilitation
- **Transportation engineering:** highway and traffic engineering, intelligent transportation systems, connected and automated vehicles, transportation planning, freight, and infrastructure management, transportation safety, user comprehension and behavior, advanced driving- and micro-simulation, big data
- **Water resources/environmental fluid mechanics:** analysis, measurement, modeling of currents, flows, and waves in natural and constructed systems; surface and groundwater hydrology; hydraulic engineering; coastal engineering; sedimentation and transport processes; infrastructure impacts of extreme weather events, hydroecology and stream restoration

Students may also pursue studies in the broad fields of environmental engineering/science and systems analysis. Areas of specialization are organized into a constructed facilities division (including transportation engineering, structural engineering, construction engineering and management, pavement engineering, materials for constructed facilities, and geotechnical engineering) and an environmental engineering division (including geoenvironmental engineering, environmental fluid mechanics and water resources engineering, environmental science and technology, and environmental and water chemistry).

Degrees require a coordinated core program of courses, selected from CEE and other department/program offerings. Graduate degree programs closely associated with the department include engineering mechanics, human factors, environmental chemistry and technology, water resources

management, geological engineering, land resources, and limnology and marine science.

In support of our instructional and research programs are laboratory facilities for structural engineering; highway materials; transportation systems; driving simulation and human factors; soil mechanics, geotechnical and geoenvironmental engineering; coastal and hydraulic engineering; environmental fluid mechanics; environmental engineering processes and engineering chemistry. Water resources engineering, environmental engineering, and water chemistry have additional research facilities in the Water Science and Engineering Laboratory on the shore of Lake Mendota. The Environmental Engineering Field Laboratory is located at the Nine-Springs Madison Metropolitan Wastewater Treatment Plant.

ADMISSIONS

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Please consult the table below for key information about this degree program's admissions requirements. The program may have more detailed admissions requirements, which can be found below the table or on the program's website.

Graduate admissions is a two-step process between academic programs and the Graduate School. **Applicants must meet the minimum requirements (<https://grad.wisc.edu/apply/requirements/>) of the Graduate School as well as the program(s).** Once you have researched the graduate program(s) you are interested in, apply online (<https://grad.wisc.edu/apply/>).

Requirements	Detail
Fall Deadline	December 15
Spring Deadline	September 1
Summer Deadline	December 15
GRE (Graduate Records Examinations)	Not required.
English Proficiency Test	Every applicant whose native language is not English, or whose undergraduate instruction was not exclusively in English, must provide an English proficiency test score earned within two years of the anticipated term of enrollment. Refer to the Graduate School: Minimum Requirements for Admission policy: https://policy.wisc.edu/library/UW-1241 (https://policy.wisc.edu/library/UW-1241/).
Other Test(s) (e.g., GMAT, MCAT)	n/a
Letters of Recommendation Required	3

APPLICATION PROCESS AND REQUIREMENTS

All applicants must meet the Graduate School's admission requirements (<http://grad.wisc.edu/admissions/requirements/>) to be considered for admission. Departmental admission is by committee review. Applications submitted after the fall deadline through March 15 will be reviewed if complete and will be considered for admission by the department if space is still available. To check if space is available, please email: ceegradadmission@engr.wisc.edu.

In addition, applicants must also meet the department's requirements listed below to be considered for admission:

Grades

A minimum undergraduate grade-point average (GPA) of 3.00 (on a 4.00 scale) on the equivalent of the last 60 semester hours (approximately two years of work) or a master's degree with a minimum cumulative GPA of 3.00 is required. Applicants from an international institution must demonstrate strong academic achievement comparable to a 3.00 for an undergraduate or master's degree. The Graduate School will use your institution's grading scale. Do not convert your grades to a 4.00 scale.

Degree

A bachelor's degree from an ABET-accredited engineering program or from a recognized international institution is recommended.

Funding

Funded offers for MS (research) and PhD students, in the form of research assistantships, project assistantships, and/or teaching assistantships come directly from individual faculty members (<https://directory.engr.wisc.edu/cee/>). Please contact interested faculty before or after you have applied to inquire about assistantship opportunities. Funding is not guaranteed with admission. Faculty will contact successful applicants directly regarding funding opportunities.

COMPLETE APPLICATION

A complete graduate application is required before an application will be reviewed by the faculty. A complete graduate application contains the following:

Graduate School Application

Applicants must submit an online application to the UW–Madison Graduate School. See Graduate School Admissions (<https://grad.wisc.edu/admissions/>) to apply.

Statement of Purpose

Submit a statement of purpose of 1,000 words or less in the online application. This statement should cover your technical areas of interest, coursework emphasis, research experience, professional goals, faculty members you are interested in working with, and any other items relevant to your qualifications for graduate school. See the Graduate School for additional guidelines for the Statement of Purpose (<https://grad.wisc.edu/apply/prepare/>) (scroll to bottom of page).

Three Letters of Recommendation

Three letters of recommendation must be submitted through the online application. These letters should be from people who can judge the applicant's academic, research, and/or work performance. See the Graduate School for FAQs (<https://grad.wisc.edu/apply/#FAQ>) regarding these letters.

Academic Transcripts

Upload the most recent copies of your transcripts to the online application, from each institution attended. Study abroad transcripts are not required if coursework is reflected on the degree granting university's transcript. Unofficial copies of transcripts are used for departmental review. If the applicant is recommended for admission, then the Graduate School will follow-up with instructions for official transcript submission. Please do not send transcripts or any other application materials to the Graduate School or the Department of Civil and Environmental Engineering unless requested.

Resume/Curriculum Vitae

Upload your most recent resume or curriculum vitae in the online application.

English Proficiency Score

Applicants whose native language is not English, or whose undergraduate instruction was not in English, must provide an English proficiency test score. Scores are accepted if they are within two years of the start of the admission term. Self-reported exam information is acceptable during departmental review; however, if you are recommended for admission, official test scores must be sent directly to the Graduate School from the testing body. See Graduate School Admission Requirements (<http://grad.wisc.edu/admissions/requirements/>) for more information on the English proficiency requirement. (NOTE: TOEFL scores may be sent electronically via ETS using institution code 1846)

Application Fee

A one-time application fee is required. See the Graduate School frequently asked questions (<https://grad.wisc.edu/apply/#FAQ>) for fee information. Fee grants are offered by the Graduate School on a limited basis and under certain conditions, as outlined here (<https://grad.wisc.edu/apply/fee-grant/>). The department does not offer an application fee waiver due to the large volume of applications received. However, if you are working with a specific faculty member, then they may offer you a fee voucher.

FUNDING

FUNDING

GRADUATE SCHOOL RESOURCES

Resources to help you afford graduate study might include assistantships, fellowships, traineeships, and financial aid. Further funding information (<https://grad.wisc.edu/funding/>) is available from the Graduate School. Be sure to check with your program for individual policies and restrictions related to funding.

PROGRAM RESOURCES

Financial support is available through fellowships, project/program assistantships (PA), research assistantships (RA), and teaching assistantships (TA). Faculty will contact successful applicants directly regarding funding opportunities. Admission is not a guarantee of funding.

REQUIREMENTS

MINIMUM GRADUATE SCHOOL REQUIREMENTS

Review the Graduate School minimum academic progress and degree requirements (<http://guide.wisc.edu/graduate/#policiesandrequirements>), in addition to the program requirements listed below.

MAJOR REQUIREMENTS

MODE OF INSTRUCTION

Face to Face	Evening/ Weekend	Online	Hybrid	Accelerated
Yes	No	No	No	No

Mode of Instruction Definitions

Accelerated: Accelerated programs are offered at a fast pace that condenses the time to completion. Students typically take enough credits aimed at completing the program in a year or two.

Evening/Weekend: Courses meet on the UW–Madison campus only in evenings and/or on weekends to accommodate typical business schedules. Students have the advantages of face-to-face courses with the flexibility to keep work and other life commitments.

Face-to-Face: Courses typically meet during weekdays on the UW–Madison Campus.

Hybrid: These programs combine face-to-face and online learning formats. Contact the program for more specific information.

Online: These programs are offered 100% online. Some programs may require an on-campus orientation or residency experience, but the courses will be facilitated in an online format.

CURRICULAR REQUIREMENTS

Requirement Detail

Minimum Credit Requirement 51 credits

Minimum Residence Credit Requirement 32 credits

Minimum Graduate Coursework Requirement 26 credits must be graduate-level coursework. Refer to the Graduate School: Minimum Graduate Coursework (50%) Requirement policy: <https://policy.wisc.edu/library/UW-1244> (<https://policy.wisc.edu/library/UW-1244/>).

Overall Graduate GPA Requirement 3.00 GPA required. Refer to the Graduate School: Grade Point Average (GPA) Requirement policy: <https://policy.wisc.edu/library/UW-1203> (<https://policy.wisc.edu/library/UW-1203/>).

Other Grade Requirements n/a

Assessments and Examinations Doctoral students are required to complete a qualifying exam to demonstrate a sufficient depth and breadth of knowledge in their major to pursue original research, usually after the first year of study. Students must consult with their advisor and/or the exam coordinator in the major area of study for the schedule and specific procedures.

Doctoral students are required to take a comprehensive preliminary/oral examination after they have cleared their record of all Incomplete and Progress grades (other than research and thesis). In order to qualify for the preliminary examination, students must have completed 32 credits in residence and their doctoral minor.

Deposit of the doctoral dissertation in the Graduate School is required.

Language Requirements No language requirements

Graduate School Breadth Requirement All doctoral students are required to complete a doctoral minor or graduate/professional certificate. Refer to the Graduate School: Breadth Requirement in Doctoral Training policy: <https://policy.wisc.edu/library/UW-1200> (<https://policy.wisc.edu/library/UW-1200/>).

Students will discuss minor and certificate options with the faculty advisor. Courses must be approved before, or by the time, the student has completed 6 of the total credits for the minor or certificate.

REQUIRED COURSES

Basic requirements for a PhD degree in Civil and Environmental Engineering include:

1. PhD major coursework;
2. qualifying examination;
3. Breadth coursework;
4. preliminary examination;
5. dissertation research; and
6. final oral examination.

Advanced coursework in a major area of civil and environmental engineering is required. The academic program for each doctoral student is planned on an individual basis with their advisor. 32 credits and breadth coursework must be completed prior to achieving dissertator status (for students who have earned an MS degree, credits accumulated for the MS can be applied toward this requirement). All graduate students must register for a 1-credit seminar course per academic year; students will discuss seminar options with faculty advisors.

Seminar course options; must discuss seminar options with faculty advisor.

Code	Title	Credits
CIV ENGR 579	Seminar-Transportation Engineering	1
CIV ENGR/ ENVIR ST/ URB R PL 717	Water Resources Management Practicum Planning Seminar I	1
CIV ENGR/ ENVIR ST/ URB R PL 718	Water Resources Management Practicum Planning Seminar II	2
CIV ENGR 760	Research Methods in Construction Engineering Management	1
CIV ENGR 909	Graduate Seminar - Environmental Chemistry & Technology	1
CIV ENGR/ ATM OCN/BOTANY/ ENVIR ST/GEOSCI/ ZOOLOGY 911	Limnology and Marine Science Seminar	1
CIV ENGR 919	Seminar-Hydraulic Engineering and Fluid Mechanics	1
CIV ENGR 929	Seminar-Environmental Engineering	1
CIV ENGR 939	Geotechnical Engineering Seminar	1
CIV ENGR 949	Seminar-Structural Engineering	1

POLICIES

GRADUATE SCHOOL POLICIES

The Graduate School's Academic Policies and Procedures (<https://grad.wisc.edu/acadpolicy/>) provide essential information regarding general university policies. Program authority to set degree policies beyond the minimum required by the Graduate School lies with the degree program faculty. Policies set by the academic degree program can be found below.

MAJOR-SPECIFIC POLICIES

PRIOR COURSEWORK

Graduate Credits Earned at Other Institutions

Refer to the Graduate School: Transfer Credits for Prior Coursework (<https://policy.wisc.edu/library/UW-1216/>) policy.

Undergraduate Credits Earned at Other Institutions or UW-Madison

Upon approval from a student's graduate advisor and the graduate program chair, the Civil and Environmental Engineering program may decide to transfer up to seven credits from another institution or numbered 300 or above from the undergraduate career completed at UW-Madison. Exceptions to this limit must be approved by the Graduate School. Transfer credits from other institutions must be equivalent to the rigor of UW-Madison courses numbered 300 and above. These credits are not allowed to count toward the 50% graduate coursework minimum unless numbered 700 or above from UW-Madison. The credits are noted on the transcript in the graduate career as transfer credits, but the courses remain in the undergraduate career if taken at UW-Madison. Refer to the Graduate School: Transfer Credits for Prior Coursework (<https://policy.wisc.edu/library/UW-1216/>) policy.

Credits Earned as a Professional Student at UW-Madison (Law, Medicine, Pharmacy, and Veterinary careers)

Refer to the Graduate School: Transfer Credits for Prior Coursework (<https://policy.wisc.edu/library/UW-1216/>) policy.

Credits Earned as a University Special Student at UW-Madison

Refer to the Graduate School: Transfer Credits for Prior Coursework (<https://policy.wisc.edu/library/UW-1216/>) policy.

PROBATION

Refer to the Graduate School: Probation (<https://policy.wisc.edu/library/UW-1217/>) policy.

ADVISOR / COMMITTEE

Refer to the Graduate School: Advisor (<https://policy.wisc.edu/library/UW-1232/>) and Graduate School: Committees (Doctoral/Master's/MFA) (<https://policy.wisc.edu/library/UW-1201/>) policies.

CREDITS PER TERM ALLOWED

15 credits

TIME LIMITS

Refer to the Graduate School: Time Limits (<https://policy.wisc.edu/library/UW-1221/>) policy.

GRIEVANCES AND APPEALS

These resources may be helpful in addressing your concerns:

- Bias or Hate Reporting (<https://doso.students.wisc.edu/bias-or-hate-reporting/>)
- Graduate Assistantship Policies and Procedures (<https://hr.wisc.edu/policies/gapp/#grievance-procedure>)
- Hostile and Intimidating Behavior Policies and Procedures (<https://hr.wisc.edu/hib/>)
 - Office of the Provost for Faculty and Staff Affairs (<https://facstaff.provost.wisc.edu/>)
- Employee Assistance (<http://www.eao.wisc.edu/>) (for personal counseling and workplace consultation around communication and conflict involving graduate assistants and other employees, post-doctoral students, faculty and staff)
- Employee Disability Resource Office (<https://employee disabilities.wisc.edu/>) (for qualified employees or applicants with disabilities to have equal employment opportunities)
- Graduate School (<https://grad.wisc.edu/>) (for informal advice at any level of review and for official appeals of program/departmental or school/college grievance decisions)
- Office of Compliance (<https://compliance.wisc.edu/>) (for class harassment and discrimination, including sexual harassment and sexual violence)
- Office Student Assistance and Support (OSAS) (<https://osas.wisc.edu/>) (for all students to seek grievance assistance and support)
- Office of Student Conduct and Community Standards (<https://conduct.students.wisc.edu/>) (for conflicts involving students)
- Ombuds Office for Faculty and Staff (<http://www.ombuds.wisc.edu/>) (for employed graduate students and post-docs, as well as faculty and staff)
- Title IX (<https://compliance.wisc.edu/titleix/>) (for concerns about discrimination)

Civil and Environmental Engineering Grievance Procedures

Students who feel that they have been treated unfairly have the right to a prompt hearing of their grievance. Such complaints may involve course grades, classroom treatment, advising, various forms of harassment, or other issues. Any student or potential student may use these procedures.

- The student should speak first with the person toward whom the grievance is directed. In most cases, grievances can be resolved at this level.
- Should a satisfactory resolution not be achieved, the student should contact the program's Grievance Advisor to discuss the grievance. Currently, the Civil and Environmental Engineering Grievance Advisors are:

Pavana Prabhakar, Professor and Associate Chair for Graduate Programs
pavana.prabhakar@wisc.edu, 2210 Engineering Hall, Phone: (608) 265-7834

Greg Harrington, Professor and CEE Department Chair
gwharrin@wisc.edu, 2205 Engineering Hall, Phone: (608) 695-3380

If the student prefers to talk with someone outside of the Civil and Environmental Engineering department, contact:

Joanna Gurstelle, College of Engineering Assistant Dean for Graduate Affairs

The Assistant Dean for Graduate Affairs (enr-dean-graduateaffairs@enr.wisc.edu) provides overall leadership for graduate education in the College of Engineering, and is a point of contact for graduate students who have concerns about education, mentoring, research, or other difficulties.

- The Grievance Advisor is responsible for facilitating any complaints or issues of students. The Grievance Advisor first attempts to help students informally address the grievance prior to any formal complaint. Students are also encouraged to talk with their faculty advisors regarding concerns or difficulties if necessary. University resources for sexual harassment concerns can be found on the UW Office of Compliance website and are included in the next section.
- If the issue is not resolved to the student's satisfaction the student can submit the grievance to the Grievance Advisor in writing, within 60 calendar days of the alleged unfair treatment.
- On receipt of a written complaint, a faculty committee will be convened by the Grievance Advisor to manage the grievance. The program faculty committee will obtain a written response from the person toward whom the complaint is directed. This response will be shared with the person filing the grievance.
- The faculty committee will determine a decision regarding the grievance. The Grievance Advisor will report on the action taken by the committee in writing to both the student and the party toward whom the complaint was directed within 15 working days from the date the complaint was received.
- At this point, if either party (the student or the person toward whom the grievance is directed) is unsatisfied with the decision of the faculty committee, the party may file a written appeal. Either party has 10 working days to file a written appeal to the College of Engineering.
- Documentation of the grievance will be stored for at least 7 years. Significant grievances that set a precedent will be stored indefinitely.

The Graduate School has established policies governing student conduct, academic dishonesty, and sexual and racial harassment. The Graduate School also has procedures for students wishing to appeal a grievance decision made at the college level. These policies are described in the Academic Guidelines.

OTHER

n/a

PROFESSIONAL DEVELOPMENT

PROFESSIONAL DEVELOPMENT GRADUATE SCHOOL RESOURCES

Take advantage of the Graduate School's professional development resources (<https://grad.wisc.edu/pd/>) to build skills, thrive academically, and launch your career.

LEARNING OUTCOMES

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1. Demonstrate an extraordinary, deep understanding of mathematical, scientific, and engineering principles in the field.
2. Demonstrate an ability to formulate, analyze, and independently solve advanced engineering problems.
3. Apply the relevant scientific and technological advancements, techniques, and engineering tools to address these problems.
4. Recognize and apply principles of ethical and professional conduct.
5. Demonstrate an ability to synthesize knowledge from a subset of the biological, physical, and/or social sciences to help frame problems critical to the future of their discipline.
6. Demonstrate an ability to conduct original research and communicate it to their peers.

PEOPLE

PEOPLE CIVIL AND ENVIRONMENTAL ENGINEERING

Professors Harrington (chair), Ahn, Hanna, Hurley, Li, Likos, Loheide, McMahon, Noguera, Noyce, Park, Parra-Montesinos, Ran, Remucal, Russell, Schauer, Wu; Associate Professors Block, Fratta, Ginder-Vogel, Hicks, Pincheira, Prabhakar, Sone, Tinjum, Wright; Assistant Professors Blum, Chen, Hampton, Pujara, Qin, Wang, Wei, Zhu; M.Eng Program Director Carlson. See also CEE faculty (<http://directory.enr.wisc.edu/cee/faculty/>).

GEOLOGICAL ENGINEERING

Professors Tinjum (Director) (Civil and Environmental Engineering), Feigl (Geoscience), Goodwin (Geoscience), Hard (Wisconsin Geological and Natural History Survey), Likos (Civil and Environmental Engineering), Loheide (Civil and Environmental Engineering), Tikoff (Geoscience), Wu (Civil and Environmental Engineering); Associate Professors Cardiff (Geoscience), Ferrier (Geoscience), Fratta (Civil and Environmental Engineering), Ginder-Vogel (Civil and Environmental Engineering), Hicks (Civil and Environmental Engineering), Sone (Civil and Environmental Engineering), Zoet (Geoscience); Assistant Professors Hampton (Civil and Environmental Engineering), Golos (Geoscience), Zahasky (Geoscience). See also GLE faculty (<https://engineering.wisc.edu/departments/civil-environmental-engineering/research/geological-engineering/>).

ENVIRONMENTAL CHEMISTRY AND TECHNOLOGY

Professors Hurley (Civil and Environmental Engineering), Bertram (Chemistry), Bleam (Soil Science), Harrington (Civil and Environmental Engineering), Karthikeyan (Biological Systems Engineering), McMahon (Civil and Environmental Engineering/Bacteriology), Roden (Geoscience), Root (Chemical and Biological Engineering), Schauer (Civil and Environmental Engineering), Thompson (Biological Systems Engineering); Associate Professors Ginder-Vogel (director; Civil and Environmental Engineering), Remucal (Civil and Environmental Engineering), Whitman (Soil Science); Assistant Professors Anantharaman (Bacteriology), Majumder (Bacteriology), Qin (Civil and Environmental Engineering), Wei (Civil and Environmental Engineering). See also ECT Faculty (<https://>

engineering.wisc.edu/departments/civil-environmental-engineering/research/environmental-chemistry-technology/).