

# GEOLOGICAL ENGINEERING, PH.D.

The graduate program offers training leading to the master of science and the doctor of philosophy degrees in geological engineering. Geological engineering is a rapidly growing field of study that integrates the two disciplines of geology and engineering. Geological engineers help find the best ways to use the earth's resources for solving technical problems while protecting the environment. The need for graduate education in geological engineering has been brought about by modern developments and activities in science and industry that have an impact on earth materials including soil, rock, water, and air. The area of study combines research and application methodologies of geology and of several engineering disciplines to address engineering problems in which the geologic nature of a site or geologic processes constitute major design objectives or constraints.

Emphasis in the program is on development of the student's ability to originate and perform analytical, numerical, and/or laboratory analysis techniques to address new and challenging earth-related problems associated with modern land-use practices, earthen construction, energy and mineral extraction, and environmental pollution control and remediation. The program is expected to be of interest to students in engineering (particularly mining, civil, environmental, and mechanical) and physical sciences (particularly geology, geophysics, and geography). Students select their research topics from such areas as geotechnical and geo-environmental engineering, applied geophysics, hydrology and hydrogeology, numerical modeling of rock masses, remote sensing, rock mechanics, and soil and rock engineering.

Modern facilities include soil and rock mechanics laboratories; drilling equipment and instrumentation for rock and soil mechanics field testing; and soils, geosynthetics, and geo-environmental laboratories. Research assistantships, teaching assistantships, and fellowships are available to qualified applicants either upon admission or one to two semesters after entering the program.

## ADMISSIONS

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 Record Examinations)	Not required.

English Proficiency Test Every applicant whose native language is not English or whose undergraduate instruction was not in English must provide an English proficiency test score and meet the Graduate School minimum requirements (<https://grad.wisc.edu/apply/requirements/#english-proficiency>).

Other Test(s) (e.g., GMAT, MCAT) n/a

Letters of Recommendation Required 3

All applicants must meet the Graduate School's admission requirements (<http://grad.wisc.edu/admissions/requirements/>) to be considered for admission. The application deadline for fall term is December 15; the application deadline for spring term is September 1st.

In addition, applicants must also meet the department's more stringent admission 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) is required for domestic applicants. A strong academic performance comparable to an average of B or above grades for all undergraduate course work is required for international applicants.
- **Degree:** A bachelor's degree from an ABET-accredited engineering program or from a recognized international institution is preferred or bachelor's degree in physical sciences. Admission to the program requires approval of the admissions committee.
- 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 Form and application fee:** Applicants must submit an online application to the UW-Madison Graduate School. See Graduate School Admissions (<http://grad.wisc.edu/admissions/requirements/>) to apply.
  - **Statement of purpose:** A statement of purpose for graduate study must be submitted through an applicant's online UW-Madison Graduate School application. Please limit this important document to 1,000 words.
  - **Letters of recommendation:** Three letters of recommendation must be submitted through an applicant's online UW-Madison Graduate School application.
  - **Transcripts:** Upload the most recent copies of your transcripts to the electronic application, from each institution attended. Study abroad transcripts are not required if coursework is reflected on the degree granting university's transcript. If the application is recommended for admission then we will follow-up with instructions for official transcript submission.
  - **English proficiency scores:** 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. See Graduate School Admission Requirements (<http://grad.wisc.edu/admissions/requirements/>) for more information on the English proficiency requirement.
- TOEFL scores may be sent to institution code 1846 from ETS.

## 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
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Minimum Residence Credit Requirement	32 credits
Minimum Graduate Coursework Requirement	26 credits must be graduate-level coursework. Details can be found in the Graduate School's Minimum Graduate Coursework (50%) policy ( <a href="https://policy.wisc.edu/library/UW-1244">https://policy.wisc.edu/library/UW-1244</a> ( <a href="https://policy.wisc.edu/library/UW-1244/">https://policy.wisc.edu/library/UW-1244/</a> )).
Overall Graduate GPA Requirement	3.00 GPA required. This program follows the Graduate School's GPA Requirement policy ( <a href="https://policy.wisc.edu/library/UW-1203">https://policy.wisc.edu/library/UW-1203</a> ( <a href="https://policy.wisc.edu/library/UW-1203/">https://policy.wisc.edu/library/UW-1203/</a> )).
Other Grade Requirements	n/a
Assessments and Examinations	<p>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.</p> <p>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 Ph.D minor/certificate.</p> <p>Deposit of the doctoral dissertation in the Graduate School is required.</p>
Language Requirements	No language requirements.
Graduate School Breadth Requirement	Doctoral students must complete a doctoral minor or graduate/professional certificate. Students will discuss minor (Option A, External or Option B, Distributed) and certificate (Option C) 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

The academic program for each doctoral student is planned on an individual basis with their advisor.

Basic requirements for a Ph.D. degree in geological engineering include: (1) Ph.D. major coursework; (2) qualifying examination; (3) Ph.D. minor/breadth coursework; (4) preliminary examination; (5) dissertation research; and (6) final oral examination (dissertation defense).

The Graduate School minimum Ph.D. credit requirement is 51 credits. 32 credits and the breadth requirement must be completed prior to achieving dissertator status (for students who have earned an M.S. degree, credits accumulated for the M.S. can be applied toward this requirement). All graduate students (including PhD dissertation students) must register for G L E 900 Seminar once per academic year.

## 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 Work from Other Institutions

This program follows the Graduate School's policy for Satisfying Requirements with Prior Graduate Coursework from Other Institutions. (<https://policy.wisc.edu/library/UW-1216/>)

##### UW–Madison Undergraduate

This program follows the Graduate School's policy for Satisfying Requirements with Coursework from Undergraduate Career at UW–Madison. (<https://policy.wisc.edu/library/UW-1216/>)

##### UW–Madison University Special

This program follows the Graduate School's policy for Transfer from UW–Madison University Special Student Career at UW–Madison. (<https://policy.wisc.edu/library/UW-1216/>)

#### PROBATION

This program follows the Graduate School's Probation policy. (<https://policy.wisc.edu/library/UW-1217/>)

#### ADVISOR / COMMITTEE

This program follows the Graduate School's Advisor policy (<https://policy.wisc.edu/library/UW-1232/>) and the Graduate School's Committees policy (<https://policy.wisc.edu/library/UW-1201/>).

#### CREDITS PER TERM ALLOWED

15 credits

#### TIME LIMITS

This program follows the Graduate School's Time Limits policy. (<https://policy.wisc.edu/library/UW-1221/>)

A candidate for a doctoral degree who fails to take the final oral examination and deposit the dissertation within five years after passing the preliminary examination may be required to take another preliminary examination and to be admitted to candidacy a second time.

#### 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/>)

- Dean of Students Office (<https://doso.students.wisc.edu/>) (for all students to seek grievance assistance and support)
- 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 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)

#### 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 Advisors: the Director of Graduate Studies or the GLE Program Director (see contact box) to discuss the grievance.

If the student prefers to talk with someone outside of the GLE program, contact:

CoE Assistant Dean for Graduate Affairs.

The Assistant Dean for Graduate Affairs ([enr-dean-graduateaffairs@enr.wisc.edu](mailto:enr-dean-graduateaffairs@enr.wisc.edu)) provides overall leadership for graduate education in the College of Engineering (CoE), 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.
- 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

## 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

1. Demonstrate an ability to synthesize knowledge from a subset of the biological, physical, and social sciences to help frame problems critical to the future of their discipline.
2. Conduct original research.
3. Demonstrate an ability to create new knowledge and communicate it to their peers.
4. Fosters ethical and professional conduct.

## PEOPLE

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

**Geological Engineering Faculty:** 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/>).