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). Please consult the table below for key information about this degree program's admissions requirements (https://grad.wisc.edu/apply/requirements/requirements/) to apply.

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Deadline</td>
<td>December 15</td>
</tr>
<tr>
<td>Spring Deadline</td>
<td>October 1</td>
</tr>
<tr>
<td>Summer Deadline</td>
<td>December 15</td>
</tr>
<tr>
<td>GRE (Graduate Record Examinations)</td>
<td>Required.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>English Proficiency Test</td>
<td>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 (<a href="https://grad.wisc.edu/apply/requirements/#english-proficiency">https://grad.wisc.edu/apply/requirements/#english-proficiency</a>).</td>
</tr>
<tr>
<td>Other Test(s) (e.g., GMAT, MCAT)</td>
<td>n/a</td>
</tr>
<tr>
<td>Letters of Recommendation Required</td>
<td>3</td>
</tr>
</tbody>
</table>

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 October 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.
  - Graduate Record Examination (GRE) Scores: Graduate Record Examination (GRE) General Test scores are required for most applicants.
  - 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.
• GRE and 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/](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/policiesandrequirementstext](http://guide.wisc.edu/graduate/policiesandrequirementstext)), in addition to the program requirements listed below.

**Major Requirements**

**Mode of Instruction**

<table>
<thead>
<tr>
<th>Face to Face</th>
<th>Evening/Weekend</th>
<th>Online</th>
<th>Hybrid</th>
<th>Accelerated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

**Mode of Instruction Definitions**

- **Evening/Weekend:** These programs are offered in an evening and/or weekend format to accommodate working schedules. Enjoy the advantages of on-campus courses and personal connections, while keeping your day job. For more information about the meeting schedule of a specific program, contact the program.

- **Online:** These programs are offered primarily online. Many available online programs can be completed almost entirely online with all online programs offering at least 50 percent of the program work online. Some online programs have an on-campus component that is often designed to accommodate working schedules. Take advantage of the convenience of online learning while participating in a rich, interactive learning environment. For more information about the online nature of a specific program, contact the program.

- **Hybrid:** These programs have innovative curricula that combine on-campus and online formats. Most hybrid programs are completed on-campus with a partial or completely online semester. For more information about the hybrid schedule of a specific program, contact the program.

- **Accelerated:** These on-campus programs are offered in an accelerated format that allows you to complete your program in a condensed time-frame. Enjoy the advantages of on-campus courses with minimal disruption to your career. For more information about the accelerated nature of a specific program, contact the program.

**Curricular Requirements**

<table>
<thead>
<tr>
<th>Requirements Detail</th>
<th>Minimum Credit Requirement</th>
<th>Minimum Residence Credit Requirement</th>
<th>Minimum Graduate Coursework Requirement</th>
<th>Overall Graduate GPA Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>51 credits</td>
<td>32 credits</td>
<td>Half of degree coursework (26 credits out of 51 total credits) must be completed graduate-level coursework; courses with the Graduate Level Coursework attribute are identified and searchable in the university’s Course Guide.</td>
<td>3.00 GPA required.</td>
</tr>
</tbody>
</table>

**Other Grade Requirements**

The Graduate School requires an average grade of B or better in all coursework (300 or above, not including research credits) taken as a graduate student unless conditions for probationary status require higher grades. Grades of Incomplete are considered to be unsatisfactory if they are not removed during the next enrolled semester.

**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 Ph.D minor.

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

**Language Requirements**

All doctoral students are required to complete a minor. Selection of an Option A minor requires the approval of the minor department/program. Selection of an Option B minor requires the approval of the advisor, Mentor Committee, and the GLE Graduate Committee Chair.

**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 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 doctoral minor requirement must be completed prior to achieving dissertation status (for students who have earned an M.S. degree, credits accumulated for the M.S. can be applied toward this...
To ensure that students are making satisfactory progress toward a degree, the Graduate School expects them to meet with their advisor on a regular basis.

A committee often accomplishes advising for the students in the early stages of their studies.

**CREDITS PER TERM ALLOWED**

15 credits

**TIME CONSTRAINTS**

Doctoral degree students who have been absent for ten or more consecutive years lose all credits that they have earned before their absence. Individual programs may count the coursework students completed prior to their absence for meeting program requirements; that coursework may not count toward Graduate School credit requirements.

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 by require 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://employeedisabilities.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)

Students should contact the department chair or program director with questions about grievances.
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, Bahia, Cramer, Hanna, Harrington, Hurley, Likos, Loheide, McMahon, Noguera, Noyce, Park, Parra-Montesinos, Ran, Russell, Schauer, Wu; Associate Professors Block, Fratta, Ginder-Vogel, Pincheira, Remucal, Tinjum; Assistant Professors Blum, Hampton, Hicks, Prabhadhakar, Pujara, Qin, Sone, Wang, Wei, Wright, 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), Holloway (Nelson Institute), Likos (Civil and Environmental Engineering), Loheide (Civil and Environmental Engineering), Thurber (Geoscience), Tikoff (Geoscience), Wu (Civil and Environmental Engineering); Associate Professors Cardiff (Geoscience), Fratta (Civil and Environmental Engineering); Assistant Professors Hampton (Civil and Environmental Engineering), Sone (Civil and Environmental Engineering), Zoet (Geoscience); Professor of Practice Pakes (Grainger). See also GLE faculty (https://www.engr.wisc.edu/geological-engineering/people/).

Environmental Chemistry and Technology: Professors Hurley (director) (Civil and Environmental Engineering), Bertram (Chemistry), Bleam (Soil Science), Harrington (Civil and Environmental Engineering), Karthikeyan (Biological Systems Engineering), McMahon (Civil and Environmental Engineering/Bacteriology), Pedersen (Soil Science), Roden (Geoscience), Root (Chemical and Biological Engineering), Schauer (Civil and Environmental Engineering), Thompson (Biological Systems Engineering); Associate Professors Ginder-Vogel (Civil and Environmental Engineering), Remucal (Civil and Environmental Engineering); Assistant Professors Anantharaman (Bacteriology), Qin, (Civil and Environmental Engineering), Wei (Civil and Environmental Engineering), Whitman (Soil Science). See also ECT Faculty (https://www.engr.wisc.edu/academics/graduate-academics/environmental-chemistry-technology/).