

# GEOLOGICAL ENGINEERING, MS

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

### 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 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: <a href="https://policy.wisc.edu/library/UW-1241">https://policy.wisc.edu/library/UW-1241</a> ( <a href="https://policy.wisc.edu/library/UW-1241/">https://policy.wisc.edu/library/UW-1241/</a> ).
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 program if space is still available. To check if space is available, please email: [glegradadmission@engr.wisc.edu](mailto:glegradadmission@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 preferred or bachelor's degree in physical sciences. Admission to the program requires approval of the admissions committee.

#### 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://engineering.wisc.edu/departments/civil-environmental-engineering/research/geological-engineering/>). Please contact interested faculty before or after you have applied to inquire about assistantship opportunities. Funding is not guaranteed with admission.

### 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 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

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### 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      30 credits  
Credit  
Requirement

Minimum Residence Credit Requirement	16 credits
Minimum Graduate Coursework Requirement	Thesis Pathway: 16 credits must be graduate-level coursework.  Independent Study Pathway: 21 credits must be graduate-level coursework.
Overall Graduate GPA Requirement	3.00 GPA required. Refer to the Graduate School: Grade Point Average (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	Thesis pathway: A faculty committee will conduct a final examination on the thesis research.  Independent Study pathway: A written report must be prepared based on the independent study project.
Language Requirements	None.

## REQUIRED COURSES

MS degree candidates may choose from two options for their program of study:

### Thesis Pathway<sup>1</sup>

Code	Title	Credits
<b>Seminar</b>		<b>2</b>
All graduate students (including PhD dissertation students) must register for G L E 900 Seminar once per academic year.		
G L E 900	Seminar	
<b>Graduate-Level Coursework</b>		<b>16</b>
In consultation with advisor, students must complete at least 16 credits of graduate-level coursework (numbered 300 and higher).		
<b>Research or Thesis</b>		<b>6</b>
G L E 790	Master's Research or Thesis	
<b>Additional Coursework</b>		<b>6</b>
In consultation with advisor, complete coursework to reach the minimum of 30 credit requirement.		
<b>Total Credits</b>		<b>30</b>

### Independent Study Pathway<sup>1</sup>

Code	Title	Credits
<b>Seminar</b>		<b>2</b>
All graduate students (including PhD dissertation students) must register for G L E 900 Seminar once per academic year.		

G L E 900	Seminar	
<b>Graduate-Level Coursework</b>		<b>21</b>
In consultation with advisor, students must complete at least 21 credits of graduate-level coursework (numbered 300 and higher).		
<b>Independent Work</b>		<b>3</b>
A written report must be prepared based on the independent study project.		
G L E 999	Independent Work	
<b>Additional Coursework</b>		<b>4</b>
In consultation with advisor, complete coursework to reach the minimum of 30 credit requirement.		
<b>Total Credits</b>		<b>30</b>

<sup>1</sup> These pathways are internal to the program and represent different curricular paths a student can follow to earn this degree. Pathway names do not appear in the Graduate School admissions application, and they will not appear on the transcript.

## 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, the Geological Engineering program may decide to transfer up to seven credits from another institution or in coursework 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 taken in coursework 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://employeeabilities.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)

Students should contact the department chair or program director with questions about grievances.

## 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 Geological Engineering Program Director (see contact box) to discuss the grievance.

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

**Joanna Gurstelle**, College of Engineering 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, 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 a strong understanding of mathematical, scientific, and engineering principles in the field.
2. Demonstrate an ability to formulate, analyze, and solve advanced engineering problems.
3. Demonstrate creative, independent problem solving skills.
4. Apply the latest scientific and technological advancements, advanced techniques, and modern engineering tools to these problems.
5. Recognize and apply principles of ethical and professional conduct.

## 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.engr.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/>).