

# GEOLOGY AND GEOPHYSICS, BS

The Geology and Geophysics major offers unusual opportunities to integrate knowledge and technology from chemistry, biology, physics, engineering, space science, and other disciplines to understand processes that have shaped the Earth, its environments, and the life that it has sustained over billions of years. Geoscientists provide insight on surface and groundwater resources and how to protect and preserve them. They probe the causes and potential risks associated with natural hazards including earthquakes, volcanoes, floods, hurricanes, landslides, climate change, and sea level rise. Sustainable exploration and extraction of key mineral resources needed to build and power a resilient and green society depends on well-trained geoscientists. To explore Earth history, develop materials and energy resources, and to take the pulse of a dynamic planet, geoscientists use an extraordinary array of tools, including satellites to measure changes of Earth's surface, sensitive instruments to detect seismic waves for exploring resources underground, cutting-edge instrumentation to measure the composition of minerals and rocks at microscopic scales, and computational approaches to assemble and interrogate enormous sets of data acquired from rocks and fossils across the globe.

Geology students have a strong interest in the natural environment as it is today and as it has developed over the past 4.5 billion years. The Department of Geoscience challenges students to develop skills in sequential thought, inductive reasoning, and three-dimensional perception. Moreover, students who concentrate in geophysics learn basic physical laws and processes involving gravity, magnetism, heat flow, and seismic wave propagation within Earth. Opportunities also include learning how satellite-based measurements, and computational approaches, are used to measure and monitor geothermal resources, volcanic activity, earthquakes, and groundwater movement.

Geology and Geophysics students prepare for careers in hydrogeology, energy, mining, engineering, and education. Students are exceptionally well-prepared for graduate studies in a broad array of geoscience fields.

## HOW TO GET IN

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Requirements	Details
How to get in	No application required. All students who meet the requirements listed below are eligible to declare. For information on how to declare, visit Advising & Careers.
Courses required to get in	None
GPA requirements to get in	None
Credits required to get in	None
Other	None

Students declared in the Geology and Geophysics cannot also declare the Geoscience certificate.

## REQUIREMENTS

### UNIVERSITY REQUIREMENTS

All undergraduate students must complete both the following Core General Education (Core GenEd) and University Degree and Quality of Work requirements. The requirements below apply to students whose first term at UW-Madison or whose earliest post-high school college attendance at any institution is Summer 2026 or later.

Students whose first term at UW-Madison or whose earliest post-high school college attendance at any institution occurred before Summer 2026 should refer to the archived Guide (<https://guide.wisc.edu/archive/>) for the requirements that apply to them.

### CORE GENERAL EDUCATION (CORE GENED) REQUIREMENTS

Civics & Perspectives	3 credits of Civics & Perspectives coursework.
Communication & Literacy	6 credits of Communication & Literacy coursework. This requirement may be partially satisfied by a qualifying placement test score. More information: <a href="https://go.wisc.edu/qualifyingenglishplacement">https://go.wisc.edu/qualifyingenglishplacement</a> ( <a href="https://go.wisc.edu/qualifyingenglishplacement/">https://go.wisc.edu/qualifyingenglishplacement/</a> )
Humanities & Arts	6 credits of Humanities & Arts coursework.
Mathematics & Quantitative Reasoning	6 credits of Mathematics & Quantitative Reasoning coursework. This requirement may be partially satisfied by a qualifying placement test score. More information: <a href="https://go.wisc.edu/qualifyingmathplacement">https://go.wisc.edu/qualifyingmathplacement</a> ( <a href="https://go.wisc.edu/qualifyingmathplacement/">https://go.wisc.edu/qualifyingmathplacement/</a> )
Natural Science & Wellness	Complete both: <ul style="list-style-type: none"> <li>6 credits of Natural Science &amp; Wellness or Natural Science &amp; Wellness + Laboratory coursework.</li> <li>one course must be in Natural Science &amp; Wellness + Laboratory coursework.</li> </ul>
Social & Behavioral Science	3 credits of Social & Behavioral Science coursework.
Total Credits	30 credits.

For more information see the policy (<https://policy.wisc.edu/library/UW-1095/>).

### UNIVERSITY DEGREE AND QUALITY OF WORK REQUIREMENTS

All undergraduate degree recipients must complete the following minimum requirements. Requirements for some programs will exceed these requirements; see program requirements for additional information.

Total Degree	120 degree credits.
Residency	Complete 30 credits in residence. A course is considered "in residence" if it is taken when in undergraduate degree-seeking status and: <ul style="list-style-type: none"> <li>• is offered by UW-Madison and completed on the UW-Madison campus or at an approved off-site location, or</li> <li>• is offered by UW-Madison in an online or distance format, or is completed during participation in a UW-Madison study abroad/study away program.</li> </ul>
Quality of Work	Achieve at least the minimum grade point average specified by the school, college, and/or academic program.
Math	Demonstrate minimal mathematics competence by: <ul style="list-style-type: none"> <li>• placing above MATH#160;96, or</li> <li>• successfully completing MATH#160;96, or</li> <li>• successfully completing a more advanced mathematics course such as MATH#160;112, MATH#160;113, MATH#160;114, MATH#160;141, MATH#160;211, or MATH#160;221.</li> </ul>
English Language	If required to take the UW-Madison English as a Second Language Assessment Test (MSN-ESLAT), demonstrate minimal English language competence by: <ul style="list-style-type: none"> <li>• earning credit for ESL#160;118, or</li> <li>• achieving a qualifying MSN-ESLAT placement test score.</li> </ul>

Language	Complete one: <ul style="list-style-type: none"> <li>• 2 high school units of a single language other than English, or</li> <li>• one course with the second semester Language designation.</li> </ul>
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Major Declaration Declare and complete the requirements for at least one major.

## COLLEGE OF LETTERS & SCIENCE DEGREE REQUIREMENTS: BACHELOR OF SCIENCE (BS)

Students pursuing a Bachelor of Science degree in the College of Letters & Science must complete all of the requirements below. Some courses satisfy more than one L&S degree requirement (visit College of Letters & Science: Requirements (<https://guide.wisc.edu/undergraduate/letters-science/#requirementstext>) for details).

This major can be paired with either the Bachelor of Arts or the Bachelor of Science degree requirements.

### BACHELOR OF SCIENCE DEGREE REQUIREMENTS

Communication	Complete both: <ul style="list-style-type: none"> <li>• Part A: one course with the Communication A designation or eligible UW Placement Score; and</li> <li>• Part B: one course with the Communication B designation</li> </ul>
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Quantitative Reasoning	Complete both: <ul style="list-style-type: none"> <li>• Part A: one course with the Quantitative Reasoning A designation or eligible UW Placement Score; and</li> <li>• Part B: one course with the Quantitative Reasoning B designation</li> </ul>
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Ethnic Studies	one 3+ credit course with the Ethnic Studies designation
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Language	the third unit of a language other than English
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Mathematics	Complete two courses of 3+ credits at the Intermediate or Advanced level in MATH, COMP SCI, or STAT subjects. A maximum of one course in each of COMP SCI and STAT subjects counts toward this requirement.
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L&S Breadth: Humanities	Complete 12 credits with the Humanities or Literature designation, which must include at least 6 credits with the Literature designation.
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L&S Breadth: Social Sciences	Complete 12 credits with the Social Science designation.
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L&S Breadth: Natural Sciences	Complete 12 credits, which must include both: <ul style="list-style-type: none"> <li>• 6 credits with the Biological Science designation, and</li> <li>• 6 credits with the Physical Science designation.</li> </ul>
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Liberal Arts and Science (LAS) Coursework	at least 108 credits
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Depth of Intermediate/Advanced Coursework	at least 60 credits at the Intermediate or Advanced level
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Major	Declare and complete at least one major.
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Total Credits	at least 120 credits
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UW-Madison Experience	<ul style="list-style-type: none"> <li>• 30 credits in residence, overall, and</li> <li>• 30 credits in residence after the 86th credit</li> </ul>
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Quality of Work	<ul style="list-style-type: none"> <li>• 2.000 in all coursework at UW-Madison</li> <li>• 2.000 in Intermediate/Advanced level coursework at UW-Madison</li> </ul>
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### NON-L&S STUDENTS PURSUING AN L&S MAJOR

Non-L&S students who have permission from their School/College to pursue an additional major within L&S only need to fulfill the major requirements. They do not need to complete the L&S Degree Requirements above.

### REQUIREMENTS FOR THE MAJOR

Prospective majors are strongly encouraged to seek assistance from a faculty advisor in order to choose courses appropriate to their interests and career plans. Advisors can also assist students in choosing a pathway that is appropriate for their interests and career goals.

### BACKGROUND REQUIREMENTS

Code	Title	Credits
	<b>Calculus</b>	
	Complete sequence:	9

MATH 221 & MATH 222	Calculus and Analytic Geometry 1 and Calculus and Analytic Geometry 2
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### Chemistry

Complete one sequence: 5-10

CHEM 109	Advanced General Chemistry
CHEM 103 & CHEM 104	General Chemistry I and General Chemistry II
CHEM 115 & CHEM 116	Chemical Principles I and Chemical Principles II

### Physics

#### First Introductory Course

Complete one of the following: 5-6

PHYSICS 207	General Physics
or PHYSICS 201	General Physics
or PHYSICS 247A	Modern Introduction to Physics
E M A 201 & E M A 202	Statics and Dynamics

#### Second Introductory Course

Complete one of the following: 5

PHYSICS 208	General Physics
or PHYSICS 202	General Physics
or PHYSICS 248A	Modern Introduction to Physics

**Total Credits** 24-30

## GEOLOGY & GEOPHYSICS CORE COURSEWORK

Code	Title	Credits
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### Core

Complete all of the following:

GEOSCI 100	Introductory Geology: How the Earth Works	3
or GEOSCI/ ENVIR ST 106	Environmental Geology	
GEOSCI 202	Introduction to Geologic Structures	4
GEOSCI 204	Geologic Evolution of the Earth	4
GEOSCI/G L E 360	Principles of Mineralogy	3
GEOSCI/G L E 370	Elementary Petrology	3

### Advanced Breadth

Complete one: 3-4

GEOSCI/ G L E 350	Introduction to Geophysics: The Dynamic Earth
GEOSCI 375	Principles of Geochemistry
GEOSCI 430	Sedimentology and Stratigraphy <sup>1</sup>
GEOSCI/ G L E 455	Structural Geology

**Total Credits** 20-21

<sup>1</sup> GEOSCI 430 (<https://guide.wisc.edu/?P=GEOSCI%20430>) may be taken to satisfy both Advanced Breadth and Communication requirement, but the credit will only count once towards total credits needed to complete the major.

## GEOLOGY & GEOPHYSICS COMMUNICATION REQUIREMENT

Code	Title	Credits
Complete one of the following:		
GEOSCI 402	Research and Communication in the Geological Sciences	3
GEOSCI/ATM OCN/ ENVIR ST/ GEOG 335	Climatic Environments of the Past	3
GEOSCI 430	Sedimentology and Stratigraphy <sup>1</sup>	3
GEOSCI 610	Geochronology, Timescales, and Rates of Geologic Processes	3
GEOSCI/G L E 629	Contaminant Hydrogeology	3
INTEREGR 397	Engineering Communication	3

<sup>1</sup> GEOSCI 430 (<https://guide.wisc.edu/?P=GEOSCI%20430>) may be taken to satisfy both Advanced Breadth and Communication requirement, but the credit will only count once towards total credits needed to complete the major.

## GEOLOGY & GEOPHYSICS MAJOR ELECTIVES

Complete additional upper-level coursework to reach a minimum of 34 credits in the major. GEOSCI courses numbered 300-692, except GEOSCI 331, are considered upper-level. Complete additional upper-level coursework to reach a minimum of 34 credits in the major.

## RESIDENCE AND QUALITY OF WORK

- 2.000 GPA in all GEOSCI and major courses
- 2.000 on 15 upper-level major credits, taken in residence <sup>1</sup>
- 15 credits in GEOSCI, taken on campus

<sup>1</sup> GEOSCI 300-699, excluding GEOSCI 331, are considered Upper Level in the Major

## HONORS IN THE MAJOR

Students may declare Honors in the Geology and Geophysics Major in consultation with the departmental undergraduate advisor.

## HONORS IN THE MAJOR: GEOLOGY AND GEOPHYSICS: REQUIREMENTS

To earn Honors in the Geology and Geophysics Major, students must satisfy both the requirements for the major (above) and the following additional requirements:

- Earn a 3.300 University GPA
- Earn a 3.400 GPA in all GEOSCI and major courses
- Complete GEOSCI 681 and GEOSCI 682, for a total of 6 credits, with a grade of B or better.

## LEARNING OUTCOMES

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1. Acquire a working knowledge of Earth history and the evidence used to constrain that history.
2. Explain how various Earth systems operate and describe the basis for that understanding. Earth systems include the lithosphere, hydrosphere, cryosphere, biosphere, and atmosphere.
3. Apply field/lab-based methods, spatial reasoning skills, temporal reasoning skills, and/or quantitative approaches to solve problems in geoscience.
4. Analyze geological, biological, chemical, and/or physical information to understand Earth processes and the rates of those processes.
5. Read the scientific literature and understand the employed methods, results, and emergent interpretations.
6. Communicate scientific data, concepts, and models effectively.

## FOUR-YEAR PLAN

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This Four-Year Plan is only one way a student may complete an L&S degree with this major. Many factors can affect student degree planning, including placement scores, credit for transferred courses, credits earned by examination, and individual scholarly interests. In addition, many students have commitments (e.g., athletics, honors, research, student organizations, study abroad, work and volunteer experiences) that necessitate they adjust their plans accordingly. Informed students engage in their own unique Wisconsin Experience by consulting their academic advisors, Guide, DARS, and Course Search & Enroll for assistance making and adjusting their plan.

#### First Year

Fall	Credits Spring	Credits
MATH 221 (Quantitative Reasoning B)	5 MATH 222	4
CHEM 103	4 CHEM 104	5
GEOSCI 100 or 106	3 GEOSCI 204	4
Language	4 Comm A (take during first year)	3
	<b>16</b>	<b>16</b>

#### Second Year

Fall	Credits Spring	Credits
PHYSICS 207	5 PHYSICS 208	5
GEOSCI 202	4 GEOSCI/G L E 370	3
GEOSCI/G L E 360	3 Ethnic Studies (take within first 60 credits)	3
L&S Breadth	3 L&S Breadth	3
	<b>15</b>	<b>14</b>

#### Third Year

Fall	Credits Spring	Credits
GEOSCI Elective 300 level and above	4 GEOSCI Elective 300 level and above	3
GEOSCI Elective 300 level and above	4 GEOSCI Elective 300 level and above	3

L&S Breadth	3 L&S Breadth	3
L&S Breadth	4 L&S Breadth	3
	Elective	3
	<b>15</b>	<b>15</b>

#### Fourth Year

Fall	Credits Spring	Credits
GEOSCI elective 300 level and above	4 GEOSCI elective 300 level and above	4
GEOSCI elective 300 level and above	3 L&S Breadth	3
Comm B / GEOSCI 402	3 L&S Breadth	3
Elective	5 Elective	4
	<b>15</b>	<b>14</b>

**Total Credits 120**

## ADVISING AND CAREERS

### ADVISING AND CAREERS DECLARE OR CANCEL THIS MAJOR

Please follow the process described on the Geoscience website (<https://geoscience.wisc.edu/academics/undergraduate-program/>).

Any student interested in the Geology and Geophysics major should meet with the advisor or program manager to discuss steps to complete the necessary coursework for the major.

### CAREERS

More than half of all professional geologists and geophysicists work in hydrogeology, engineering geology, technical consulting, mining, or energy resource industries. The need for energy, environmental protection, and responsible land and resource management is expected to spur future demand for geoscientists. Geoscientists will be involved in discovering and developing next-generation energy and mineral resources (U.S. Bureau of Labor Statistics, November, 2022). Such careers involve an unusual breadth of training and personal adaptability, and the MS degree is generally required. About one-fifth of all geoscientists work in state and federal geological surveys or research activities. These positions largely involve problems in geologic mapping, mineral resources, groundwater, and engineering. Geophysics offers opportunities in earthquake studies, seismic verification of nuclear test bans, and rock characterization techniques for waste disposal and groundwater modeling. Many geology students continue on to obtain a PhD degree and become faculty members at colleges or universities. A geology and geophysics major is also appropriate for those interested in careers in elementary or secondary education, environmental policy, or environmental law. Faculty advisors can provide additional information on career opportunities.

### STUDY ABROAD

Learning in Letters & Science emphasizes discovery, growth, understanding different perspectives, and challenging yourself, which makes studying abroad an excellent fit for many L&S students: [studyabroad.wisc.edu](https://studyabroad.wisc.edu) (<https://studyabroad.wisc.edu/>)

As a university with global influence, we have more than 300 study abroad programs (<https://studyabroad.wisc.edu/programs/>) in over 80 countries. These vary in length, academic focus, teaching format, language requirements, cost, and level of independence. There are many programs to complement every major (<https://studyabroad.wisc.edu/>)

academics/major-advising-pages-maps/#L&S) and any year of college (including the final semester)—and all meet UW–Madison’s high academic standards. Students admitted into Letters & Science can even choose a short program in the summer before they start college or their whole first year: [studyabroad.wisc.edu/launch](http://studyabroad.wisc.edu/launch/) (<http://studyabroad.wisc.edu/launch/>). Talk with your academic advisor about how studying abroad might fit with your academic plan.

## SUCCESSWORKS

SuccessWorks (<https://successworks.wisc.edu/>) at the College of Letters & Science helps you turn the academic skills learned in your classes into a fulfilling life, guiding you every step of the way to securing jobs, internships, or admission to graduate school.

Through one-on-one career advising, events, and resources, you can explore career options, build valuable internship and research experience, and connect with supportive alumni and employers who open doors of opportunity.

- What you can do with your major (<https://successworks.wisc.edu/what-you-can-do-with-your-major/>) (Major Skills & Outcomes Sheets)
- Make a career advising appointment (<https://successworks.wisc.edu/make-an-appointment/>)
- Learn about internships and internship funding (<https://successworks.wisc.edu/finding-a-job-or-internship/>)
- Try “Jobs, Internships, & How to Get Them,” (<https://successworks.wisc.edu/canvas/>) an interactive guide in Canvas for enrolled UW–Madison students