GEOSCIENCES, BS

Many students are already familiar with Geosciences through what is commonly called "earth science" in high school. Geosciences covers our Planet Earth - its soil, minerals, climate change, magnetic fields, earthquakes, water, plants, fossils, volcanoes and more.

Students can opt for either a Bachelor of Science degree (BS) or a Bachelor of Arts degree (BA) in geosciences.

The Bachelor of Science (BS) degree in Geosciences is designed to prepare students to become professional Earth scientists in a wide range of disciplines, as well as to enter graduate programs for further advanced training. The BS curriculum includes more science requirements than the BA and is designed for students who plan professional employment or advanced study in the geosciences. Graduates seek employment with environmental and water resource management; energy and mineral industries; and government agencies.

Geosciences majors at UWM can organize their electives around a particular area of interest if they wish:

- Hard Rock - the study of structural geology, mineralogy, petrology, volcanology and tectonics
- Hydrogeology - the study of water resources
- Paleontology - the study of evolutionary patterns in history
- Sedimentary Geology - the study of rocks, fossils, and the biological and chemical make-up of landforms

Geosciences touches on all aspects of the other natural sciences including chemistry, biology, mathematics and physics, so the ideal student for Geosciences loves all types of science and is curious about how they interrelate. Many Geosciences students also love the outdoors and traveling off of the beaten path.

Required outdoor field work prepares students for jobs with environmental and water resource management; energy and mineral industries; and government agencies.

UWM students often participate in research abroad in places as diverse as Iceland, Turkey, South America, Spain, and New Zealand. Others gain hands-on experience in the dirt of Montana, the hills of South Dakota or the volcanoes of Hawaii.

Requirements

Code	Title	Credits
General Education Requirements		30
L&S Requirements (general and major requirements)		105-115
Total Credits		**135-145**

Credit numbers reflect total possible credits towards degree. Due to the ability to count courses towards more than one requirement, credit amounts will vary. Please work with your academic advisor on your plan of study.

Preparatory Coursework

Based on individual placement results, some students may be required to complete preparatory coursework before enrolling in the courses listed here. This may include English language or composition preparation, developmental math, introductory chemistry, and/or student support courses for students participating in the First Year Bridge program.

General Education Requirements (GER)

UW-Milwaukee has General Education Requirements (https://catalog.uwm.edu/policies/undergraduate-policies/#generaleducationtext) that must be met in order to earn a bachelor's or associate degree. They include at minimum 30 credits (10 courses) in six categories that are designed to assure basic student competencies and provide a broad body of knowledge as a context for specialization.

Some degree requirements may fulfill GERs. Please review the requirements and consult with your academic advisor.

Code	Title	Credits
General Education Categories and Credits		
Civics and Perspectives (CP)		6
Communication and Literacy (CL)		6
Humanities and Arts (HA)		6
Mathematics and Quantitative Reasoning (MQR)		3
Natural Science and Wellness (NSW/NSWL)		6
Social and Behavioral Science (SBS)		3
Total Credits		**30**

Letters and Science Course of Study – Bachelor of Science Degree

Complete 120 credits including 75 credits in the College of Letters & Science, with 36 of the 75 credits in L&S upper-level (numbered 300 or above) courses and 30 of those 36 credits in designated L&S Advanced Natural Science courses (https://catalog.uwm.edu/letters-science/approved-courses-advanced-natural-science/).

The College requires that students complete, in residence at UWM, at least 15 credits in upper-division (numbered 300 or above) courses in their major. The College also requires that students complete at least 30 credits overall in residence at UWM. For additional residency and transfer credit limitations, see L&S Undergraduate Policies and Regulations (https://catalog.uwm.edu/letters-science/#policiesandregulationstext).

Students are also required to complete the University-wide General Education Requirements (https://catalog.uwm.edu/policies/undergraduate-policies/#bachelorsdegreegeneraleducation) and the specific L&S requirements listed below.

To complete a major, students must satisfy all the requirements of the major as stated in this catalog. Students who declare their majors within five years of entering the UW System as a degree candidate may satisfy the requirements outlined in any catalog issued since the time they entered. Credits used to satisfy the major also may be used to satisfy other degree requirements.

College of Letters & Science Requirements

The degree requirements in the College of Letters and Science build on the University General Education Requirements to provide a broad base of knowledge as well as an array of skills cited by employers as critical to professional success: critical thinking, problem solving, oral and written communication, ability to work well with others, and adaptability to change.

For the Bachelor of Science (B.S.), students must complete the UWM General Education Requirements as well as these L&S requirements: the International requirement, the Breadth requirement (with extra courses in Advanced Natural Science required), a Natural Science Lab

requirement, the Research requirement, and a Language other than English requirement. The International requirement develops student potential for cross-cultural understanding in a globalizing world. The Breadth requirement ensures that students take classes in a wide variety of subjects, across humanities, natural sciences, and social sciences. The Research requirement calls for students to build critical thinking and oral and written communication skills through conducting an independent research project in their major. The Language other than English requirement further develops student proficiency in a language other than English. And, the requirement that students take an L&S Natural Science lab ensures exposure to and practice with the scientific method in action.

I. Total Credits and Upper-Division Courses Requirement

Students must complete 120 credits including 75 credits in the College of Letters & Science with 36 of those 75 credits in L&S upper-level (numbered 300 and above) courses.

II. L&S Advanced Natural Sciences Requirement

For the Bachelor of Science, students must complete 30 credits of the 36 credits required in upper-division courses in designated L&S Advanced Natural Science courses (https://catalog.uwm.edu/letters-science/approved-courses-advanced-natural-science/).

III. Language other than English Requirement

Students doing the B.S. must fulfill a language other than English requirement by successfully completing the second semester of university work or equivalent in one language other than English (including all languages other than English and American Sign Language).

Language courses (including American Sign Language) other than English taken in high school may be used to satisfy all or part of this requirement. One year of high school language equates to one semester of college work. Proficiency tests approved by the Languages faculty may be used to satisfy all or part of this requirement.

IV. International Requirement

To meet the International Requirement, students must successfully complete some two-course (minimum 6 credits) combination of:

1. Courses with L&S approved international content (see Courses Approved for the L&S International Requirement (https://catalog.uwm.edu/letters-science/approved-courses-international-requirement/) for course options).
2. Any study-abroad course(s).

Students who graduated secondary school in a country other than the U.S. are exempt from this requirement.

IV. Breadth Requirement

In addition to completing the University General Education Requirements, L&S students must complete the Breadth requirement to obtain deeper experience across our three substantive divisions.

The L&S Breadth requirement calls for 9 credits each in L&S courses designated L&S Humanities, L&S Natural Sciences, and L&S Social Sciences breadth. One of the L&S Natural Science breadth courses must be a laboratory or fieldwork course.

Please refer to the list of Courses Approved for the L&S Breadth Requirement (https://catalog.uwm.edu/letters-science/breadth-requirement-course-list/).

V. The Major

The College requires that students attain at least a 2.0 GPA in all credits in the major attempted at UWM. In addition, students must attain a 2.0 GPA on all major credits attempted, including any transfer work. Individual departments or programs may require higher GPAs for graduation. Some departmental majors require courses from other departments. Students should contact their major department for information on whether those credits will count as part of the major GPA. The College requires that students must complete, in residence at UWM, at least 15 credits in upper-division (numbered 300 or above) courses in their major.

Research Requirement

Within their majors, students must complete a research experience approved by the L&S faculty. A list of courses satisfying the research requirement in each major can be found here (https://catalog.uwm.edu/letters-science/approved-courses-research-requirement/).

VI. The Minor

Students are encouraged to consider completing a minor, but it is not required. To complete a minor, the College of Letters and Science requires that students attain at least a 2.0 GPA in all credits in the minor attempted at UWM. In addition, students must attain a 2.0 GPA on all minor credits attempted, including any transfer work. The minor must contain at least 9 credits in upper-division (numbered 300 and above) courses at UWM.

Major Requirements

All students who major in Geosciences must complete at least 15 credits in Geosciences courses at the advanced level (numbered 300 or above) in residence at UWM as part of the 36 advanced-level credits required for the L&S degree. The College requires that students attain at least a 2.0 GPA on all credits in the major attempted at UWM. In addition, students must attain a 2.0 GPA on all major credits attempted, including any transfer work.

Code	Title	Credits
Required		
GEO SCI 100	Introduction to the Earth	3
GEO SCI 102	Evolution of the Earth	3
GEO SCI 301	Principles of Mineralogy	4
GEO SCI 302	Elementary Petrology	4
GEO SCI 316	Introduction to Geophysics	4
GEO SCI 414	Structural Geology (satisfies L&S research requirement)	4
GEO SCI 455	Field Geology (normally taken over the summer) [1]	4-8
GEO SCI 511	Stratigraphy and Sedimentation	4
Electives		
Select two (6 – 8 credits) of the following:		6-8
GEO SCI 400	Water Quality	
GEO SCI 409	Process Geomorphology	
GEO SCI 443	Glacial and Pleistocene Geology	
GEO SCI 463	Physical Hydrogeology	
GEO SCI 464	Chemical Hydrogeology	
GEO SCI 515	Physical Sedimentology	
GEO SCI 525	Terroir: Geology in a Glass	
GEO SCI 563	Field Methods in Hydrogeology	

CES 651	Principles of Stream Management and Restoration	
Select 10-12 additional credits from Geosciences Department courses at the 300 level or above, for a total of 18 elective credits.		10-12
Other Requirements		
Mathematics		
MATH 231	Calculus and Analytic Geometry I	4
Students are encouraged to take the following:		
MATH 232	Calculus and Analytic Geometry II	
MATH 233	Calculus and Analytic Geometry III	
MATH 234	Linear Algebra and Differential Equations	
Chemistry		
CHEM 102	General Chemistry	5
Students are encouraged to take the following course as well as courses in organic and inorganic chemistry:		
CHEM 104	General Chemistry and Qualitative Analysis	
Physics		
Select one of the following options:		5
Option 1:		
PHYSICS 120 & PHYSICS 121	General Physics I (Non-Calculus Treatment) and General Physics Laboratory I (Non-Calculus Treatment)	
Option 2:		
PHYSICS 209 & PHYSICS 214	Physics I (Calculus Treatment) and Lab Physics I (Calculus Treatment)	
Students are encouraged to take:		
PHYSICS 122 & PHYSICS 123	General Physics II (Non-Calculus Treatment) and General Physics Laboratory II (Non-Calculus Treatment)	
OR		
PHYSICS 210 & PHYSICS 215	Physics II (Calculus Treatment) and Lab Physics II (Calculus Treatment)	
Total Credits		**60-68**

[1] GEO SCI 455 is required but not offered at UWM. Students must enroll in a field course at another university to satisfy the requirement.

Students are advised strongly to increase their scholastic breadth by selecting courses from among several subdisciplines of the geosciences, in consultation with Geosciences Department faculty.

Students who are interested in general geology are encouraged to include courses from among the following:

Code	Title	Credits
GEO SCI 409	Process Geomorphology	4
GEO SCI 420	Methods in Paleomagnetism and Environmental Magnetism	3
GEO SCI 515	Physical Sedimentology	4
GEO SCI 520	Introduction to Paleontology	4
GEO SCI 545	X-Ray Analytical Methods	3
GEO SCI 614	Advanced Structural Geology	3
GEO SCI 635	Volcanology	3
GEO SCI 638	Advanced Igneous Petrology	3
Students are encouraged to consider topics offered under the following:		
GEO SCI 696	Topics in the Geological Sciences:	1-3
GEO SCI 697	Seminar in the Geological Sciences:	1-3

Students who are interested in environmental geology or hydrogeology are encouraged to include courses from among the following:

Code	Title	Credits
GEO SCI 400	Water Quality	4
GEO SCI 409	Process Geomorphology	4
GEO SCI 443	Glacial and Pleistocene Geology	4
GEO SCI 463	Physical Hydrogeology	4
GEO SCI 464	Chemical Hydrogeology	4
GEO SCI 545	X-Ray Analytical Methods	3
GEO SCI 562	Environmental Surface Hydrology	3
GEO SCI 563	Field Methods in Hydrogeology	4

Geosciences BS Learning Outcomes

Students graduating from the Geosciences BS program will be able to:

- recognize basic earth materials and geological processes.
- apply the scientific method to geological problems.
- communicate scientific findings both orally and in writing.
- apply field and laboratory skills to investigate geological questions.
- use quantitative skills for geologic research.

Letters & Science Advising

During your time at UWM, you may have multiple members of your success team, including advisors, peer mentors and success coaches. Letters & Science students typically work with at least two different types of advisors as they pursue their degrees: professional college advisors and faculty advisors. L&S college advisors advise across your entire degree program while departmental faculty advisors focus on the major.

College advisors are located in Holton Hall (or virtually for online students) and serve as your primary advisor. They are your point person for your questions about navigating college and completing your degree. College advisors will:

- Assist you in defining your academic and life goals.
- Help you create an educational plan that is consistent with those goals.
- Assist you in understanding curriculum, major and degree requirements for graduation, as well as university policies and procedures.
- Provide you with information about campus and community resources and refer you to those resources as appropriate.
- Monitor your progress toward graduation and completion of requirements.

Faculty advisors mentor students in the major and assist them in maximizing their development in the program. You will begin working with a faculty advisor when you declare your major. Faculty advisors are an important partner and will:

- Help you understand major requirements and course offerings in the department.
- Explain opportunities for internships and undergraduate research and guide you in obtaining those experiences.
- Serve as an excellent resource as you consider potential graduate programs and career paths in your field.

Students are encouraged to meet with both their college advisor and faculty advisor at least once each semester. Appointments are available in-person, by phone or by video.

Currently enrolled students should use the Navigate360 website (https://uwm.navigate.eab.com/) to make an appointment with your assigned advisor or call (414) 229-4654 if you do not currently have an assigned Letters & Science advisor. Prospective students who haven't enrolled in classes yet should call (414) 229-7711 or email let-sci@uwm.edu.

College of Letters and Science Dean's Honor List

GPA of 3.750 or above, earned on a full-time student's GPA on 12 or more graded credits in a given semester.

Honors College Degree and Honors College Degree with Distinction

Granted to graduating seniors who complete Honors College requirements, as listed in the Honors College (https://catalog.uwm.edu/honors-college/) section of this site.

Commencement Honors

Students with a cumulative GPA of 3.500 or above, based on a minimum of 40 graded UWM credits earned prior to the final semester, will receive all-university commencement honors and be awarded the traditional gold cord at the December or May Honors Convocation. Please note that for honors calculation, the GPA is **not** rounded and is truncated at the third decimal (e.g., 3.499).

Final Honors

Earned on a minimum of 60 graded UWM credits: Cum Laude - 3.500 or above; Magna Cum Laude - 3.650 or above; Summa Cum Laude - 3.800 or above.