

# 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.

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 allied 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 landforms in the context of the biological and chemical make-up

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. Most 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, Ireland, and New Zealand. Others gain hands-on experience in the dirt of Montana, the hills of South Dakota or the swamps of Florida.

## Course of Study – Bachelor of Science Degree

Complete 120 credits including 90 credits in the College of Letters & Science and with 36 of the 90 credits in L&S upper-level (numbered above 300) courses and 30 of those 36 credits in designated Advanced Natural Science courses (<https://uwm.edu/letters-science/advising/degree-requirements/advanced-natural-science-approved-courses-list/>). 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. Students are also required to complete University-wide General Education Requirements 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.

## University General Education Requirements (GER)

Code	Title	Credits
<b>Oral and Written Communication</b>		
<i>Part A</i>		
Achieve a grade of C or better in the following course:		
ENGLISH 102	College Writing and Research (or equivalent)	
<i>Part B</i>		
Course designated as OWC-B; may be completed through a major-specific course requirement		
<b>Quantitative Literacy</b>		
<i>Part A</i>		
Earn at least 3 credits with a grade of C or higher in one of the following courses or an equivalent course, or achieve a placement code of at least 30 on the mathematics placement test (or other appropriate test, as determined by the Mathematical Sciences Department)		
MATH 102	Mathematical Literacy for College Students II	
MATH 103	Contemporary Applications of Mathematics	
MATH 105	Introduction to College Algebra	
MATH 108	Algebraic Literacy II	
MATH 111	Introduction to Logic - Critical Reasoning <sup>1</sup>	
or PHILOS 111	Introduction to Logic - Critical Reasoning	
MATH 116	College Algebra	
Or equivalent course		
<i>Part B</i>		
Course designated as QL-B; may be completed through a major-specific course requirement		
<b>Arts</b>		
Select 3 credits		3
<b>Humanities</b>		
Select 6 credits		6
<b>Social Sciences</b>		
Select 6 credits		6
<b>Natural Sciences</b>		
Select 6 credits (At least two courses including one lab)		6
<b>UWM Foreign Language Requirement</b>		
Complete Foreign Language Requirement through:		
Two years (high school) of a single foreign language		
Two semesters (college) of a single foreign language		
Or equivalent		
<b>UWM Cultural Diversity Requirement</b>		
One course from the Arts, Humanities, or Social Sciences must also satisfy UWM's Cultural Diversity requirement		

<sup>1</sup> Math 111 and Philosophy 111 are jointly offered and count as repeats of one another. Students cannot receive credit for both courses.

## College of Letters & Science Requirements

### I. English Composition Requirement

Students must satisfy the English Composition Requirement with one of the following options:

- 1) Completing ENGLISH 102 with a grade of C or higher; or
- 2) placing beyond English 102 on the English Placement Test (EPT) (or other assessment as determined by the English Department); or
- 3) transferring a course of at least 2.5 equivalent credits from another institution that is equivalent to English 102, or a UWM higher-level expository writing course, with a grade of C or higher.

**Note:** This requirement is the same as the University General Education Requirement for Oral and Written Communication Part A. The College of Letters & Science does not have a specific requirement for a writing course beyond English 102, but students must complete the university-wide requirement for Oral and Written Communication Part B listed above.

### II. Mathematics and Formal Reasoning

To satisfy the Mathematics and Formal Reasoning Requirement, Bachelors of Sciences degree students must satisfy the following two requirements:

1. Complete one of the following courses or an equivalent course:

Code	Title	Credits
MATH 211	Survey in Calculus and Analytic Geometry I	4
MATH 213	Calculus with Life Sciences Applications	4
MATH 221	Honors Calculus I	5
MATH 231	Calculus and Analytic Geometry I	4

2. Complete one course (at least 3 credits) at the 200 level or above chosen from courses in Mathematics, PHILOS 211, or Letters and Science statistics courses:

Code	Title	Credits
Complete one of the following:		
3 or more credits in any 200-level or above Math course		
AFRIC 220	Introduction to Statistics in African and African Diaspora Studies	
ANTHRO 568	Introduction to Anthropological Statistics	
ATM SCI 500	Statistical Methods in Atmospheric Sciences	
BIO SCI 465	Biostatistics	
ECON 210	Economic Statistics	
GEOG 247	Quantitative Analysis in Geography	
HIST 595	The Quantitative Analysis of Historical Data	
MTHSTAT 215	Elementary Statistical Analysis	
PHILOS 211	Elementary Logic	
POL SCI 390	Political Data Analysis	
POL SCI 392	Survey Research	
PSYCH 210	Psychological Statistics	

SOCIOL 261	Introduction to Statistical Thinking in Sociology
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**Note:** This requirement is NOT the same as the University General Education Requirement for Quantitative Literacy Part B. To complete the BS, students must take one of the L&S approved courses. **Not all of the courses listed here will satisfy the QL-B requirement.**

### III. Foreign Language Requirement

Two courses (minimum of 6 credits) in a language (including American Sign Language) other than English at the 100 level or above are required.

Placement testing may be used to satisfy all or part of this requirement. 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.

Completion of the L&S Language Requirement also satisfies the university-wide Foreign Language GER, but not vice versa.

### IV. International Requirement

See Approved Courses for the L&S International Requirement (<http://catalog.uwm.edu/letters-science/approved-courses-international-requirement/>) for course options.

Code	Title	Credits
Completed in one of the following ways:		9
Complete 3 courses (min. 9 cr) in a single foreign language (not including literature-in-translation or American Sign Language) at the 3rd semester level and above		
Complete 3 non-language courses (min. 9 credits) with an international content chosen from at least 2 curricular areas.		
Complete 9 credits in combination of the two options above.		

### V. Breadth Requirement

Along with completing the University General Education Requirements of 3 credits in the Arts (A); 6 credits in the Humanities (HU), Social Sciences (SS), and Natural Sciences (NS/NS+); and a course with the Cultural Diversity (CD/+) designation, L&S students must complete the Breadth requirement.

Code	Title	Credits
<b>Arts</b>		
Select 3 credits		3
<b>Humanities</b>		
Complete 12 credits of L&S courses with Humanities Breadth designation; no more than 6 credits from a single subject area. *		12
<b>Social Sciences</b>		
Complete 12 credits of L&S Courses with Social Science Breadth designation; no more than 6 credits from a single curricular area. *		12
<b>Natural Sciences</b>		
Complete 12 credits of L&S Courses with Natural Sciences Breadth designation, including laboratory or field courses from three different curricular areas. *		12
<b>Cultural Diversity</b>		
Complete 3 credits in a course with Cultural Diversity (CD) designation. **		3

\* Students should check their course selections carefully with the list of approved L&S Breadth Courses (<http://catalog.uwm.edu/letters-science/breadth-requirement-course-list/>). Students are advised to select at least 6 credits worth of courses in each of the Humanities, Social Science, and Natural Sciences areas that can satisfy both the campus-wide General Education Requirements and the L&S Breadth requirement.

\*\* Students are advised to select a course that satisfies the Cultural Diversity requirement as well as a Humanities or Social Science breadth/GER requirement.

## VI. 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. Contact your 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 (<http://catalog.uwm.edu/letters-science/approved-courses-research-requirement/>).

## VII. The Minor

The College 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. Individual departments or programs may require higher GPAs for graduation.

## 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
<b>Required</b>		
GEO SCI 100	Introduction to the Earth	3
GEO SCI 102	Principles of Historical Geology	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) <sup>1</sup>	4-8
GEO SCI 511	Stratigraphy and Sedimentation	4
<b>Electives</b>		
Select two of the following:		8
GEO SCI 400	Water Quality	

GEO SCI 401	General Soil Science	
GEO SCI 409	Process Geomorphology	
GEO SCI 443	Glacial and Pleistocene Geology	
GEO SCI 463	Physical Hydrogeology	
GEO SCI 464	Chemical Hydrogeology	
GEO SCI 563	Field Methods in Hydrogeology	
Select 12 additional credits from Geosciences Department courses at the 300 level or above		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)	
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OR

PHYSICS 210 & PHYSICS 215	Physics II (Calculus Treatment) and Lab Physics II (Calculus Treatment)	
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Total Credits 64-68

<sup>1</sup> 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 515	Physical Sedimentology	4

GEO SCI 520	Introduction to Paleontology	4
GEO SCI 614	Advanced Structural Geology	3
GEO SCI 635	Volcanology	3
GEO SCI 636	Geochronology	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 401	General Soil Science	3
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 562	Environmental Surface Hydrology	3
GEO SCI 563	Field Methods in Hydrogeology	4

## Letters & Science Advising

The College of Letters and Science provides general academic advising for all students with a major in the College, particularly as it relates to campus' general education requirements and the College's degree requirements. We also provide specialized advising for pre-professional students (pre-med, pre-dental, pre-pharmacy, etc.) regardless if their major is in Letters and Science or not. Prospective students, including high school students and students seeking to transfer to a program in Letters and Science may also receive advising from our admissions counselors.

Upon admission, students are assigned an advisor in the College advising office. Academic advising is available Monday through Friday from 8:30 a.m. to 4:30 p.m. by appointment. Appointments outside of these times may be available and phone appointments are available for online students. The advising office (<https://uwm.edu/letters-science/advising/contact-advising/>) is located on the first floor of Holton Hall. Current students should call (414) 229-4654 to schedule an appointment or use the Navigate website (<https://uwmilwaukee.campus.eab.com>) to make an appointment with your assigned advisor; online scheduling is only available if you already have a Letters & Science advisor assigned to you. Prospective students should call (414) 229-7711 or email [let-sci@uwm.edu](mailto:let-sci@uwm.edu).

When students declare a major, they will receive an additional faculty advisor located within the major department who will assist with requirements for that major. Students should read the "Declaration of Major" information on the website of the major that they are interested in. In some cases, the student will need to choose a faculty advisor as part of the declaration process.

All students are cautioned to consult their Letters & Science academic advisor AND their major advisor prior to each registration period to ensure they understand all requirements. Do not rely on pre-printed sample plans, as they are intended to be samples only and may not be right for your particular situation.

## Honors in the 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 (<http://catalog.uwm.edu/opportunities-resources/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.

### Contact Information

Current Students contact the Department directly at [geo-info@uwm.edu](mailto:geo-info@uwm.edu)  
Prospective Students contact a Letters & Science Admissions Counselor at  
(414) 229-7711 or [let-sci@uwm.edu](mailto:let-sci@uwm.edu)

<http://uwm.edu/geosciences/undergraduate/>