

## Earth Science

*College of Social & Behavioral Sciences*

*Department of Geography*

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Web site: [www.mnsu.edu/dept/geog](http://www.mnsu.edu/dept/geog)

[www.mnsu.edu/dept/geol](http://www.mnsu.edu/dept/geol)

Director: Donald Friend, Ph.D.

Earth Science studies the Earth's interrelated physical systems of atmosphere, biosphere, geosphere, hydrosphere, and outer space. Fundamental to Earth Science are the impacts of people and the interactions of chemical, physical, and biological processes at all spatial scales ranging from submicroscopic to planetary, and over time scales from the immediate to billions of years. Thus, courses in Astronomy, Biology, Chemistry, Geography, Geology, and Physics are required to fulfill degree requirements. Majors may choose to earn the BA or BS in the broadly based program or a more focused Geology "option" (BS only) is available. For secondary teacher licensure see the "Science Teaching" program and major. An Earth Science minor is available.

**Admission to Major** is granted by the department. Minimum university admission requirements are:

- a minimum of 32 earned semester credit hours.
- a minimum cumulative GPA of 2.00 ("C").

Contact the department for application procedures.

### EARTH SCIENCE BA, BS

#### Required for Major (Core, 43 credits):

AST 101	Introduction to Astronomy (3)
AST 102	Introduction to the Planets (3)
BIOL 100	Our Natural World (4)
CHEM 201	General Chemistry I (5)
GEOG 101	Introduction to Physical Geography (3)
GEOG 217	Weather (3)
GEOG 315	Geomorphology (3)
GEOG 410	Climatic Environments (3)
GEOL 121	Physical Geology (4)
GEOL 122	Earth History (4)
GEOL 201	Elements of Mineralogy (4)
PHYS 211	Principles of Physics I (4)

#### Required Electives for Major (6 credits):

Choose six credits from the following:

AST 125	Observational Astronomy (3)
BIOL 432	Lake Ecology (4)
GEOG 370	Cartographic Techniques (4)
GEOG 373	Introduction to Geographic Information Systems (4)
GEOG 412	Advanced Weather (4)
GEOG 420	Conservation of Natural Resources (3)
GEOG 440	Field Studies: Colorado
GEOG 440	Field Studies: Field Methods
GEOG 480	Seminar (1-4)
GEOL 330	Structural Geology (4)
GEOL 350	Environmental Geology (4)
GEOL 370	Geotectonics (2)
GEOL 450	Hydrogeology (3)

**Required for Bachelor of Arts (BA) degree ONLY:** Language (8)

**Minor Required: None.**

### EARTH SCIENCE (BS) GEOLOGY OPTION

Geology is the study of the Earth, its materials, and its processes. It concerns itself with solving basic scientific problems and utilizing knowledge of the Earth for the benefit of mankind. Its concerns include but are not limited to soil preservation, water production and quality, hazards mitigation, resource exploration and

production, engineering of structures large and small, climate change, and the history of life on Earth and the search for life on other planets.

#### Required General Education (13)

Chem 201	General Chemistry I (5)
Phys 211	General Physics I (4)
Math 121	Calculus I (4)

#### Core Courses (22)

Geol 121	Physical Geology (4)
Geol 122	Earth History (4)
Geol 201	Mineralogy (4)
Geol 202	Lithology (3)
Geol 320	Sedimentology and Stratigraphy (3)
Geol 330	Structural Geology (4)

**Required Electives (13)** Electives must include at least two (2) Geography and at least two (2) Geology courses

Geog 315	Geomorphology (3)
Geog 373	Introduction to Geographic Information Systems (3)
Geog 420	Conservation of Natural Resources (3)
Geog 471	Digital Field Mapping with GPS (4)
Geog 474	Introduction to Remote Sensing (4)
Geol 350	Environmental Geology (4)
Geol 401	Field Studies (3)
Geol 450	Hydrogeology (3)

**Required Capstone Experience (4).** Choose from (with advisor approval):

- Senior Thesis; Credited as GEOL 499, Individual Study (1-6)
- Geology Field Camp (provided through an accredited geology program at another college / university)
- Successful Completion of a Research Experience for Undergraduates (REU)
- Earth Science (Geology) Internship (GEOG 497)

Minor Required: None.

### EARTH SCIENCE BS TEACHING (5-12)

Requirements for the Earth Science, Teaching major can be found in the SCIENCE TEACHING section of this bulletin.

### EARTH SCIENCE MINOR

**Required General Education for Minor (17 credits):**

AST 101	Introduction to Astronomy (3)
PHYS 100	Cultural Physics (3)
CHEM 100	Chemistry in Society (4)
BIOL 100	Our Natural World (4)
GEOG 101	Introduction to Physical Geography (3)

**Required for Minor (Core, 14 credits):**

GEOL 121	Physical Geology (4)
GEOL 122	Earth History (4)
GEOG 217	Weather (3)
GEOG 315	Geomorphology (3)

**Required Electives for Minor (3 credits):**

Choose one from the following:

AST 102	Introduction to the Planets (3)
GEOG 410	Climatic Environments (3)
GEOG 420	Conservation of Natural Resources (3)

### POLICIES/INFORMATION

**GPA Policy.** A GPA of 2.0 or higher in a major or minor is required for graduation.

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## EARTH SCIENCE

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Refer to the College regarding required advising for students on academic probation.

P/N Grading Policy. All courses in earth science must be taken for a letter grade.