

Earth Science

Related Courses in Other Departments

ART 218. Digital Imaging (3).

ART 318. Graphic Design (3).

ART 319. Web Design (3).

ESS 375. Geographic Information and Positioning Systems (4).

Special and Advanced Courses

199. Exploratory Internship (1-3).

299. Experimental Course (1-3).

399. Professional Internship (1-12).

451. Independent Study (1-3).

499. Advanced Experimental Course (1-3).

Earth Science

Major Program Requirements

Bachelor of Arts in Earth Science (30 hours and 9-12 hours of cognates)

Earth Science Core (8 hours)

ERTH 101

Physical Geology (4)

ERTH 102

Historical Geology (4)

Earth Science Electives (22 hours), at least 12 hours of which must be from courses numbered 300 or above.

Cognates (9-12 hours)

Three courses from the following: CHEM 103, 104; PHYS 101, 102, 205, 206; MATH 104, 115, 135, 204, 205; or CIS 106.

Bachelor of Arts candidates who plan professional earth science careers are strongly encouraged to include in their degree programs the following courses, which are usually required for entry into graduate school: Earth Science 301, 302, 307, 313, 315, 318; Chemistry 103, 104; Physics 101, 102 and Mathematics 115.

Earth Science

Bachelor of Science degree in Earth Science (32 hours of Earth Science and 28 hours of cognates)

Earth Science B.S. Core (32 hours)

ERTH 101	Physical Geology (4)
ERTH 102	Historical Geology (4)
ERTH 301	Mineralogy (4)
ERTH 302	Petrology (4)
ERTH 307	Structural Geology (4)
ERTH 313	Sedimentology (4)
ERTH 315	Biostratigraphy (4)
ERTH 318	Field and Laboratory Methods (4)

Earth Science B.S. Cognates (28 hours)

MATH 115	Pre-Calculus Mathematics (4)
MATH 135, 205	Calculus I, II (4, 4)
PHYS 205, 206	General Physics I, II (3, 3)
PHYS 209, 210	General Physics Lab I, II (1,1)
CHEM 103, 104	College Chemistry (4,4)

Computer Information Systems is recommended. Many graduate schools require a summer field course that is available at several field camps operated by major universities.

Bachelor of Arts with Teacher Certification in Earth Science. See the Teacher Education section of the catalog, page 233.

Minor and Associate Program Requirements

The **Associate of Arts** degree and the minor in earth science each require 18 semester hours of credit in the department.

The semesters listed after course descriptions indicate when courses are expected to be offered. Schedules are subject to change; students should confirm semester offerings with the department when planning degree programs.

101. Physical Geology (NATURAL SCIENCE/LABORATORY) (4). The rocks, landscapes and structures of the earth's surface and the processes that produced them, including volcanism, earthquakes, landslides, glaciation and continental drift. Mineral and rock identification, topographic map reading and geologic map interpretation are covered in laboratory sessions. A field trip of Lenawee County glacial geology is included. Three lectures, one 2-hour laboratory per week. Fall, spring.

Earth Science

- 102. Historical Geology (4).** The geologic history of the earth from its origin to the present, with emphasis on the many physical changes that have occurred and the origin and development of life as revealed by fossils and the rock record. Three lectures, one 2-hour laboratory per week. (Prerequisite: Earth Science 101 or permission of instructor.) Spring.
- 103. Descriptive Astronomy (NATURAL SCIENCE/LABORATORY) (4).** Observational and theoretical studies of the solar system and the extra-solar system. Topics include the telescope, planets and their satellites, asteroids, comets, meteors, the sun as a star, characteristics of stars, galaxies, interstellar matter, and the possibility of life elsewhere in the universe. Three lectures, one 2-hour laboratory per week. Fall.
- 104. Regional Geography (3).** The regions of the world defined climatically to emphasize the interrelationships between human occupancy and climate, vegetation, soils and geology. Fall.
- 107. Geology of National Parks (NATURAL SCIENCE/LABORATORY) (4).** An overview of the geology of U.S. National Parks. Unifying geological principles emphasized. Major topics: sandstone parks, volcanic parks, hot springs and geothermal areas, caves and limestone parks, reefs and fossilized reefs, rivers and erosion, ice and glaciers, mountain building and mountain ranges. Three lectures, one 2-hour laboratory per week. Spring of alternate years.
- 108. Natural Disasters (NATURAL SCIENCE/LABORATORY) (4).** An examination of the causes, effects, and options available to mitigate natural disasters, such as earthquakes, volcanic eruptions, landslides, subsidence, coastal erosion, flooding, severe weather, and wildfires. Three lectures, one 2-hour laboratory per week. Spring of alternate years.
- 201. Weather and Climate (3).** Introduces the nature and causes of meteorological phenomena, severe weather, and climatic pattern. Topics include: temperature, humidity and precipitation; pressure and wind; weather prediction; hurricanes, tornadoes and thunderstorms; the climatic history of the earth; effect of human activities on weather and climate, and of weather and climate on humans. (does not satisfy the laboratory science requirement.)
- 204. Oceanography (3).** The distribution of the earth's land and water. Topics include the nature, relief and erosion and other changes affecting the sea floor; the properties of sea water; and marine sedimentation, tides, currents and waves. (Does not satisfy the laboratory science requirement.)
- 205. Environmental Geology (3).** The Interaction between natural systems and society, including the effects of geologic hazards such as volcanic activity, earthquakes, landslides, flooding and water pollution. Fall.

Earth Science

- 301. Mineralogy (4).** Crystallography, atomic structure and bonding, phase equilibria and crystal chemistry, and the megascopic identification and descriptive mineralogy of nonsilicate and silicate minerals. Two lectures, one 3-hour laboratory per week. (Prerequisite: Chemistry 103.) Offered as needed.
- 302. Petrology (4).** The origin, classification and occurrence of igneous, metamorphic and sedimentary rocks, with emphasis on megascopic and optical techniques. Two lectures, one 3-hour laboratory per week. (Prerequisite: Earth Science 301.) Offered as needed.
- 307. Structural Geology (4).** The behavior of rocks under various kinds of force, with analysis of resulting structural features, including folds, joints and faults, and the nature of the forces that produced them. These concepts are applied to understanding the basic structural and tectonic framework of North America. Two lectures, one 3-hour laboratory per week. (Prerequisite: Earth Science 101.) Offered as needed.
- 313. Sedimentology (4).** Sedimentary rocks, the environments of deposition they represent, techniques employed in their study, the processes that produced them and their many characteristics; how these characteristics are used to reconstruct ancient environments and geologic history. Three lectures, one 1 1/2-hour laboratory per week. A field trip to West Texas or West Virginia is required. (Prerequisites: Earth Science 101, 102 and permission of instructor.) Offered as needed.
- 315. Biostratigraphy (4).** Invertebrate fossils, with particular emphasis on their use in the correlation and reconstruction of ancient environments and geologic history. Three lectures, one 1 1/2-hour laboratory per week. A field trip to Southern Ohio is required. (Prerequisite: Earth Science 313 or permission of instructor.)
- 317. Introduction to Geomorphology (4).** The geological processes that form landscapes, including coverage of surficial geological materials and soils; the physics and chemistry of weathering; the dynamics of streams; wind, waves, glacier ice and mass movement; and the interactions of geomorphology and the environment. Three lectures, one 2-hour laboratory per week. (Prerequisites: Earth Science 302 and 307, Chemistry 101 or 103, Mathematics 125 or permission of instructor.) Offered as needed.
- 318. Field and Laboratory Methods (4).** Familiarization with basic field and laboratory techniques, including maps, mapping instruments, air photographs, photography, data reproduction and presentation, sources of geologic information and planning field work and reports. A field problem is required. Two lectures, two 2-hour laboratories per week. (Prerequisites: Earth Science 307 and 313 or permission of instructor.)
- 342. Optical Techniques (4).** The basic principles and techniques of mineral identification using the petrographic microscope, with emphasis on the oil immersion technique, identification of opaque and non-opaque minerals in thin section and determination of rock type by point counting. Two lectures, two 2-hour laboratories per week. (Prerequisites: Earth Science 301 and 302.) Offered as needed.

Economics

Special and Advanced Courses

199. **Exploratory Internship (1-3).**

299. **Experimental Course (1-3).**

399. **Professional Internship (1-12).**

451. **Independent Study (1-3).** A program of independent study supervised by a departmental faculty member. The work may be theoretical, experimental or a field problem. May be repeated. (Prerequisite: departmental written permission.)

499. **Advanced Experimental Course (1-3).**

Economics

The study of economics provides a basis for diverse applications. For those seeking placement directly upon graduation, career opportunities exist in business and government involving management, administration, research, development and forecasting. The **Bachelor of Arts** degree in economics also provides excellent preparation for graduate study – in economics itself, or in business, law, public administration and other areas.

Major Program Requirements

Bachelor of Arts degree in Economics (34 hours of Economics and 3 hours of cognates)

Economics core (18 hours)

ECON 201	Microeconomics (4)
ECON 202	Macroeconomics (4)
ECON 320	Intermediate Macroeconomics (4)
ECON 321	Intermediate Microeconomics (4)
ECON 401	Senior Research (2)

Economics electives (16 hours)

Economics cognates (3 hours)

MATH 204	Elementary Statistics
or MATH 314	Mathematical Prob. & Statistics II (3)

It is strongly recommended that economics majors, especially those interested in graduate school, also complete Mathematics 135 and 205.