GEOSCIENCES

Geoscientists focus on problems related to how the Earth works, and our students are given opportunities to build the skills necessary for understanding the Earth System. Through a variety of field and laboratory experiences, our curriculum emphasizes hands-on learning. Students may find employment opportunities in the Earth resources field, environmental consulting, the government sector, or a variety of other career paths.

Transfer to College of Arts & Sciences

Students should apply to the college upon the attainment of:

- a cumulative GPA of 2.0 or better (includes transfer coursework until 30 credits are earned at UA)
- a major GPA of 2.0 or better (includes transfer coursework until 30 credits are earned at UA)
- 30 credits completed including both required English composition courses and 3 credits of mathematics or statistics that meets the General Education requirement

Students can arrange inter-college transfers through an appointment with their academic advisor; advisor contact information is listed in “My Akron.”

Placement

A student is encouraged to check with his/her major department and with the Career Center, Student Union 211, (330) 972-7747, regarding employment opportunities in the field.

College of Arts & Sciences

Degree requirements in Arts and Sciences include the demonstration of ability to use another language by completion of the second year of a foreign language or sign language and a minimum of 40 credits of 300/400 level courses (excluding workshops) consisting of either:

- Upper level (300/400) courses both in and outside the student’s major
- Any courses outside the major department as specified in and approved by the student’s major department chair (permission should be obtained prior to enrollment) except workshops

Geology Websites

- For careers in Geoscience visit: http://www.earthscienceworld.org
- Association of American State Geologists at https://www.stategeologists.org/
- Link to other geology websites: http://www.uakron.edu/colleges/artsci/depts/geology/links.php

Geosciences Contact

Dr. David Steer
122 Crouse Hall
330-972-2099
steer@uakron.edu

Geology (3370)

- Environmental Studies, Certificate (https://bulletin.uakron.edu/undergraduate/colleges-programs/arts-sciences/environmental-studies-certificate/)
- Geology, BS (https://bulletin.uakron.edu/undergraduate/colleges-programs/arts-sciences/geosciences/geology-bs/)
- Geology, Earth Science, BA (https://bulletin.uakron.edu/undergraduate/colleges-programs/arts-sciences/geosciences/geology-earth-science-ba/)
- Geology, Environmental Science, BA (https://bulletin.uakron.edu/undergraduate/colleges-programs/arts-sciences/geosciences/environmental-science-ba/)

Geology (3370)

3370:100 Earth Science (3 Credits)
Introduction to earth science for non-science majors. Survey of earth in relation to its physical composition, structure, history, atmosphere, oceans; and relation to solar system and universe.
Gen Ed: Tier 2 - Natural Science

3370:101 Introductory Physical Geology (4 Credits)
A study of the nature of earth, its materials, and the processes which continue to change it. Laboratory, field trips.
Gen Ed: Tier 2 - Natural Science w/LAB

3370:102 Introductory Historical Geology (4 Credits)
Prerequisite: 3370:101 or [3370:104 and 3370:211] or permission. Geologic history of earth, succession of major groups of plants and animals interpreted from rocks, fossils. Laboratory, field trips.
Gen Ed: Tier 2 - Natural Science w/LAB

3370:103 Natural Science: Geology (3 Credits)
Study of basic principles and investigative techniques in various fields of geology with emphasis on relationship of geologic processes to society.

3370:104 Exercises in Physical Geology (1 Credit)
Prerequisite: 3370:100 or 3370:103 or 3370:200 or 3370:211 or permission of geology adviser. Laboratory exercises on the identification of earth materials and the utilization and interpretation of geologic data and maps.

3370:105 Geology for Engineers (3 Credits)
Introduction of physical geology to engineers, including mechanics, hydraulics and case studies that illustrate interactions between geology and engineering. Laboratory, field trips.

3370:121 Dinosaurs (1 Credit)
Introductory course exploring the geological occurrence, mode of fossilization, evolutionary development, habits, and sudden extinction of the largest known land vertebrates.
Gen Ed: Tier 2 - Natural Science

3370:122 Mass Extinctions & Geology (1 Credit)
Catastrophic changes in plants and animals have occurred throughout earth history. The causes of these extinctions have sparked debate which has enlivened the scientific world.
Gen Ed: Tier 2 - Natural Science

3370:125 Earthquakes: Why, Where, When? (1 Credit)
Causes and effects of earthquakes, geological settings for earthquakes, seismic measurements, mechanical response of rock to stress, earthquake prediction and precautionary measures.

3370:126 Natural Disasters & Geology (1 Credit)
A study of the earth’s natural hazards including earthquakes, landslides, meteorites and tsunamis.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3370:127</td>
<td>The Ice Age &amp; Ohio (1 Credit)</td>
<td>1</td>
<td>Introductory course covering the effects of the ice age on the geology, vegetation, fauna and economy of Ohio.</td>
</tr>
<tr>
<td>3370:128</td>
<td>Geology of Ohio (1 Credit)</td>
<td>1</td>
<td>Survey of Ohio's geologic setting and history, natural resources, landforms, and their significance in terms of human activity, from early settlement to future economy.</td>
</tr>
<tr>
<td>3370:129</td>
<td>Medical Geology (1 Credit)</td>
<td>1</td>
<td>Abundance and distribution of trace elements in surface and groundwater, soils and rocks. The effects of trace elements to health through dose-response relationships.</td>
</tr>
<tr>
<td>3370:130</td>
<td>Geologic Record of Climate Change (1 Credit)</td>
<td>1</td>
<td>Examines evidence for natural climate changes in geologic past and evaluates the role of modern society in influencing future climate.</td>
</tr>
<tr>
<td>3370:132</td>
<td>Gemstones &amp; Precious Metals (1 Credit)</td>
<td>1</td>
<td>Introduction to minerals which form gemstones and precious metals. Topics to be covered include physical properties, geologic occurrences, and geographic locations of major deposits.</td>
</tr>
<tr>
<td>3370:133</td>
<td>Caves (1 Credit)</td>
<td>1</td>
<td>Topics include: karst processes and the origin of caverns; carbonate depositional environments and the origin of limestones; environmental problems associated with karst landscapes.</td>
</tr>
<tr>
<td>3370:134</td>
<td>Hazardous &amp; Nuclear Waste Disposal (1 Credit)</td>
<td>1</td>
<td>Disposition of hazardous waste in secured landfill site. Geologic factors which determine the selection of low-level and high-level radioactive waste sites.</td>
</tr>
<tr>
<td>3370:135</td>
<td>Geology of Energy Resources (1 Credit)</td>
<td>1</td>
<td>Topics include the origin of hydrocarbon and coal deposits, global distribution of energy resources, environmental impact of energy consumption.</td>
</tr>
<tr>
<td>3370:137</td>
<td>Earth's Atmosphere &amp; Weather (1 Credit)</td>
<td>1</td>
<td>Structure and composition of the atmosphere; earth's radiation budget; atmospheric moisture, clouds and precipitation; weather systems and storms, severe weather, Ohio weather.</td>
</tr>
<tr>
<td>3370:139</td>
<td>Current Topics in Geology (1 Credit)</td>
<td>1</td>
<td>(May be repeated for up to 2 credits.) Special topics offered once or only occasionally in areas where no formal course exists.</td>
</tr>
<tr>
<td>3370:140</td>
<td>Rocky Mountain National Parks (1 Credit)</td>
<td>1</td>
<td>Badlands, Yellowstone, Grand Canyon and other Rocky Mountain National Parks will be used to illustrate basic principles of geology.</td>
</tr>
<tr>
<td>3370:141</td>
<td>Natural Environment of China (1 Credit)</td>
<td>1</td>
<td>Introduction to geographical and geological environments of China. Geography and geology of geoparks will be presented and discussed as examples.</td>
</tr>
<tr>
<td>3370:171</td>
<td>Introduction to the Oceans (3 Credits)</td>
<td>3</td>
<td>Provides a basic introduction to the oceans. Topics include formation of the oceans, ocean circulation, waves and tides, marine animals, marine communities, and climate change.</td>
</tr>
<tr>
<td>3370:200</td>
<td>Environmental Geology (3 Credits)</td>
<td>3</td>
<td>Analysis of geologic aspects of the human environment with emphasis on geologic hazards and environmental impact of society's demand for water, minerals and energy.</td>
</tr>
<tr>
<td>3370:201</td>
<td>Exercises in Environmental Geology I (1 Credit)</td>
<td>1</td>
<td>Prerequisite or corequisite: 3370:200. Recognition, and evaluation of environmental problems related to geology through laboratory exercises and demonstrations which apply concepts discussed in introductory geoscience courses. Laboratory.</td>
</tr>
<tr>
<td>3370:203</td>
<td>Exercises in Environmental Geology II (1 Credit)</td>
<td>1</td>
<td>Prerequisite: 3370:201. Prerequisite or Corequisite: 3370:200. Recognition and evaluation of environmental problems related to geology. (Continuation of 201) Laboratory.</td>
</tr>
<tr>
<td>3370:211</td>
<td>Introduction to Environmental Science (3 Credits)</td>
<td>3</td>
<td>Interdisciplinary analysis of our relationship with nature and dependence upon the environment, with emphasis on evaluation of current environmental problems and rational solutions.</td>
</tr>
<tr>
<td>3370:230</td>
<td>Mineral Science (4 Credits)</td>
<td>4</td>
<td>Prerequisite: 3370:101 or [3370:104 and 3370:211]. Corequisites: 3150:151 and 3150:152. Crystallography and chemistry of minerals. Topics also covered include physical, chemical and optical properties, occurrences and uses of the common non silicate minerals. Laboratory, field trips.</td>
</tr>
<tr>
<td>3370:231</td>
<td>Silicate Mineralogy and Petrology (4 Credits)</td>
<td>4</td>
<td>Prerequisites: [3370:101 and 3370:230] or appropriate test score. Corequisites: 3150:151 and 3150:152. Physical and chemical properties, occurrence, and uses of common silicate minerals, followed by megascopic and microscopic identification, classification, and petrogenesis of rocks. Laboratory.</td>
</tr>
<tr>
<td>3370:232</td>
<td>Comparative Mineralogy (4 Credits)</td>
<td>4</td>
<td>Analysis of geologic aspects of the human environment with emphasis on geologic hazards and environmental impact of society's demand for water, minerals and energy.</td>
</tr>
<tr>
<td>3370:300</td>
<td>Engineering Geology (3 Credits)</td>
<td>3</td>
<td>Prerequisite: 3370:101 or [3370:100 and 3370:104] or [3370:104 and 3370:211] or permission of instructor. Presents quantitative analysis of geologic features and processes and is supported by the study of case histories. Lecture, lab, field study, field trips.</td>
</tr>
<tr>
<td>3370:310</td>
<td>Geomorphology (3 Credits)</td>
<td>3</td>
<td>Prerequisite: 3370:101 or [3370:100 and 3370:104] or [3370:104 and 3370:211]. Study of landforms as a function of structure, process, and time. Laboratory, field trips.</td>
</tr>
<tr>
<td>3370:324</td>
<td>Sedimentation &amp; Stratigraphy (4 Credits)</td>
<td>4</td>
<td>Prerequisite: 3370:102. Introduction to sedimentary processes and environments; stratigraphic principles and techniques. Hand specimens, thin sections, and sedimentary sequences studied. Laboratory, field trips.</td>
</tr>
</tbody>
</table>
3370:355 Contemporary Issues in Environmental Science (3 Credits)
Prerequisite: 3370:100, 3370:101, or 3370:211. Advanced interdisciplinary analysis of our relationship with nature and dependence upon the environment, with emphasis on evaluation of current environmental problems and rational solutions.

3370:360 Paleobiology (4 Credits)
Prerequisite: 3370:101 or 3100:111. Introductory course emphasizing morphology and evolution of major invertebrate groups with consideration of practical applications of paleontology. Laboratory, field trips.

3370:371 Oceanography (4 Credits)
Prerequisite: 3370:101. Study of the dominant feature of our planet, the oceans, emphasizing ocean basins evolution, and physical, chemical and biological processes in the various marine environments. Field trips.

3370:405 Archaeological Geology (3 Credits)
Prerequisite: 3370:101. Provides background in geologic principles and techniques relevant to archaeologists. Topics include stratigraphy, absolute dating, locality assessment, zooarchaeology, taphonomy, and remote sensing. Laboratory, field trips.

3370:407 Archaeogeophysical Survey (3 Credits)
Prerequisites: 3240:250 or 3370:101 or 3350:310. Advanced instruction in subsurface geophysical survey techniques in archaeology. Emphasis on magnetic gradiometry and electrical resistivity techniques, image processing and geological and archaeological interpretation.

3370:410 Regional Geology of North America (3 Credits)
Prerequisites: 3370:101 and 3370:102. Examination of physiographic provinces of North America emphasizing structure, tectonic setting, stratigraphy and processes responsible for landforms in each province. Laboratory, field trips.

3370:411 Glacial Geology (3 Credits)
Causes and effects of Pleistocene expansion of polar ice masses with emphasis on glacial deposits and world climatic changes. Laboratory, field trips.

3370:421 Coastal Geology (3 Credits)
Prerequisites: 3370:101, 3370:324 or permission of instructor. Study of the origins and evolution of coasts and coastal deposits with particular attention paid to the interaction of waves and currents with sediment, and the development of associated sedimentary features. Field trips.

Gen Ed: Tier 3 - Complex Systems

3370:425 Principles of Sedimentary Basin Analysis (3 Credits)
Prerequisites: 3370:324 and 3370:360 or permission. Primarily the study of depositional systems, regional and global stratigraphic cycles, and sedimentation and plate tectonics.

3370:432 Optical Mineralogy - Introductory Petrology (3 Credits)
Prerequisites: 3370:230 and 3370:231. Optical techniques for identification, characterization, and classification of minerals and rocks using the petrographic microscope. Laboratory.

3370:433 Advanced Petrology (3 Credits)
Prerequisite: 3370:432. Petrogenesis of igneous, metamorphic and sedimentary rocks as determined by microscopic studies of textures and mineral assemblages using thin sections. Laboratory.

3370:435 Petroleum Geology (3 Credits)
Prerequisite: 3370:350. Natural occurrences of petroleum. Characteristics, origin, entrapment and exploration methods. Laboratory, field trips.

3370:436 Coal Geology (3 Credits)
Prerequisites: 3370:101 and 3370:102. Origin, composition and occurrence of coal with emphasis on depositional environments, coalification processes, exploration, evaluation and exploitation. Laboratory, field trips.

3370:437 Economic Geology (3 Credits)
Prerequisites: 3370:231 and 3370:350. Study of metallic and nonmetallic mineral deposits emphasizing paragenesis and exploration. Laboratory, field trips.

3370:441 Fundamentals of Geophysics (3 Credits)
Prerequisites: 3450:223 or permission and 3650:292. Fundamental concepts in solid earth geophysics, planetary physics, geodesy, and geomagnetism. Contributions of geophysics to recent major developments in geoscience.

3370:443 Rivers (3 Credits)
Prerequisite: Permission of department. Study of the geologic and environmental aspects of river systems and related human impacts. Includes mandatory, 0 credit weekend field work.

Gen Ed: Tier 3 - Complex Systems

3370:444 Environmental Magnetism (3 Credits)
Prerequisite: 3370:101 or permission. Introduction to the theory and methods of environmental magnetism and the application of environmental magnetism to interpreting sedimentary deposits.

Gen Ed: Tier 3 - Critical Thinking

3370:445 Environmental and Engineering Geophysics (3 Credits)
Prerequisites: 3650:261 or 3650:291 or permission of instructor. Corequisite: 3650:262 or 3650:292 or permission of instructor. Basic subsurface exploration using ground penetrating radar and multi-channel electrical resistivity. Applications in environmental assessment, civil engineering and geotechnical engineering. Field trips.

3370:446 Exploration Geophysics (3 Credits)
Prerequisites: 3450:223 and 3650:292. Basic principles and techniques of geophysical exploration with emphasis on gravimetric, magnetic, seismic and electrical methods and application to geological problems. Laboratory, field trips.

3370:449 Borehole Geophysics (3 Credits)
Basic principles and techniques of geophysical well logging with emphasis on electrical, radioactive, and sonic measures and their quantitative evaluation. Applications in oil, gas, and groundwater exploration. Laboratory.

3370:450 Advanced Structural Geology (3 Credits)
Prerequisite: 3370:350. Fundamental and advanced concepts of structural geology with emphasis on current and developing concepts. Laboratory, field trips.

3370:451 Field/Lab Studies in Environmental Science (3 Credits)
Field/Laboratory inquiry into a specific interdisciplinary, environmental science topic. Students complete a research project involving collecting, analyzing and interpreting real world data. (May be repeated once.)

3370:452 Geology and Environmental Science Service Learning (1-3 Credits)
Prerequisite: Permission of instructor. Team service-learning project that involves collection, organization, analysis, and presentation of data. Field trips. (May be repeated for a maximum of four credits.)

Gen Ed: Tier 3 - Complex Systems
3370:453 Geology Field Camp I (3 Credits)
Prerequisite: 3370:101, 3370:102, and permission of instructor.
Introduction to collection and interpretation of field data and construction of geologic maps. Student will bear trip expenses.

3370:454 Geology Field Camp II (3 Credits)
Prerequisites: 3370:231, 3370:350, 3370:453, and permission of instructor. Advanced techniques and methods of field geology necessary for detailed geological maps and interpretation. Student will bear trip expenses.

3370:455 Field Studies in Geology (1-3 Credits)
Field trip course emphasizing aspects of geology not readily studied in Ohio. Includes pre-trip preparation and post-trip examination. Student will bear trip expenses. (May be repeated for a total of four credits.)

3370:462 Macroevolution (3 Credits)
Prerequisites: 3370:360 or 3100:111. Provides a comprehensive treatment of macroevolutionary theory, focusing on evidence from the fossil record. Topics include genetics, speciation, development, and fossil lineages. Laboratory.

3370:463 Environmental Micropaleontology (3 Credits)
Prerequisite: 3370:360. Introduction to techniques of micropaleontology as proxy indicators for environmental and climate change. Laboratory. Field trips.

3370:465 Geomicrobiology (3 Credits)
Prerequisites: 3150:151 and 3150:153. A course addressing the physiology, ecology, and activities of microorganisms that mediate important biogeochemical processes, and the interdisciplinary approaches to studying them.

3370:470 Geochemistry (3 Credits)
Prerequisites: 3370:101, 3370:230, 3150:151, and 3150:152. Application of chemical principles to the study of geologic processes. Laboratory, field trips.

3370:472 Stable Isotope Geochemistry (3 Credits)

3370:474 Groundwater Hydrology (3 Credits)
Prerequisite: 3370:101 or [3370:104 and 3370:211]. Origin, occurrence, regimen and utilization of groundwater. Qualitative and quantitative presentation of geological and geochemical aspects of groundwater hydrology. Laboratory, field trips.

3370:480 Seminar in Environmental Studies (2 Credits)
Discussion of specific environmental topic(s) from an interdisciplinary viewpoint; resource persons are drawn from the University and surrounding community.

3370:481 Analytical Methods in Geology (2 Credits)
Prerequisite: 3370:230, 3370:231. A survey of analytical methods used to solve geologic problems with emphasis on method selection, proper sample collection, analysis of data quality and data presentation.

3370:484 Geoscience Research & Consulting Methods (2 Credits)
Prerequisite: Must be a Geology Department graduate student or senior major in Geology, or have permission of instructor. Methods for finding, gathering, managing, and evaluating geoscience information. Emphasis on finding data sources (including electronic), creating valid data sets, visualizing data.

3370:485 Individual Readings in Geology and Environmental Science (1-3 Credits)
Prerequisite: Permission of instructor. (May be repeated for a total of 4 credits) Independent study and directed readings on a selected topic to fit an individual student’s program.

3370:490 Workshop in Geology and Environmental Science (1-4 Credits)
Group studies of special topics in geology and environmental science. May not be used to meet undergraduate major requirements in the Department. May be used for elective credit only. (May be repeated for up to 4 credits.)

3370:491 Internship in Geology and Environmental Science (1-3 Credits)
Prerequisite: Permission of Department Chair. Supervised professional experience in geology or environmental science. Only three credits may be applied toward a degree in geology. (May be repeated for a total of six credits.)

3370:497 Honors Project in Geology (1-3 Credits)
(May be repeated for a total of six credits.) Prerequisite: permission of department honors preceptor. Honors student only. Exploration of research topics and issues in geology. Selection of research topic and writing of research paper in proper scholarly form under direction of faculty member.

3370:498 Special Topics in Geology (1-3 Credits)
Prerequisite: Permission of instructor. Special lecture courses offered once or only occasionally in areas where no formal course exists.

3370:499 Research Problems in Geology (1-3 Credits)
(May be repeated for a total of four credits) Prerequisite: Permission. Independent research leading to the completion of a written paper or presentation at a professional meeting.