Earth Sciences

The Department of Earth Sciences, created in 2002, is a program that combines archaeology, geography, and geology. It currently has 14 faculty members with diverse research backgrounds. Major research foci include:

- Hazards
- Active Tectonic & Dynamic Geomorphology
- Geoarchaeology & Quaternary Studies
- Hydrology & Water Resources
- Spatial and Community Analysis

At the undergraduate level the department offers the B.A. degree in Earth Sciences with concentrations in geology, geography, and geoarchaeology. Visit the Department of Earth Sciences website to learn more (www.memphis.edu/earthsciences/).

A bachelor’s degree from the Department of Earth Sciences can lead to a career in fields such as cartography, environmental management, archaeology, geology, energy, city and regional planning, soil and water conservation, and state and federal regulatory agencies. The bachelor’s degree is also a prerequisite to entering graduate school to receive advanced training.

What opportunities can you enjoy as a student in Earth Sciences?

- Working closely with very active, award-winning research faculty
- We have close ties with the Center for Earthquake Research and Information (CERI), the Center for Applied Earth Science and Engineering Research (CAESER), C. H. Nash Museum, and the Confucius Institute (CIUM)
- Going to “field camp”—that is, geologists will take six hours of upper-division course work in the Black Hills of South Dakota, and in adjacent Wyoming. During the month-long course, you stay in dorms at Black Hills State University, in Spearfish, SD
- Archaeology field school – participating in an archaeological excavation and learning the skills necessary to excavate and document cultural material.
- Joining the University of Memphis Earth Science Club

4 year plans for Geoarchaeology, Geography, and Geology are available in the Undergraduate Catalog – http://www.memphis.edu/earthsciences/programs/undergraduate/undergrad-4year-sequence.php
# Bachelor of Arts
## Earth Sciences – Geography Concentration*

### Freshman Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
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<tbody>
<tr>
<td>ENGL 1010</td>
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<td>ENGL 1020</td>
<td>3</td>
</tr>
<tr>
<td>GE MATH</td>
<td>3-4</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>GE Humanities/Fine Arts</td>
<td>3</td>
<td>GE Social/Behavioral Science</td>
<td>3</td>
</tr>
<tr>
<td>BA Foreign Language 2010</td>
<td>3</td>
<td>BA Foreign Language 2020</td>
<td>3</td>
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<tr>
<td>Elective</td>
<td>3</td>
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**Semester Totals** 15-16 hrs.  
**15 hrs.**

### Sophomore Year

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<tr>
<td>ENGL 2201 or 2202</td>
<td>3</td>
<td>COMM 2381</td>
<td>3</td>
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<tr>
<td>ESCI 1301 - GE Soc./Behav. Sci.</td>
<td>3</td>
<td>UD Elective</td>
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<td>GE Fine Arts</td>
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<td>3</td>
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<tr>
<td>ESCI 1010/1050/1103-GE Nat. Science w/lab</td>
<td>4</td>
<td>ESCI 1020-GE Nat. Science w/lab</td>
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<tr>
<td>Elective</td>
<td>3</td>
<td>GE History</td>
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**Semester Totals** 16 hrs.  
**16 hrs.**

### Junior Year

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<tr>
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<tr>
<td>ESCI 4515</td>
<td>3</td>
<td>UD ESCI</td>
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<td>UD ESCI</td>
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<td>UD Elective</td>
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<td>Elective</td>
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<tr>
<td>Elective</td>
<td>3</td>
<td>UD Elective</td>
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**Semester Totals** 15 hrs.  
**15 hrs.**

### Senior Year

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<tr>
<th>Course</th>
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<td>ESCI 4521</td>
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<td>UD ESCI</td>
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<tr>
<td>Elective</td>
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**Semester Totals** 15 hrs.  
**13 hrs.**

GE = General Education Requirements  
BA = Bachelor of Arts college requirements  
UD = Upper division  

Foreign Language Requirement – See the [Undergraduate Catalog](http://catalog.memphis.edu)

Degree hours = 120  
**42 Upper Division hours required for graduation**

No more than 2 hours of physical education courses may be counted toward a degree.

Residence – 30 of the last 60 hours must be taken at University of Memphis; at least 60 hours must be at a four-year institution; transfer students must earn at least 6 hours of a major at UM and at least 3 hours of a minor at UM

*4 year plans for Geoarchaeology and Geology are available in the Undergraduate Catalog – catalog.memphis.edu in the College and Degree Programs section.*
EARTH SCIENCES COURSE DESCRIPTIONS

ESCI 1010 - Weather and Climate (4) Atmospheric processes and geographic distribution of radiation, moisture, pressure, and circulation.

ESCI 1020 - Landforms (4) Agents and processes of landform development and geographic relationships of landscapes.

ESCI 1040 - Physical Geology (4) Introduction to processes that form the rocks in the earth's crust.

ESCI 1050 – The Earth Through Time (4) Overview of history of earth and its life as interpreted from rock and fossil record; origins of continents, mountain ranges, ocean basins and National Parks.

ESCI 1100 - Biol Anth & Prehistory (3) (Same as ANTH 1100) Evolutionary basis of human origins and contemporary biocultural variation.

ESCI 1103 – The Human Planet (4) Applications of physical geology to problems encountered by past human populations.

ESCI 1301 - Survey of World Regions (3) Survey of economic, cultural and physical traits characteristic of nations.

ESCI 1401 - Intro/Cultural Geog (3) Geographical aspects of human behavior.

ESCI 2300 – Great Discoveries in Archaeology (3) (Same as ANTH 2300). Great discoveries of archaeology that underlie our understandings of ancient societies and social institutions are explored.

ESCI 2301 - Fundamental of Archaeol (4) Hands-on experience in archaeological methods.

ESCI 3100 – Seminar in Emergency Management (Same as EMGT/PADM 3100) (3) Synthesizing and integrating the various elements of emergency management.

ESCI 3131 – Severe Weather (3) Descriptive account of the physical processes important in the formation of blizzards, ice storms, thunderstorms, tornadoes, hurricanes, floods, and heat waves.

ESCI 3200 - People/Culture World (3) Major ethnographic areas and selected cultures of world.

ESCI 3211 - Invertebrate Paleontology (4) Fossil invertebrate animals and their importance in interpretation of ancient environments.

ESCI 3221 - Principles/Conservation (3) Development of conservation ethics and wilderness concepts.

ESCI 3311 - Mineralogy/Petrology (4) Classification and identification of minerals and rocks.

ESCI 3451 - Intro/Urban Planning (3) Introduction to regional and urban planning.

ESCI 3502 - Introduction to Geophysics (3) Physical methods used to study the earth's interior.

ESCI 3503 - Soils and Soil Processes (3) Processes and dynamics of soil profile development.

ESCI 4201 - Urbanization/Environnt (3) Ways man has changed natural environment by urbanization.

ESCI 4202 - Geomorphology (4) Description & interpretation of landforms & their relationships to underlying structure and geologic history.

ESCI 4211 - Physical Hydrology (4) Movement, storage and development of groundwater.

ESCI 4213 - Field Methods/Hydrology (3) Practice of field methods in solving hydrologic problems.

ESCI 4214 - Climatology (3) Climatic elements and methods of data analysis.

ESCI 4215 - Physical Climatology (3) Components of earth's energy balance.

ESCI 4216 - Synoptic Meteorology (3) Physical processes in the atmosphere applied to analysis and interpretation of weather systems using maps, upper-air soundings, satellite and radar imagery, and computer model output; introduction to techniques used in weather forecasting.

ESCI 4231 - Water Resources (3) Hydrologic processes and their application to needs of cities, industry, agriculture, and recreation.

ESCI 4241 - Biogeog/GIS Analyses/Ecology (3) Basic principles of interaction between geography, organism diversity and evolution.

ESCI 4251 - Environmental Hazards (3) Nature, impact, and social responses to environmental hazards.

ESCI 4252 - Global Environ Change (3) Characteristics of natural systems; magnitude of human alteration of environmental systems.

ESCI 4261 - Plan Sustainable Cities/Region (3) Sustainability of natural and built environments in planning cities and regions.

ESCI 4301 - Archaeology/North America (3) Intensive study of various prehistoric cultures from earliest times until historic contact.

ESCI 4307 - Thematic Studies/China (3) Geographic analysis of characteristics of China and neighboring regions.

ESCI 4325 - Archaeology Fld/Lab Techn (3) Instruction in field excavation, specimen preparation, use of survey instruments.

ESCI 4332 - Intro to Geochemistry (3) Processes that govern or control migration and distribution of elements and atomic species of earth.

ESCI 4335 - Analysis of Stone Artifacts (3) (Same as ANTH 4335). This class outlines the basics in stone “olithic” artifact analysis.

ESCI 4330 - Economic Geography (3) Spatial characteristics and distribution of economic activities.

ESCI 4341 - Aqueous Geochemistry (3) Physical chemistry of aqueous solutions as applied to geochemical processes on earth's surface.

ESCI 4350 - Archaeology of Collapse (3) Emphasis on archaeology of regional politics and archaic states throughout the world. Overview of social and political collapse of complex societies.

ESCI 4352 - Old World Archaeology (3) Old World cultures from first humans to early civilizations.

ESCI 4365 - Cultural Resource Management in Archaeology. Prepares students for cultural resource management (CRM) roles.

ESCI 4431 - Urban Geography (3) Geography of urban processes and forms.

ESCI 4443 - Transportation Planning (3) Planning for various transportation modes and networks and impact on land use.

ESCI 4502 - Computer Cartography (3) Use of computer mapping programs as effective techniques for visual presentation of data.

ESCI 4511 - Remote Sensing/Environ (3) Survey of theory and application of using color, infrared, thermal, and radar images.

ESCI 4512 - Structural Geology (4) Structures of the crust; geometry of folds and faults, rock deformation.

ESCI 4515 - Geographic Info Science (3) Theoretical and practical understanding of GIS concepts, capabilities, and applications.

ESCI 4521 - Quantitative Methods (3) Introduction to quantitative methods in spatial analysis. [C]

ESCI 4525 - Adv Geographic Info Sci (3) Design and implementation of spatial analysis approaches within the context of GIS technology.

ESCI 4530 - Advanced Remote Sensing (3) Practical exercises and datasets to elaborate on fundamental skills introduced in ESCI 4511.

ESCI 4541 - Field Methods/Geography (3) Basic methods of geographic analysis for field generated data.

ESCI 4541 - Geography/Fld Studies (1-6) Faculty conducted field trip emphasizing study of geographic phenomena.

ESCI 4551 - Urban Planning Studio (3) Application of planning process to urban problems and preparation of plans for the urban area.

ESCI 4621 - Investigations In GEOG (1-3) Student, under faculty supervision, studies in-depth particular geographic topic.

ESCI 4622 - Geology Field Camp (6) Preparation of structural and lithologic maps in prescribed geologic areas.

ESCI 4680 - Applied Archaeology/Museums (3) Representations of cultural heritage in a broad array of public venues.

ESCI 4700 - Earth Science Internship (1-9) Experience working with agency in which knowledge of earth science can be utilized.

ESCI 4851 - ESCI Field Exdcted field trip (1-6) Conducted during spring vacation.

ESCI 4722 - Investigation In ESCI (1-3) Individual or group work on topics of current interest in the broad field of geophysics.

ESCI 4731 - Senior Thesis (1-3) Original study on subject of significance to earth science with faculty supervision.

ESCI 4801 - Seminar in Applied Geography (3) Synthesis and application of geographic perspectives, concepts, techniques and tools.

Please consult the Undergraduate Catalog at http://catalog.memphis.edu for complete descriptions.
B.A. IN EARTH SCIENCES: PROGRAM REQUIREMENTS

A. University General Education Program (41 hours)
See the Undergraduate Catalog for the University General Education Program requirements.

B. College and Degree (B.A.) Requirements (6-9 hours)
The College and Bachelor of Arts requirements are in addition to the University General Education Program requirements and are listed in the Undergraduate Catalog.

C. The Major (35-49 hours)
1. Core Requirements (7 hours):
   All students must take ESCI 1020 (4) and ESCI 4515 (3). In addition, all students must fulfill the requirements for one of the following concentrations:
2. Concentration (28-42 hours):
   a. Geoarchaeology (33 hours): ESCI 1103 (4), 2301 (4), 4202 (4), 4301, 4325, 4350, 4352, 4521; and six upper division hours as approved by advisor.
   b. Geography (28 hours): ESCI 1010 (4), or 1050 (4), or 1103 (4); ESCI 1401 or 4430; ESCI 1301 or 4307; ESCI 4521; and 15 additional upper division hours as approved by advisor.
   c. Geology (41-42 hours): ESCI 1040 (4), 1050 (4), 3311 (4), 3712 (4), 4512 (4), 4622 (6); CHEM 1110/1111 (4) and CHEM 1120/1121 (4); PHYS 2010/2011 (4) and 2020/2021 (4); MATH 1910 (4) (taken as University General Education requirement); and 3-4 hours ESCI upper division hours approved by advisor.

D. Electives (12-16 hours)
Electives may be chosen to bring the total number of hours to 120.

Earth Sciences Minor
Completion of 20 semester hours in earth sciences courses, at least 9 of which must be upper division hours.

For more information, please contact:
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901-678-2177

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Undergraduate Advisor (Geoarchaeology):
Dr. Ryan Parish
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The University of Memphis
http://www.memphis.edu

The College of Arts and Sciences
http://www.memphis.edu/cas

Career Services: http://www.memphis.edu/careerservices
The University of Memphis is an Equal Opportunity/Affirmative Action University. It is committed to education of a non-racially identifiable student body.