EARTH AND SPACE SCIENCE

The Department of Earth and Space Science offers a minor in Earth and Space Science, and supports other major programs within the Division of Natural Sciences.

Geology and Meteorology courses are designed to introduce students to the array of the earth's natural phenomena and broaden their appreciation and understanding of these environmental systems. Geology and Meteorology course offerings also serve as a foundation to students pursuing an Earth/Space Science teaching license.

Physics courses are designed to help students attain an understanding and appreciation of the fundamental laws of nature and how they apply in everyday life; gain competence in the use of physics as a tool in the natural sciences; and prepare for work in graduate and professional schools, or secondary teaching.

MINOR IN EARTH SCIENCE (18 credits)

REQUIRED: 2 courses (6 credits)

111 Environmental Geology 125 Astronomy

ELECTIVES: minimum 12 credits, selected from Earth and Space Science courses (ESS 121, 122, 126, 128, 132, and 246).

Earth/Space Science Teaching: A minor in Earth Science, coupled with a minor in Education, can lead to a double license to teach Earth/Space Science at the middle school, junior high and high school levels. This program of study, coupled with Core 5, covers all four areas (Energy in the Earth System, Geochemical Cycles, Origin and Evolution of the Earth System, Origin and Evolution of the Earth) required by the state of Indiana for a license to teach Earth/Space Science.

The minimum requirements for a teaching license in Earth/Space Science is a major and minor, or a group major, in the Natural Sciences Division, plus an education minor, with the following distribution of courses:

REQUIRED: 18 credits of ESS courses that must include ESS 111, 125, 126, 128, 132, and 246.

COURSE DESCRIPTIONS

111. Environmental Geology 3 credits

This course is a survey of physical geology from the perspective of human interaction with the environment. Topics covered in the two credits of weekly lectures include: Plate Tectonics, volcanoes, earthquakes, mountain building, the rock cycle, weathering and erosion, mass wasting, stream landscapes and flooding, wind processes, shoreline erosion and deposition. The weekly laboratory includes the study of typical rocks and minerals, topographic maps and survey systems, and an introduction to aerial photographic interpretation.

121. General Physics I: Mechanics and Heat 4 credits

This course is an introduction to classical physics. It covers Kinematics: force, motion, energy, momentum and rotational motion. It also treats fluids, heat, and sound. Lab fee. **Prerequisite: MTH 125, or permission of instructor.**

122. General Physics II: Optics, Electricity and Atomic Structure 4 credits

This course is a sequel to Physics 121. It studies electricity and magnetism, light and optics, and it briefly sketches some selected topics in Modern Physics. Lab fee. **Prerequisite: ESS 121, MTH 125, or permission of instructor.**

125. Astronomy **3 credits**

A non-mathematical introduction to astronomy including the history of astronomy, the principal tools of astronomy, the determination of location using celestial bodies, and main features of the known universe. Also, there is an emphasis on the origin of planets, stars, and galaxies. Offered irregularly.

126. Introduction to the Atmosphere, Climate and Weather **3 credits**

A qualitative introduction to meteorology with lectures emphasizing the vertical structure of the atmosphere, clouds, air circulation and various atmospheric and weather processes, including severe weather. The laboratory introduces the fundamentals of meteorological observations and analysis techniques.

128. Environmental Studies **3 credits**

This course seeks to give the student a broad overview of this multidisciplinary subject. Topics covered include, but are not limited to: economics, politics, and ethical responsibility toward the environment, ecology, population issues, geological processes and resources, human impact on the environment. This course provides sufficient coverage to prepare an education major for teaching units dealing with environmental concerns. An integral part of the course is an independent literature search culminating in a short oral presentation given by each student near the end of the semester.

132. Geography of Economic Resources **3 credits**

A study of the principle economic and commercial regions of the Earth. The emphasis of the course is placed on agriculture, water resources, manufacturing, and extractive (mining) centers. The environmental impacts of resource use are given special consideration. Offered irregularly. **Prerequisite: ESS 111 is desirable, but not required**.

246. Environmental Research Methods (BIO 246) **3 credits**

Basic environmental field methods will be examined and applied during this course. Field sampling and analysis of various environmental media such as water, soil, air, refuse, sediment, waste, etc., are undertaken in the context of environmental program implementation Environmental field methods are foundational to virtually all aspects of environmental investigations and problem-solving. This course will also be an introduction to library search techniques, information retrieval systems, and scientific writing. Laboratory. **Prerequisite: BIO 111-112 or ESS 111 & 128**.

255. Independent Study **1-3 credits**

455. Research in Earth Sciences **1-3 credits**