Program Requirements:
CHEM 1141, 1143, 1241, 1243; PHYS 1144, 1244 or 1624, 2644; MATH 1634 and 1734; one year of a single foreign language.

Requirements for a minor in Geosciences
GEOS 1134, 1234, and 10 additional hours in geosciences, 6 of which must be advanced.

COURSES IN ENVIRONMENTAL SCIENCE (ENSC)

1114. Foundations of Environmental Science (TCCNS = ENVR 1401) 4(3-2)
A survey of topics in environmental science including natural resources, populations, ecosystems, biodiversity, and the impact of humans on the environment.

3103. Environmental Policies and Laws 3(3-0)
Prerequisites: Two laboratory science courses.
An analysis of contemporary problems in establishing policy, legislation, and regulation to protect the environment at all levels of government from the international to the local level.

4103. Internship 3(3-0)
Prerequisites: Seven hours ENSC and two years of biology, chemistry, or geosciences either combined or separately.
Field experience in selected agencies.

COURSES IN GEOSCIENCES (GEOS)

1134. Physical Geology (TCCNS = GEOL 1403) 4(3-2)
Elements of earth science including the study of earth materials, interpretation of geologic evidence, and study of geological processes.

1234. Historical Geology (formerly 1233) (TCCNS = GEOL 1404) 4(3-2)
Formation of the Earth and the evolution of its origins to the present, plate tectonics, mountain building, and major evolutionary events.

3034. Oceanography (formerly 3133) 4(3-2)
Prerequisites: GEOS 1134 or 1234 or BIOL 1144; or GNSC 1104 and 1204; or consent of the instructor.
An introduction to the physical, chemical, geological, and biological processes of the oceans; history of ocean exploration. Laboratory includes weekend field trip to the Texas coast.

3134. Mineralogy (formerly 2134) 4(3-2)
Prerequisites: GEOS 1134, CHEM 1141 and 1143 or 1101 and 1103, or consent of the instructor.
An integrated study of the physical and chemical characteristics of minerals and the conditions under which they form, including crystallography and crystal structure, crystal chemistry and variability, mineral associations and genesis, and systematic description and identification.

3234. Petrology 4(3-2)
Prerequisite: GEOS 3134 or consent of the instructor. CHEM 1241 and 1243, and MATH 1433 are recommended.
An examination of the characteristics and origins of igneous, sedimentary, and
metamorphic rocks, including the application of experimental and theoretical studies of rock genesis. Laboratory work emphasizes the systematic description, classification, and identification of rocks in hand specimen and thin section.

3434. **Structural Geology** 4(3-2)
Prerequisite: MATH 1433 or 1534 or consent of the instructor. GEOS 3234 is recommended.
Survey of topics including mechanical principles, classification of structural features, and tectonics. Laboratory emphasizes analysis of both surface and subsurface features and field mapping by graphical and mathematical techniques.

3534. **Invertebrate Paleobiology** 4(3-2)
Prerequisite: GEOS 1234 or BIOL 1144.
Theoretical and descriptive invertebrate paleobiology. Topics include speciation, extinction, paleoecology, biostratigraphy, and systematics.

3634. **Fundamentals of Remote Sensing** 4(3-2)
Prerequisite: GEOS 1134 or consent of the instructor.
An introduction to the principles and concepts of digital remote sensing, including an introduction to electromagnetic radiation, remote sensing instrumentation, sensor technology (multispectral, hyperspectral, radar, etc.), earth resource satellites, digital image interpretation and processing, and GIS integration. Course emphasis will include an analysis of remote sensing images (photographs, satellite imagery, radar imagery, etc.) and their interpretation and use for a variety of applications specific to geologic, biologic, and environmental assessment.

3734. **Applied Geomorphology** 4(3-2)
Prerequisites: GEOS 1134 and 1234, GEOS 3634, or consent of the instructor.
A systematic analysis of the morphology of the Earth’s surface--both the continents and the sea floor--and of the processes which shape that surface. Laboratory work emphasizes the use of paper and digital topographic maps and remotely sensed imagery for geomorphic and geologic interpretation.

3836. **Field Geology** 6(3-6)
Prerequisites: GEOS 3134, 3434, and 4534.
Six weeks of geosciences field methods including measurement of sections and interpretation of stratigraphy, structure, depositional environments, and igneous and metamorphic rocks.

4001. **Geosciences Seminar** 1(1-0)
Prerequisite: Senior Geosciences or Environmental Science major or consent of the instructor.
Oral and/or poster presentation of literature or research topics.

4034. **Petroleum Geology** 4(3-3)
Prerequisites: GEOS 1134, 3134, and 3434, or consent of the instructor.
Teaches the fundamental skills routinely used by petroleum geologists, including basic well log analysis, log and geologic section correlation, cross section construction, and building of data contour and reservoir maps. Exposure to geophysical seismic data, rock sample evaluation, and well drilling operations. Focus on lab exercises as well as integration of computer applications.
4233. **Groundwater Hydrology** 3(2-2)
Prerequisites: GEOS 1134, 1234, or consent of the instructor.
An introduction to subsurface groundwater movement and physical properties, emphasizing geological controls on groundwater flow, quantitative methods of the analysis of aquifer systems, regional hydrogeology, water quality, and pollution. Water resources are examined based on their occurrence, movement, and chemistry.

4333. **Advanced Topics in Geosciences** (formerly 4334) 3(2-2)
Prerequisite: Consent of the instructor.
Lectures, discussion, reading, presentations, and/or laboratory work on advanced topics in geosciences or environmental science.

4534. **Sedimentology and Stratigraphy** 4(3-2)
Prerequisites: GEOS 1134 and 1234.
Analysis of depositional environments based on the physical and chemical formation of sediment, the physics of sediment transport, and post-depositional diagenetic changes. Also includes the study and interpretation of stratified sedimentary rocks, including their identification, description, and modes of origin. Fundamental principles of lithostratigraphic and sequence stratigraphic analysis, mapping, and correlation are also presented.

4911, 4912, 4913. **Independent Study in Geosciences/Environmental Science** 1-3 semester hours
Prerequisites: Senior Geosciences major and consent of the instructor and dean. See page 74 for additional requirements.
Directed research/study in areas of geological science or environmental science.

**PROTHRO DISTINGUISHED PROFESSORSHIP OF GEOLOGICAL SCIENCE**

The Prothro Distinguished Professorship of Geological Science was established in 1986 to support the work and research of a professor in the Department of Geosciences.

**GENERAL SCIENCE**

Courses in general science are offered to students who are pursuing their teacher certification with a Bachelor of Science in Interdisciplinary Studies or a Bachelor of Science (with a science major) with secondary certification. (See pages 136-146 and 148-150.)

**COURSES IN GENERAL SCIENCE (GNSC)**

1104. **Life/Earth Science** 4(3-2)
A basic course designed to introduce students to the scientific methods and topics in biology and earth science. Creditable only for students seeking grades 1-6 and 4-8 education certification. This course may not be substituted to fulfill science core requirement for other majors.

1204. **Physical Science** 4(3-2)
An introductory survey of topics in physics and chemistry. Creditable only for students seeking grades 1-6 and 4-8 education certification. This course may not be substituted to fulfill science core requirement for other majors.