School of Natural Sciences and Mathematics

The School of Natural Sciences and Mathematics offers both graduate and undergraduate programs in Biology, Chemistry, Geosciences, Mathematical Sciences, and Physics, and a graduate program in Science Education. Undergraduate and post-baccalaureate programs in teacher certification are administratively housed in the School of Natural Sciences and Mathematics but serve other schools as well.

The undergraduate program in Biology provides a basic foundation in molecular and cell biology to prepare students for graduate studies in biology (B.S.), for professional studies in a wide variety of health-related areas, for secondary school teaching, and for employment as research assistants in pharmaceutical, biotechnology, government, and environmental science laboratories (B.S., B.A.).

The undergraduate program in Chemistry provides the fundamental knowledge required for professional participation in chemically oriented industries, for graduate study in chemistry, and for medical or dental studies (B.S.), or for secondary science teaching or ancillary positions (sales, legal, etc.) in the chemical industries (B.A.).

The undergraduate program in Geosciences provides a general scientific background suitable for some careers in business or law, for secondary school teaching (B.A.), or for employment as a professional geologist, or for graduate studies in Geosciences (B.S.).

The undergraduate programs in Mathematical Sciences (B.S.) encompass Mathematics, Statistics, Applied Mathematics, and Engineering Mathematics, and are designed so that students can have the opportunity to prepare for employment immediately upon graduation or for continuing with graduate studies in any of these areas.

The undergraduate Physics program offers a basic foundation in classical and modern physics for students interested in professional careers in physics, usually requiring graduate degrees, as well as in related fields, e.g., electrical engineering, medical physics, radiology, lasers, geophysics, computer science (B.S.), or a strong base in physics for students seeking to pursue careers in medicine, patent law, government or industrial laboratories, or secondary school teaching (B.A.).

The School of Natural Sciences and Mathematics also provides opportunities for students to complete Texas Teacher Certification requirements in Biology, Chemistry, Earth Science, Life/Earth Science, Mathematics, and Physics. Students who wish to be certified should consult the Teacher Development Center for specific requirements as soon as possible after formal admission to the University. Further details may be found in the Teacher Education section of the catalog.

Geosciences (B.A., B.S.)

Attaining greater understanding of past and present Earth processes is the fundamental goal of geosciences. To achieve this goal the geoscientist studies the minerals, rocks, fluids, and fossils of the Earth and investigates the physical, chemical, and biological processes occurring on and in the Earth.

Professional opportunities in geology exist in the environmental, energy, and mineral resources industries and in government agencies concerned with these fields. In addition, many occupations concerned with law, management, economics, and the environment utilize a background in geosciences.

Specific degree plans will be formulated by the undergraduate advisor in Geosciences. Changing circumstances may require changes to the degree plans.
Bachelor of Arts in Geosciences* Degree Requirements (120 hours)

I. Core Curriculum Requirements1: 42 hours

A. Communication (6 hours)
   3 hours Communication (RHET 1302)
   3 hours Communication Elective (NATS 4310)2
B. Social and Behavioral Sciences (15 hours)
   6 hours Government (GOVT 2301 and 2302)
   6 hours History (HST 1301 and 2301)
   3 hours Social and Behavioral Sciences Elective
C. Humanities and Fine Arts (6 hours)
   3 hours Fine Arts (AP 1301)
   3 hours Humanities (A&H 1301)
D. Mathematics and Quantitative Reasoning (6 hours)
   6 hours College Mathematics (See College Master for recommended courses)
E. Science (9 hours)
   8 hours of Chemistry, Biology or Physics, including laboratory component
   1 hour Geoscience Laboratory (GEOS 1103)

1 Curriculum Requirements can be fulfilled by other approved courses from accredited institutions of higher education. The courses listed in parenthesis are recommended as the most efficient way to satisfy both Core Curriculum and Major Requirements at U.T. Dallas.

II. Major Requirements: 50 hours

Major Preparatory Courses (15 hours)
   GEOS 1303 Physical Geology
   GEOS 1304 Introduction to Earth History
   GEOS 1104 Earth History Laboratory
   GEOS 2407 Field Geology I
   GEOS 2409 Rocks and Minerals
Major Core Courses (8 hours)
   GEOS 3421 Stratigraphy and Sedimentology
   GEOS 3430 Invertebrate Paleontology
Major Related Courses (27 hours)
   Geosciences electives (15 hours)
   Science electives (12 hours)
Advanced Writing (3 hours)
   NATS 4310 Advanced Writing in the Natural Sciences and Mathematics

2 A Major requirement that also fulfills a Core Curriculum requirement. If hours are counted in the Core Curriculum, students must complete additional coursework to meet the minimum requirements for graduation. Course selection assistance is available from the undergraduate advisor.

* Must be taken in conjunction with a second major.

III. Elective Requirements: 28 hours

Advanced Electives (6 hours)
All students are required to take at least six hours of advanced electives outside their major field of study. These must be either upper-division classes or lower-division classes that have prerequisites.

Free Electives (22 hours)
Both lower- and upper-division courses may count as electives, but students must complete at least 51 hours of upper-division credit to qualify for graduation.

Fast Track Baccalaureate/Master's Degrees

U.T. Dallas students with strong academic records who intend to pursue a master's degree in Geosciences may apply for a Fast Track baccalaureate/master's plan of study, an accelerated program which allows undergraduates, upon admission to the graduate program, to take selected graduate courses that may be applied toward the bachelor's degree and be used to satisfy requirements for the master's degree. Interested students should contact the Geosciences undergraduate advisor for more information.

Geosciences Minor

Students not majoring in Geosciences are encouraged to choose Geosciences as a minor.

Lower-division courses (8 hours):
- GEOS 1303 Physical Geology *
- GEOS 1103 Physical Geology Lab. *
- GEOS 1304 Introduction to Earth History *
- GEOS 1104 Earth History Lab.

Upper-division courses (12 hours): To be selected in consultation with academic advisor

*A prerequisite course to be completed before enrolling in upper-division GEOS courses.

Specified Course Descriptions

A&H 1301 (HUMA 1301) Exploration of the Humanities (3 semester hours) An introduction to the concept of cultural tradition through the study of selected works of literature, philosophy, music, and visual art. Emphasis on the relations among various forms of cultural expression and developing students' ability to interpret complex artistic works in their historical, cultural, and intellectual contexts. General education core course. (3-0) S

AP 1301 (ARTS 1301) Exploration of the Arts (3 semester hours) This course introduces students to the physical and intellectual demands required of the author, the performer, and the visual artist. This introduction includes, but is not limited to, the student's production of a creative project as well as written assessments of art and performance. (3-0) Y

GEOS 1103 (GEOL 1103) Physical Geology Laboratory (1 semester hour) A laboratory to accompany GEOS 1303. The exercises include mineral and rock identification. Topographic maps, geologic maps, and aerial photographs are used to study surface landforms, geologic phenomena and tectonic processes. GEOS 1303 is a corequisite or prerequisite. (0-3) S

GEOS 1104 Earth History Laboratory (1 semester hour) A laboratory to accompany GEOS 1304. Exercises include: fossil identification, stratigraphy and correlation, the geologic time scale, age-determination techniques, and maps. (0-3) Y

GEOS 1303 (GEOL 1303) Physical Geology (3 semester hours) Introduction to the Earth as a unique planet. The course investigates minerals and rocks which make up the Earth. The structure of the Earth and dynamics of its internal mechanisms are explored. Plate tectonics and surface processes which sculpt the Earth are the topic of the second half of the course. Other planets and celestial bodies within the solar system are contrasted with Earth. Field trip. (3-0) S

GEOS 1304 Introduction to Earth History (3 semester hours) Introduction to the history of the Earth. The history of life and an introduction to the principles of paleontology, stratigraphy and global change will be discussed. All topics will be
discussed in the context of the tectonic evolution of North America. Field trip. Prerequisite: GEOS 1303 and GEOS 1103. (3-0) Y

**GEOS 2407 Field Geology I** (4 semester hours) Geologic field techniques. Field trips. Prerequisites: GEOS 1303 and 1103; GEOS 2409 recommended. (4-0) Y

**GEOS 2409 (GEOL 2409) Rocks and Minerals** (4 semester hours) Introduction to crystallography, mineralogy, and petrography. Laboratory course. Prerequisites: GEOS 1303 and 1103 (may be taken concurrently). (3-3) Y

**GEOS 3421 Stratigraphy and Sedimentology** (4 semester hours) Principles and evolution of modern stratigraphic nomenclature; concepts of space and time in the rock record and methods of stratigraphic correlation; factors controlling stratigraphic architecture of sedimentary basins; integrated stratigraphic techniques. Origin, transportation, and deposition of carbonate and siliciclastic sediments; weathering, textural analysis, and depositional environments. Laboratory course. Field trips. Prerequisites GEOS 1304, 1104, and 2409 (3-3) Y

**GEOS 3430 Invertebrate Paleontology** (4 semester hours) Studies in the morphology, evolution, classification, and paleoecology of invertebrates important in the fossil record. Laboratory course. Field trip. GEOS 1304 and 1104 recommended (2-6) Y

**GOVT 2301 (GOVT 2305) Constitutional Foundations and Political Behavior in the U.S. and Texas** (3 semester hours) This course examines the evolution and current state of political behavior and public policy making in the U.S. and Texas. Topics discussed will include the constitutions, federalism, intergovernmental relations, voting, elections, political parties, public opinion, and interest groups. (Fulfills one-half of the legislative requirement of 6 hours of American government.) (3-0) S

**GOVT 2302 (GOVT 2306) Political Institutions in the U.S. and Texas** (3 semester hours) This course explores the primary institutions of U.S. and Texas government. It examines the bureaucracy as well as the executive, legislative, and judicial branches of government at the state and federal level. (Fulfills one-half of the legislative requirement of 6 hours of American government.) (3-0) S

**HST 1301 Themes and Ideas in American History** (3 semester hours) An introduction to the methods of historical inquiry through the study of selected main themes in American history. A course designed to offer students an understanding of the historical and cultural context of America in the contemporary world. Fulfills one-half of the Texas legislative requirement for six hours in American history. (3-0) S

**HST 2301 Issues in American History** (3 semester hours) Readings, commentary, and discussion aimed at varying aspects of history and culture. Fulfills one-half of the Texas legislative requirement for six hours in American history. (3-0) Y

**NATS 4310 Advanced Writing in the Natural Sciences and Mathematics** (3 semester hours) A writing-intensive course on questions or problems in natural sciences and mathematics; satisfies the advanced writing requirement for graduation. (3-0) S

**RHET 1302 (ENGL 1302) Rhetoric** (3 semester hours) The course presents an integrated approach to writing, reading, and critical thinking by developing the grammatical, logical, and rhetorical skills necessary for university writing. All classes work in a computerized learning environment. Students are taught basic computer literacy and submit all work electronically and on paper. (3-0) S