School of Natural Sciences and Mathematics

Geosciences (BS)

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.

The [UTeach option](https://catalog.utdallas.edu/2014/undergraduate/programs/nsm/geosciences) may be added to the BS degree in Geosciences. UTeach Dallas Option degree plans are streamlined to allow students to complete both a rigorous Bachelor of Science degree and all coursework for middle or high school teacher certification in four years. Teaching Option degrees require deep content knowledge combined with courses grounded in the latest research on math and science education. While most graduates go on to classroom teaching, UTeach alums are also prepared to enter graduate school and to work in discipline related industry.

Faculty

**Professors:** Carlos L. V. Aiken, John F. Ferguson, John W. Geissman, William I. Manton, George A. McMechan, John S. Oldow, Robert J. Stern

**Professors Emeritus:** David E. Dunn, Richard M. Mitterer, Emile A. Pessagno Jr., Dean C. Presnall, Robert H. Rutford

**Associate Professors:** Thomas H. Brikowski

**Associate Professor Emeritus:** James L. Carter

**Senior Lecturers:** William R. Griffin, Ignacio Pujana
Bachelor of Science in Geosciences

Degree Requirements (120 semester credit hours)\(^1\)

I. Core Curriculum Requirements: 42 semester credit hours\(^2\)

Communication: 6 semester credit hours

- **COMM 1311** Survey of Oral and Technology-based Communication
- **RHET 1302** Rhetoric

Mathematics: 3 semester credit hours

- **MATH 2413** Differential Calculus\(^3,4\)
- or **MATH 2417** Calculus \(^3,4\)

Life and Physical Sciences: 6 semester credit hours

- **CHEM 1311** General Chemistry \(^3\)
- **CHEM 1312** General Chemistry II\(^3\)

Language, Philosophy and Culture: 3 semester credit hours

Select any 3 semester credit hours from Language, Philosophy and Culture core courses (see advisor)

Creative Arts: 3 semester credit hours

Select any 3 semester credit hours from Creative Arts core courses (see advisor)

American History: 6 semester credit hours

Select any 6 semester credit hours from American History core courses (see advisor)

Government / Political Science: 6 semester credit hours

- **GOVT 2305** American National Government
- **GOVT 2306** State and Local Government

Social and Behavioral Sciences: 3 semester credit hours

Select any 3 semester credit hours from Social and Behavioral Sciences core courses (see advisor)
Component Area Option: 6 semester credit hours

- **GEOS 1303** Physical Geology
- **GEOS 1304** History of Earth and Life

II. Major Requirements: 60-68 semester credit hours

Major Preparatory Courses: 19 semester credit hours beyond Core Curriculum

Prerequisite courses to be completed before enrolling in upper-division GEOS courses.

- **CHEM 1311** General Chemistry I 3
- **CHEM 1312** General Chemistry II 3
- **GEOS 1303** Physical Geology 3
- **GEOS 1304** History of Earth and Life 3
- **GEOS 1103** Physical Geology Laboratory
- **GEOS 1104** History of Earth and Life Laboratory
- **GEOS 2409** Rocks and Minerals
- **MATH 2413** Differential Calculus 3, 4
  - or **MATH 2417** Calculus I 3, 4
- **MATH 2414** Integral Calculus
  - or **MATH 2419** Calculus II
- **PHYS 2325** Mechanics
- **PHYS 2125** Physics Laboratory I
- **PHYS 2326** Electromagnetism and Waves
- **PHYS 2126** Physics Laboratory II

Major Core Courses: 27 semester credit hours

- **GEOS 2306** Essentials of Field Geologic Methods
- **GEOS 3300** Field Geology I (Summer Field Camp I)
- **GEOS 3421** Stratigraphy and Sedimentology
- **GEOS 3464** Igneous and Metamorphic Petrography
- **GEOS 3470** Structural Geology
- **GEOS 4300** Field Geology II (Summer Field Camp II)
GEOS 4320 The Physics and Chemistry of the Solid Earth
GEOS 4390 Geoscience Writing and Reports

Geology Option: 14-15 semester credit hours

GEOS 3434 Paleobiology
GEOS 4322 The Earth System
GEOS 4430 Hydrogeology and Aqueous Geochemistry

A mathematics course selected from:

GEOS 5306 Data Analysis for Geoscientists (with permission)
MATH 2418 Linear Algebra
MATH 2451 Multivariable Calculus with Applications
PHYS 3330 Numerical Methods in Physics and Computational Techniques

OR

Geophysics Option: 24 semester credit hours

MATH 2420 Differential Equations with Applications
MATH 2451 Multivariable Calculus with Applications
MATH 4362 Partial Differential Equations
PHYS 3411 Theoretical Physics
PHYS 3312 Classical Mechanics
PHYS 3416 Electricity and Magnetism

III. Elective Requirements: 10-18 semester credit hours (17 or 18 semester credit hours for Geology Option; 10 semester credit hours for Geophysics Option)

Electives: 6 semester credit hours

All students are required to take at least six semester credit hours of electives outside their major field of study. These must be either upper-division classes or lower-division classes that have prerequisites.

Free Electives: 12 semester credit hours (11 or 12 semester credit hours for Geology Option; 4 semester credit hours for Geophysics Option)

Both lower- and upper-division courses may count as electives, but students must complete at least 51 semester credit hours of upper-division courses to qualify for graduation. Students

are strongly encouraged to take GEOS graduate courses as free electives.

Bachelor of Science in Geosciences with UTeach Option

Degree Requirements (120 semester credit hours)

I. Core Curriculum Requirements: 42 semester credit hours

Communication: 6 semester credit hours

COMM 1311 Survey of Oral and Technology-based Communication
RHET 1302 Rhetoric

Mathematics: 3 semester credit hours

MATH 2413 Differential Calculus
or MATH 2417 Calculus

Life and Physical Sciences: 6 semester credit hours

CHEM 1311 General Chemistry
CHEM 1312 General Chemistry II

Language, Philosophy and Culture: 3 semester credit hours

Select any 3 semester credit hours from Language, Philosophy and Culture core courses (see advisor)

Creative Arts: 3 semester credit hours

Select any 3 semester credit hours from Creative Arts core courses (see advisor)

American History: 6 semester credit hours

Select any 6 semester credit hours from American History core courses (see advisor)

Government / Political Science: 6 semester credit hours

GOVT 2305 American National Government
GOVT 2306 State and Local Government

Social and Behavioral Sciences: 3 semester credit hours

Select any 3 semester credit hours from Social and Behavioral Sciences core courses (see
advisor)

Component Area Option: 6 semester credit hours

GEOS 1303 Physical Geology
GEOS 1304 History of Earth and Life

II. Major Requirements: 72 semester credit hours

Major Preparatory Courses: 19 semester credit hours beyond Core Curriculum

Prerequisite courses to be completed before enrolling in upper-division GEOS courses.

CHEM 1311 General Chemistry I
CHEM 1312 General Chemistry II
GEOS 1303 Physical Geology
GEOS 1304 History of Earth and Life
GEOS 1103 Physical Geology Laboratory
GEOS 1104 History of Earth and Life Laboratory
GEOS 2409 Rocks and Minerals
MATH 2413 Differential Calculus
or MATH 2417 Calculus I
MATH 2414 Integral Calculus
or MATH 2419 Calculus II
PHYS 2325 Mechanics
PHYS 2125 Physics Laboratory I
PHYS 2326 Electromagnetism and Waves
PHYS 2126 Physics Laboratory II

Major Core Courses: 21 semester credit hours

GEOS 2306 Essentials of Field Geologic Methods
GEOS 3421 Stratigraphy and Sedimentology
GEOS 3434 Paleobiology
GEOS 4320 Physics and Chemistry of the Solid Earth
GEOS 4322 The Earth System
**GEOS 4430** Hydrogeology and Geochemistry

**Composite Science and Mathematics Requirements: 8 semester credit hours**

**BIOL 2311** Introduction to Modern Biology I  
**BIOL 2111** Introduction to Modern Biology Workshop I  
**BIOL 2312** Introduction to Modern Biology II  
**BIOL 2112** Introduction to Modern Biology Workshop II

**UTeach Requirements: 24 semester credit hours**

**NATS 1141** UTeach STEP 1  
**NATS 1143** UTeach STEP 2  
**NATS 3341** Knowing and Learning in Mathematics and Science  
**NATS 3343** Classroom Interactions  
**HIST 3328** History and Philosophy of Science and Medicine  
**NATS 4390** Research Methods  
**NATS 4341** Project-based Instruction  
**NATS 4694** UTeach Apprentice Teaching, 8-12 Science and Mathematics  
  or **NATS 4696** UTeach Apprentice Teaching, 4-8 Science and Mathematics  
**NATS 4141** UTeach Apprentice Teaching Seminar

**III. Free Electives: 6 semester credit hours**

**Electives: 6 semester credit hours**

Students are required to take additional free electives (upper-division if necessary) if needed to reach 120 total degree semester credit hours or 51 upper-division semester credit hours.

**Fast Track Baccalaureate/Master’s Degrees**

The Fast-Track program allows students with strong academic records to take selected graduate courses that may be applied toward the baccalaureate degree and be used to satisfy requirements for the master's degree. Interested students who intend to pursue a master's degree in Geosciences may apply for a Fast Track baccalaureate/master's plan of study via the Geosciences graduate advisor. The planned coursework must be coordinated with the Geosciences undergraduate advisor; the Geosciences graduate advisor should also be notified. A maximum of 15 semester credit hours may be applied under this program.
1. Incoming freshmen must complete and pass UNIV 1010 Freshman Seminar and the corresponding school-related freshman seminar course. Students, including transfer students, who complete their core curriculum at UT Dallas must take UNIV 2020.

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

3. A Major requirement that also fulfills a Core Curriculum requirement.

4. Three semester credit hours are counted to fulfill the Mathematics Core Requirement with the remaining semester credit hour to be counted under the major requirements.