The Department of Geosciences offers two undergraduate programs: the Geology major, leading to a Bachelor of Science degree, and the Earth and Space Sciences major, leading to a Bachelor of Arts degree. Minimum course requirements for the B.S. program in Geology are detailed below. For requirements for the B.A. program in Earth and Space Sciences, see the entry in the alphabetical listing of Approved Majors, Minors, and Programs. Upon declaring the major, the student is assigned a faculty advisor who will assist in the selection of a course sequence leading to the degree. Students should consult frequently with their faculty advisors regarding their progress and regarding appropriate science courses. Because the position of the scientist in society is responsible and complex, the student is cautioned to pay careful attention to general education in the arts, humanities, and social sciences.

**Geology**

The science of geology is focused on evaluation of the physical and chemical characteristics of the Earth and other planets and the processes that have controlled evolution of these characteristics over time. The B.S. program has built-in flexibility to allow majors to choose from a variety of electives in environmental geoscience, planetary geoscience, geophysics, and geochemistry. This allows students to develop a major that best reflects their interests and career goals, by allowing students to build upon the core curriculum by selecting 15 credits of upper-level science/mathematics electives from both within and outside of the Geosciences. The major aims to provide the student with maximum preparation to carry out graduate and professional work in each of these fields. Students graduating with a B.S. in Geology typically go on to graduate school or obtain professional employment with environmental consulting firms or various government organizations.

**Courses in Geology**

See the Course Descriptions listing in this Bulletin for complete information.

**Affiliated Faculty**

Robert C. Aller, SoMAS
Henry J. Bokuniewicz, SoMAS
J. Kirk Cochran, SoMAS
Roger Flood, SoMAS
David W. Krause, Anatomical Sciences
Maureen O'Leary, Anatomical Sciences

**Teaching Assistants**

Estimated number: 12

**Faculty**

Daniel M. Davis, Professor, Ph.D., Massachusetts Institute of Technology: Geophysics.
Steven C. Englebright, M.S., Curator, Stony Brook University: Geology.
Timothy Glotch, Assistant Professor, Ph.D., Arizona State University: Planetary Science.
Gilbert N. Hanson, Associate Professor and Professor, Ph.D., University of Minnesota: Geochronology.
William E. Holt, Professor, Ph.D., University of Arizona: Geophysics.
Robert C. Liebermann, Distinguished Service Professor and Professor, Ph.D., Columbia University: Geophysics.
Donald H. Lindsley, Distinguished Professor Emeritus, Ph.D., Johns Hopkins University: Geochemistry; petrology.
Scott M. McLennan, Professor, Ph.D., Pennsylvania State University: Geological Oceanography.
Artem Oganov, Associate Professor, Ph.D., University College London: Computational mineral physics.
John B. Parise, Professor, Ph.D., James Cook University: Crystallography; mineral physics.
Brian L. Phillips, Associate Professor, Ph.D., University of Illinois: Geochronology; mineralogy.
Troy Rasbury, Associate Professor, Ph.D., Stony Brook University: Geochemistry.
Richard J. Reeder, Professor, Ph.D., University of California, Berkeley: Geochemistry.
Andrea Deanne Rogers, Research Assistant Professor, Ph.D., Arizona State University: Remote sensing; planetary surface processes; GIS.
Martin A. Schoonen, Professor, Ph.D., Pennsylvania State University: Geochemistry.
Christiane Stidham, Lecturer, Ph.D., University of California: Tectonic and structural modelling.
Donald J. Weidner, Distinguished Professor, Ph.D., Massachusetts Institute of Technology: Geophysics.
Lianxing Wen, Professor, Ph.D., California Institute of Technology: Global geophysics.
Teng-fong Wong, Professor, Ph.D., Massachusetts Institute of Technology: Geophysics.
Requirements for the Major in Geology (GEO)

The major in Geology leads to the Bachelor of Science degree. All courses offered for the major must be passed with a letter grade of C or higher.

Completion of the major requires 65 to 68 credits.

A. Required departmental courses
- GEO 103 The Earth Through Time
- GEO 113 Historical Geology Laboratory
- GEO 122 Physical Geology
- or GEO 102 The Earth and GEO 112 Physical Geology Laboratory
- GEO 306 Mineralogy
- GEO 309 Structural Geology
- GEO 403 Sedimentation and Stratigraphy
- GEO 407 Igneous and Metamorphic Petrology

B. Required courses in the related sciences
- MAT 131, 132 Calculus I, II (See Note 1 below)
- CHE 131, 132 General Chemistry or CHE 141, 142 Honors Chemistry
- PHY 131/133, 132/134 Classical Physics I, II and labs or PHY 141, 142 Honors Physics

C. Related science electives
- A set of upper-division science courses, totaling 20 credits, that has been approved by the department.

D. Upper-Division Writing Requirement
- All students majoring in Geology must submit two papers (term papers, laboratory reports, or independent research papers) to the director of undergraduate studies for Department evaluation by the end of the junior year. If this evaluation is satisfactory, the student will have fulfilled the upper-division writing requirement. If it is not, the student must fulfill the requirement before graduation.

Notes:
1. The following alternate beginning calculus sequences may be substituted for MAT 131, 132 in major requirements or prerequisites: MAT 125, 126, 127 or 141, 142 or 171. Equivalency for MAT courses achieved by earning the appropriate score on a University mathematics placement examination will be accepted as fulfillment of the requirement without the necessity of substituting other credits. For detailed information about the various calculus sequences, see “Beginning Mathematics Courses” under the entry for the Department of Mathematics and the individual course descriptions.

Suggested Clusters of Science Electives:

Students with interest in Geology:
- GEO 310 Introduction to Geophysics
- GEO 315 Groundwater Hydrology
- GEO 320 Glacial Geology
- GEO 405 Field Camp
- GEO 487 Senior Research in Geology

Students with interest in Environmental Geoscience:
GEO 305 Field Geology
GEO 315 Groundwater Hydrology
GEO 316 Geochemistry of Surficial Processes
GEO 420 Environmental Analysis and Remote Sensing/GIS
MAR 340 Environmental Problems

Students with interest in Geological Oceanography:
GEO 310 Introduction to Geophysics
GEO 316 Geochemistry of Surficial Processes
GEO 318 Engineering Geology and Coastal Processes
GEO 353 Marine Ecology
MAR 304 Waves, Tides, and Beaches

Honors Program in Geology
Students in the Geology major who have maintained a grade point average of 3.50 in natural sciences and mathematics through the junior year may become candidates for Departmental honors in Geology by applying to the Department.

In addition to the academic program, the student must complete an honors thesis, which is evaluated by a committee composed of the student's advisor and two other science faculty members including one from outside of the Department. If the honors program is completed with distinction and the student has maintained a minimum 3.50 grade point average in all coursework in natural sciences and mathematics, honors are conferred.

Requirements for the Minor in Geology (GEO)
For students majoring in other areas who are interested in obtaining a fundamental understanding of the earth sciences, a minor concentration in Geology is available. The Geology minor acquaints students with earth materials, the origin and evolution of life on earth, and physical processes that have shaped the earth through time.

All courses offered for the minor must be passed with a letter grade of C or higher. Completion of the minor requires 20 credits.