The complementary fields of geology and geophysics are combined in one interdisciplinary department, with graduate degrees offered in both disciplines. The undergraduate degree is in geology and geophysics. Geology offers unusual opportunities to interweave knowledge from many disciplines in the study of natural Earth phenomena. Those who enjoy the challenge of integrating different kinds of information into a unified interpretation will find geology particularly satisfying. Most geology students enjoy travel and have a strong interest in the natural environment as it is today and as it has developed through the past 4.5 billion years. A natural capacity for historical and sequential thought, inductive reasoning, and three-dimensional perception is helpful, and these skills will be developed. Geological investigations are becoming increasingly quantitative and experimental, and thus require some computer experience and a strong foundation in chemistry, physics, and mathematics.

The student of geophysics is interested in developing a quantitative understanding of the structure and dynamics of the Earth’s interior from the shallow crust to deep core. Courses in geophysics apply basic physical laws and processes, such as those governing gravity, magnetism, heat flow, and seismic wave propagation, to the study of the Earth. An undergraduate may choose to concentrate in geophysics, but professional employment in the field often requires an advanced degree. Most students who pursue advanced study and careers in geophysics major in geology, physics, mathematics, or engineering as undergraduates.

CAREERS

More than half of all professional geologists and geophysicists work in hydrogeology or the petroleum and mining industries. Such jobs involve an unusual breadth of training and personal adaptability, and the M.S. degree is generally required. About one fifth of all geoscientists work in state and federal geological surveys, and in government research activities such as oceanographic programs. These positions largely involve problems in geologic mapping, mineral resources, groundwater, and engineering. Geophysics offers opportunities in earthquake studies, seismic verification of nuclear test bans, and crustal rock characterization techniques for waste disposal and groundwater modeling. Many geology students continue on to obtain a Ph.D. degree and become faculty members at a college or university. A geology and geophysics major is also appropriate for those interested in careers in elementary or secondary education, environmental policy, or environmental law. Faculty advisors can provide additional information on career opportunities.

PREPARATION FOR GRADUATE STUDY

An advanced degree is normally required for professional activity in geological and geophysical sciences; the student who contemplates such a degree should satisfy both department and graduate school requirements for admission to graduate study.

Minimum requirements for admission to graduate work in geology or geophysics at most universities in the United States, including the University of Wisconsin–Madison, are:

1. A bachelor’s degree in geology/geophysics or a related science
2. One year of college chemistry (one year high school plus CHEM 109 Advanced General Chemistry recommended)
3. One year of college physics (PHYSICS 207 General Physics–PHYSICS 208 General Physics recommended)
4. One year of calculus (MATH 221 Calculus and Analytic Geometry 1–MATH 222 Calculus and Analytic Geometry 2 recommended)
5. A summer field-mapping course equivalent to GEOSCI 459 Field Geology (Park City, Utah)