The Department of Earth Sciences takes the Montana State University tagline “Mountains and Minds” quite literally. Our faculty, staff and students use their minds for learning and discovery in the scenic and rugged mountains of southwest Montana, as well as in mountainous areas and rural landscapes around the nation and worldwide. Earth Sciences students have many opportunities to participate in field trips that facilitate the study of earth processes, earth resources, earth history and environments that people have modified.

UNDERGRADUATE DEGREE OPTIONS

The Department of Earth Sciences offers a Bachelor of Science in the following options:

Geography
The geography option offers a unique perspective that emphasizes 1) the importance of understanding the human and physical world, 2) the intricate interactions that link people with their environment, and 3) the value and utility of geographical techniques and tools such as cartography, aerial photo interpretation, remote sensing and geographic information systems (GIS). Geographers find professional jobs in urban and land use planning, natural resources and environmental management as well as skills-orientated positions in cartography, remote sensing and GIS.

Geology
The geology option is designed for students who wish to apply the principles of field geology to the study of the Earth. This background can be used in a variety of careers, including exploration for and development of Earth’s mineral and energy resources; environmental and engineering applications related to land use and development; and research into ground and surface-water hydrology, surficial processes and natural hazards, and climatic change.

GIS/Planning
The GIS (geographic information system)/planning option is designed to offer students a mix of technical skills and academic education that prepares them for careers in local, state and federal planning, as well as opportunities in private consulting firms that are involved in the planning process. The GIS/planning option takes advantage of excellent GIS facilities, lab space, expertise and software available on campus and allows students to learn in an active hands-on environment. Students are equipped to work as cartographers, spatial analysts and planners.

Paleontology
The paleontology option is designed for those students who have a strong interest in geology and biology, specifically vertebrate or invertebrate fossil organisms. The paleontology option provides the background needed for those seeking employment with natural history museums (fossil collections and curation). Graduate training beyond the bachelor’s degree is considered essential for those seeking a career in teaching and/or research (typically a doctorate). Additionally, some job opportunities for paleontologists exist in the petroleum industry, normally for those with a master’s degree.

Snow Science
The snow science option is based on a solid and broad-based foundation of course work from geography, mathematics, statistics, chemistry and physics. The degree provides a robust quantitative approach to geo-science, with an emphasis on snow, mountain systems and GIS. The program prepares students for work in a variety of snow-related areas, including avalanche forecasting, water resource planning, snow-melt hydrology, land-use planning and snow engineering, as well as a strong technical undergraduate program for environmental scientists or lawyers.
HANDS-ON LEARNING

Because of the research conducted by faculty in the department, an undergraduate student may have the opportunity to work on active research projects. In particular, we offer the opportunity to do a senior thesis to our top students in each senior class. The senior thesis enables a student to work on an actual research project under the supervision of a faculty member, write a research report (a mini-thesis) and present the results at a professional conference. This is excellent preparation for graduate school and/or the workplace.

EARTH SCIENCES RESEARCH FACILITIES AND GROUPS

Geomicrobiology Lab: This lab investigates the role microbes and microbial processes play in geological and geochemical processes.

Earth Surface Processes Lab: This lab studies the chemical and physical evolution of Earth’s soils and surface, using a diverse range of geochemical, remote sensing, geophysical and field methods.

Image and Chemical Analysis Lab: This facility provides academic and public microanalytical and imaging facilities.

Museum of the Rockies: With a vast collection of dinosaur fossils, the museum houses some of the most famous dinosaur specimens in the world including Tyrannosaurus rex and Triceratops, and is a Smithsonian Affiliate and a Federal Repository for fossils.

Paleoecology Lab: The paleoecology research group focuses on fire and vegetation history of the Quaternary Period. Ecological history is reconstructed via pollen and charcoal analysis.

Snow and Avalanche Lab: This lab provides graduate research space for snow and avalanche research, focused primarily on snow as a hazard and as a resource.

Spatial Sciences Center: The center supports research that incorporates geographic information science, remote sensing, global positioning system and spatial analysis.

Structural Geology Lab: The structural geology and tectonics research laboratory provides high-end computing capabilities and field equipment that support surface and subsurface structural analysis and synthesis.

For additional information, contact:
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A degree in earth sciences also prepares students for graduate work in this discipline; graduate degrees are typically required for professional participation in the field.

What can I do with a degree in Earth Sciences?
- Avalanche forecasting
- CAD operator
- Cartographer
- Climatologist
- Earth science teacher
- Ecologist
- Environmental consultant
- Environmental engineer
- Geographer
- Geographic information specialist
- Geologist
- Geomorphologist
- Geophysicist
- Government agency administrator
- Hydrogeologist
- Landscape architect
- Lawyer
- Museum curator
- Natural resource manager
- Naturalist
- Paleontology
- Petrologist
- Research scientist
- Remote sensing
- Science librarian
- Seismologist
- Soil conservationist
- Soil scientist
- Snow engineer
- Surveyor
- Technical sales representative
- Technical writer
- Urban/land use planner
- Water quality specialist

Undergraduate students learning snow surveying techniques.