Undergraduate Program Assessment

Department of Geosciences

Student Learning Objectives

Department
• Critical thinking and analytic reasoning.
• Data analysis and interpretation skills.
• Real-world problem solving for effective decision-making.
• Working in groups and consideration of diverse perspectives.
• Effective writing, presentational, and computational skills.
• Professional and ethical behavior.

Geology Program
• Fundamental geologic principles, including hands-on field experiences.
• Basic observational skills related to the recognition of rocks and minerals, common fossils and sedimentary environments, structures and tectonic features.
• Three-dimensional visualization of dynamic geologic systems.
• An understanding of geologic time and Earth history.
• An understanding of geologic processes and rates.
• Collection, integration, and analysis of data using a variety of tools and methods to solve real-world geologic problems.
• Use and critical evaluation of models to simulate and understand Earth processes.
• Solid background in physics, chemistry, and math.
• Access to interdisciplinary training in geochemistry, biogeochemistry, and geophysics.
• History of the science and scientific method.
• New developments, techniques, and discoveries in the field.
• Application of geology to the challenges facing humankind, including natural resources, energy, water, geohazards, and global climate change.

Earth Systems Program
• Fundamental geologic principles, including atmosphere and ocean science.
• Solid background in physical and biological sciences, and math.
• Access to interdisciplinary training in geochemistry, biogeochemistry, and geophysics.
• Integration of large-scale Earth systems.
• Use and critical evaluation of models to simulate Earth processes.
• Human impact on Earth systems.
• Issues and controversies of global change today.

Geography Program
• The application of spatial thinking to contemporary issues.
• The social and physical processes that affect the location and distributions of people, their institutions, and their impact on the Earth within three areas: environment, global society and culture, and geographical techniques.
• Environment:
  (1) To become literate in the terminology and frames of reference used in environmental research and to apply terminology and frames of reference appropriately.
  (2) Demonstrate the ability to identify and explain aspects of key environmental issues, including global climate change and land-surface transformation.
  (3) To be able to identify and apply analytic tools and geographic models appropriate to the study of environmental and natural-resource issues.
• **Society and Culture:**
  (1) Demonstrate the ability to synthesize and examine critically a range of contemporary issues, particularly those connected with globalization and geopolitics.
  (2) To understand and evaluate connections and disconnections between places and peoples within the context of development and unequal power relationships.
  (3) To be able to identify and apply analytic tools and geographic models appropriate to the study of cultural, societal and environmental issues at multiple spatial scales.

• **Geographical Techniques:**
  (1) To demonstrate an understanding of fundamental principles, concepts and knowledge of geographic technologies used in the acquisition, processing and analysis of spatial geographic data.
  (2) To be able to locate, access, manipulate, display and communicate spatial geographic data on selected topics.
  (3) To become fluent in specific applications that support career prospects.

**Assessment tools**
• Indirect: in-house designed exit interviews (planned)
• Questionnaire to be sent to alums concerning their UMass preparation for their career and recommendations for ways to improve the undergraduate curriculum to meet the present day challenges in the geosciences (planned).

**Highlighted recent activities**
• Department has developed a series of informal meetings for undergraduates entitled “Get Your Ducks in a Row”, addressing topics related to career development, and success as gauged by student feedback has resulted in the Department determining to hold the series annually. (*This action does not appear to be linked to the use of evidence on student learning outcomes.)*
• Department has initiated a review of learning goals and outcomes of the core geology courses
• Survey data suggest a need to focus additional work on improving writing skills, and in academic advising, particularly as it relates to careers.
• Geography program has incorporated into the writing course an in-depth survey of career opportunities and preparation.