

Table 7. Course listings with the outcomes, experiential components, and portfolio products identified.

Course	Outcomes	Portfolio Products	Experiential Component
GEO 103	Familiarity with general facts, principles and concepts of Earth and Earth Processes; Identify Earth materials and use simple geological tools	Final Project?	
GEO 150	Be familiar with concept of geological time and its theoretical basis; Understand basic stratigraphic principles; Understand Geology as a historical science; Acquire basic experience in geological field methods (measurement of stratigraphic sections; simple field mapping) in the context of the reconstruction of Earth history.	Short (ca. 5 pages) paper Measured section and/or simple geological map	Use of basic mapping skills to identify and understand successions of rocks and the ancient environments they represent
GEO 210	Identify and recognize the non-randomness of landforms. Understand the geologic processes that produce landforms. Characterize geomorphic features and identify the geomorphic processes responsible for observed landforms.	Project report from multi-week coastal processes field exercise.	Use topographic maps and aerial photographs to characterize and identify landforms produced by a variety of geological processes. Use selected field methods to actively investigate the relationship between process and observed geomorphic features.
GEO 320.5	Identify and characterize Earth materials; recognize criteria for distinguishing them; Understand basic physico-chemical processes of Earth material formation; Understand role of tectonic settings and geological processes on specific mineral/rock occurrences; and Apply above in the field.	Summary paper describing how and why knowledge of Earth materials is fundamental to further study in the Geosciences.	Hands-on discovery of how to classify minerals & rocks; Field observations involving laboratory and lecture concepts

Table 7 (continued)

<p>GEO 370</p>	<p>Identify and interpret earth structures, on a micro- to macro-scale, with an emphasis upon brittle structures (i.e., faults and fractures); Collect and interpret qualitative and quantitative structural data in the field; Carry out simple <i>detailed structural analyses</i> of common geologic phenomena; Understand the relationships amongst the earth’s internal energy sources, plate tectonics, and structural features; Apply tenets of continuum mechanics to interpretation of earth structure; Have familiarity with major stages in the geologic evolution of New England; Assess and interpret selected geohazards, such as earthquakes and landslides, in terms of stress and strain.</p>	<p>Ten laboratory exercises are based upon an imaginary field locale (based upon U. California field camp). Portfolio products include labs plus a capstone report on the locale; Detailed geologic maps and cross sections, with stereographic projections, of geologic sites in the area.</p>	<p>Laboratory and field exercises including: 1) collection of structural data; 2) manipulation and interpretation of data, through use of orthographic and stereographic projections, and computer modeling; 3) construction of structural profiles and related diagrams; 4) identification of styles of deformation, at thin section to outcrop scale, with emphasis placed upon discrimination between brittle vs. ductile structures.</p>
<p>GEO 3XX</p>	<p>Recognize natural and human geohazards; Be able to describe in detail the causes and effects of the following short- and long-term geohazards, and their impact on society: earthquakes, volcanic eruptions, riverine and coastal flooding, landslides, global warming; Be able to predict the magnitude and likelihood of events such as floods or earthquakes for specific locales; Be able to assess the primary and secondary costs of such events; Be familiar with those geohazards of relevance to New England</p>	<p>Case study of a geohazard or event (e.g., Loma Prieta earthquake) that has received considerable attention in recent years; Additional short paper.</p>	<p>Use of internet and other resources in preparation of Case Study and paper; Interview geologists and other persons involved in geohazard assessment and management.</p>
<p>GEO 450</p>	<p>Understand basic principles of facies and depositional environments. Understand and use basic concepts such as transgression and regression. Ability to use said basic principles and concepts to interpret rock sequences. Ability to use basic lab techniques to determine texture and composition of sediment and sedimentary rocks in hand sample and thin section.</p>	<p>Selected laboratory and field trip reports, including a capstone exercise constructing a series of depositional environmental maps.</p>	<p>Laboratory and field exercises including: 1) measuring a section in Proterozoic rock in the Boston Basin, and 2) interpreting facies and stratification in a trench dug by them across a Rhode Island beach.</p>

Table 7 (continued)

GEO 483	Understand basic principles of ground-water flow. Ability to use basic techniques to interpret hydrogeologic data. Ability to identify an appropriate approach for addressing a given hydrologic problem.	Project report on the hydrogeology of the Chipuxet Aquifer.	Project: characterizing the hydrogeology of the Chipuxet Aquifer. Students use a variety of field, laboratory and interpretive techniques to describe and understand the hydrogeology of the aquifer system.
GEO 484	Understand physical principles governing contaminant fate and transport Interpret complex environmental data sets Predict the fate and transport of contaminants Formulate strategies for polluted site investigation and clean-up	Presentation and project report on the fate and transport of a particular contaminant class.	Project: Fate and transport of contaminants. Students use a variety of laboratory and interpretive techniques to analyze and predict the the behavior of pollutants in the environment.
COPlat	Be familiar w/ rock sequences in the field; Understand and apply lithostratigraphic principles; Recognize and reconstruct paleoenvironments; Understand the evolution of paleoenvironments over geological time; and Synthesize undergraduate learning to solve geological problems (capstone course)	Measured sections and facies map; Paleoenvironmental reconstructions	Fieldwork necessary to accomplish outcomes; geological mapping with topographic maps; measuring of columnar sections; observation of lithological features; use of pocket transit and/or geological compass; interpretation of same.
OCG 451	Understand basic physical, chemical and biological principles and processes pertaining to the world's Ocean System	work product	
OCG 540	Understand the origin and evolution of ocean basins and margins in the context of morphology, structure, plate tectonics, volcanism, sedimentation, and paleoceanography		
OCG elec.	varies with the course		
OCG 493/494	Ability to work in an oceanography laboratory setting	Final report as specified by advisor	Cohesive laboratory study supervised by GSO faculty.