

Meaning, Quality and Integrity of the Geology BS Degree (2014 Assessment Report)

Meaning of the Geology BS Degree:

Expectations for Entering Students

Geology majors must meet the minimum admissions standards for Cal Poly Pomona; i.e., C average in previous course work and satisfactory English and math skills. Freshmen applicants are expected to have general interests in the geosciences. Transfer applicants must have satisfied the lower division GE requirements. They should also have taken Principles of Geology lecture and lab that constitutes one of our core requirements. We recommend that transfers take a year of calculus and some chemistry before beginning at Cal Poly Pomona. About 1/3 of the admitted transfer students do.

Preparation for Future Careers in Geosciences

The Geological Sciences Department offers diverse and modern BS degree programs to produce graduates who understand the science behind active Earth processes and bring quantitative problem-solving skills to the table in an interdisciplinary work environment. Future geoscientists will confront a rapidly changing world with regional, national, and global issues related to strained water resources, natural hazards mitigation, shortages of mineral and energy resources, and site evaluations of infrastructure or housing projects. Their endeavors must interface with the environmental challenge of maintaining quality of life while managing development in an increasingly populated world. Graduates of the Geology program have broad capabilities and are ready to confront these new challenges as professional geologists or in post-graduate educational settings.

Skills and Knowledge Developed by the Program

Students entering the Geological Sciences Department are offered a choice between three emphases leading to a Bachelor of Science Degree in Geology. Each emphasis presents a comprehensive curriculum in the Geosciences with support courses in mathematical, physical, chemical and biological sciences. Each has a different focus, enabling students to direct their own curriculum towards their main Geoscience interests. The Geology emphasis is strongly field-oriented and offers a hands-on, traditional, program focused on mineral resources and developing excellent field and mapping skills. The Geophysics/Earth Exploration emphasis takes a more global and quantitative approach to the Earth and Planetary Sciences, producing graduates who use modern technology to address another growth area in the Geosciences: natural hazard analysis and mitigation. The Environmental Resources emphasis, through its interdisciplinary coursework, addresses the important contemporary need for geoscientists able to tackle the challenges posed by the world's demand for mineral, energy and water resources in the context of environmental change.

Program Quality:

Pedagogical Techniques and Faculty Expertise

The Geology BS curriculum balances classroom theory, modern technology and laboratory application with field experiences that incorporate industry-standard equipment, and offers opportunities for faculty-mentored research. We have a strong record of obtaining state-of-the-art equipment through faculty research grants. Students gain valuable and practical skills utilizing such equipment individually and in teams. Our applied approach to learning and career training is directed by faculty who can provide personal guidance specific to each student. Much department

effort goes toward recruiting and retaining the highest quality faculty who are current in their field. In general, we strive to achieve the learning outcomes listed below:

Learning Outcomes

Graduates from our BS degree program should be able to:

- 1) Understand and implement various facets of the scientific method.
- 2) Effectively communicate results of scientific investigations in written and oral format
- 3) Recognize common Earth materials, structures, and landforms, describe their properties, and determine their age relationships.
- 4) Acquire geologic data in the laboratory or field using standard observational procedures and scientific equipment.
- 5) Describe the interrelated processes operating in Earth's lithosphere, hydrosphere, atmosphere, and biosphere over different geologic time scales.
- 6) Use maps, cross sections, and other imagery to analyze and interpret spatial and temporal relationships displayed by Earth features or geologic data sets.
- 7) Utilize quantitative reasoning, experiential judgment, and computer technology to assess data, draw conclusions, and solve problems.

Program Integrity:

The integrity of the Geology BS program is gauged through a series of assessment tools developed as a result of implementing our 2005-06 Assessment Plan. Several tools that have been especially informative include:

- Mapping of specific GSC courses against Program Learning Outcomes
- Development and piloting of rubrics for our GE Area B1 and B5 classes
- Development of rubrics for the senior thesis presentations (GSC 462)
- Pre-test / Post-test analyses conducted in several classes
- Advising efforts that include one-on-one advising of each Geology major each quarter. These efforts allow us to track student progress toward the degree, make suggestions for efficient scheduling, and rectify academic performance problems before they become untenable
- Development of seminars focused on how to apply for internships and graduate school
- Tracking of BS graduate placement. The majority of our graduates are placed in industry jobs related to the geosciences. Approximately 10-20% continue on to graduate school, including some very prestigious institutions
- Constructive discussions among Geology faculty about our curricular goals in light of the semester conversion

Additional evidence of our program success is contained in the various reports related to our Academic Program Review of 2010-11. Assessment by the External Reviewers, the Dean's comments and subsequent meetings with the Provost, Associate Provost and Science Dean were all positive. The Geology BS program is rapidly growing and on track for continued success.