Form E-1-A for Boston College Undergraduate Programs

Program: GEOLOGICAL SCIENCES

We are beginning the process of a thorough review of our undergraduate curriculum, motivated by a broad-based national discussion regarding the future of geoscience education. In January 2016 our Department Chair, John Ebel, attended a national summit at UT Austin on developing a community vision for geoscience education. The summit addressed issues such as course content, teaching methods, and concepts and skills that the next generation of geoscience students will need to master. Reflecting on that summit was the impetus for us to review and reevaluate how we teach earth and environmental sciences. The department faculty met in January to begin that process, and we continued and expanded on that discussion at our annual full-day faculty retreat meeting, which was held this year on June 2.

Below is a summary of the status of our assessment activities for the Geological Sciences major, as of our June 2, 2016 faculty meeting. Since we are in some ways ahead of the national trend in what is called for in the national modernization of geoscience education, much of what is described below will likely continue to be applicable as we move forward with this process of a thorough review of our undergraduate curriculum.

1) Have formal learning outcomes been developed? What are they? (What specific sets of skills and knowledge does the department expect its majors to have acquired before they graduate?)

As part of our assessment program, we recently modified the Learning Goals for this major to include more specific geological, geophysical, tectonic, and surface processes content. This provides a better balance between the very general goals of our previous version versus including more specific, discipline-related content. The current Learning Goals are:

Majors in Geological Sciences will:

1. Be able to think critically about scientific problems in the geological sciences, and have basic knowledge of the nature of geological materials and the structure of the Earth.
2. Have basic knowledge of the geological processes that form rocks and shape the Earth’s landscape, and understand how Earth history and past environments are reconstructed using geological, geochemical, and geophysical methods.
3. Understand the concept of geologic time, the processes that form and shape the Earth’s lithospheric systems, and the theory of plate tectonics.
4. Understand geological and geophysical maps and perform geological and/or geophysical field investigations.
5. Collect, analyze, and interpret qualitative and quantitative scientific data in the geological sciences.
6. If this is their goal, enter graduate or professional school in geological sciences, environmental science, policy, law or other related fields.
7. If this is their goal, obtain a job or internship in a field related to the geological sciences.
2) **Where are these learning outcomes published? Be specific.** (Where are the department’s learning expectations accessible to potential majors: on the web or in the catalog or in your department’s major handouts?)

These goals will be included in the description of the undergraduate curriculum on the Department of Earth and Environmental Sciences (E&ES) website ([www.bc.edu/schools/cas/geo.html](http://www.bc.edu/schools/cas/geo.html)), in the BC catalog, and in handouts available in the Department’s main office for students expressing interest in majoring in Earth and Environmental Sciences.

3) **Other than GPA, what data/evidence is used to determine whether graduates have achieved the stated outcomes for the degree?** (What evidence and analytical approaches do you use to assess which of the student learning outcomes are being achieved more or less well?)

The department the faculty meets each spring, after classes are over, to discuss how the changes we implemented based on previous years’ assessment activities have resulted in improved learning outcomes. We also discuss additional changes we would like to make based on what we have learned from the assessment process. This year’s assessment meeting was held on June 2, 2016.

The focus of last year’s assessment meeting was on evaluating our curriculum change from the three “Geology and Geophysics” majors (Geology, Geophysics, and combined Geology & Geophysics) to one Geological Sciences major. That change began with the class of 2014. The results of that evaluation are described in last year’s E-1-A report.

This year’s assessment discussion focused on two topics: (1) Our new thorough review of our undergraduate curriculum, motivated by a broad-based national discussion regarding the future of geoscience education, and (2) assessment of how well our students are succeeding, and benefiting from their educational experiences as a major in our department, in terms of jobs, further education in graduate or professional school, and careers beyond graduation, i.e., Learning Goals #6 and #7 above. See below for details of that assessment discussion.

4) **Who interprets the evidence? What is the process?** (Who in the department is responsible for interpreting the data and making recommendations for curriculum or assignment changes if appropriate? When does this occur?)

The department full-time faculty meets annually to review all aspects of our majors programs, and to make recommendations to the whole department for improvement. The conclusions of those discussions are reviewed by all full-time faculty, and are presented in department annual reports.

Other faculty meetings are held throughout the year in which we continuously work towards gathering and interpreting data for reviewing our majors programs and evaluating how well our curriculum is achieving our espoused Learning Goals.