Form E-1-A for Boston College Core Curriculum

Department/Program: EARTH AND ENVIRONMENTAL 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. Our review will affect all of our undergraduate programs, including of course how we continue to approach the renewal of our Core Curriculum. The department faculty met in January to begin this process, and the next step will be to continue and expand on that discussion at our annual full-day faculty retreat meeting, to be held this year on June 2.

Below is a summary of the status of our Assessment activities for the Core Curriculum in Earth and Environmental Sciences (EES), as of May 31, 2016, but we are expecting updates on this process following our June 2 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, some of what is described below will likely continue to be applicable as we move forward with this process after our June 2 meeting.

1) **Have formal learning outcomes for the department’s Core courses been developed? What are they?** (What specific sets of skills and knowledge does the department expect students completing its Core courses to have acquired?)

EES Core courses are designed to help students achieve the Learning Goals listed below. Although any given EES Core course is unlikely to promote every goal on this list, our Core course faculty endeavor to promote as many of these goals as possible in each course.

1. Demonstrate an awareness of how scientific concepts and methods are employed in the study of planet Earth and its environment, and how this awareness is necessary for liberally educated people in the 21st century.
2. Demonstrate an awareness of the principles and strategies of natural science that are employed in the study of planet Earth and its environment.
3. Demonstrate an awareness of the critical role that the Earth and Environmental sciences play in contemporary society.
4. Demonstrate an awareness of the power of the scientific method in the study of planet Earth and in solving the Earth’s environmental problems.
5. Demonstrate an awareness of the limitations of science in the study of planet Earth and in solving Earth’s environmental problems.
6. Demonstrate an awareness of the application of mathematics and other sciences as they are used in the study of planet Earth and its environment.
7. Demonstrate how the Earth and Environmental sciences affect humans.
8. Demonstrate how humans are effecting the environment and habitability of our planet.
2) Where are these learning outcomes published? Be specific. (Where are the department’s expected learning outcomes for its Core courses accessible: on the web, in the catalog, or in your department handouts?)

These goals will be included in the description of the undergraduate curriculum on the Department of EES website (www.bc.edu/schools/cas/geo/undergraduate.html), in the BC catalog, and in handouts available in the Department’s main office for students expressing interest in taking Core courses in Earth and Environmental Sciences.

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

In April 2014, our Director of Undergraduate Studies met with the University Core Development Committee (UCDC) to discuss the status of Core curriculum assessment in our department. At that meeting, we reviewed our Core Learning Goals, and based on that discussion the UCDC requested that for the 2015 assessment of our Core, we choose one or two of our Learning Goals, and evaluate them as part of our annual assessment meeting of full-time faculty.

In May 2015, the department full-time faculty met to discuss the extent to which our Core course students achieve the Learning Goals described above. As requested by the UCDC, our focus for that year was on two specific goals that we consider to be the most immediate challenge for our department’s Core: Learning Goals #1 and #6.

1. Demonstrate an awareness of how scientific concepts and methods are employed in the study of planet Earth and its environment, and how this awareness is necessary for liberally educated people in the 21st century.

6. Demonstrate an awareness of the application of mathematics, physics, chemistry and biology as they are used in the study of planet Earth and its environment.

At our May 2015 assessment meeting of full-time faculty, we discussed how well we thought our courses, and our Core curriculum in general, are achieving our espoused Learning Goals. We also discussed syllabi, exams, assignments, online exercises/discussions, and laboratory work in our Core courses. Based on that discussion, we concluded that our Core courses are, in general, doing well in achieving these goals. There is of course (a healthy) diversity in the extent to which different faculty promote the various eight goals on our list, but all EES courses do promote goals #1 and #6. It would not be possible to complete the work, pass the exams, and pass the courses without demonstrating some awareness of the concepts described above in #1 and #6.

As we move forward with our 2016 and beyond review of our undergraduate curriculum, motivated by the national discussion regarding the future of geoscience education, we will be reviewing our Core Learning Goals and how well our Core curriculum is achieving our espoused Learning Goals. The next step will be to move forward with that discussion at our annual full-day faculty retreat meeting, to be held this year on June 2.
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 faculty meets annually to review all aspects of our Core course offerings, and to make recommendations to the whole department for improvement. The conclusions of those discussions are reviewed by all full-time faculty, and 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 Core Learning Goals and how well our Core curriculum is achieving our espoused Learning Goals.

We are still in the process of fine-tuning our Core Learning Goals and designing ways to investigate evidence that changes we have made have resulted in improved learning outcomes. This will be an important part of our 2016 and beyond review of our undergraduate curriculum, motivated by the national discussion regarding the future of geoscience education.