Elements of the Assessment Process
Form E-1-A for Boston College Departments/Programs

Department/Program – Earth and Environmental Sciences

1) **Have formal learning outcomes been developed? What are they?**

EESC Core courses are designed to help students achieve the Learning Goals listed below. Although any given EESC 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 affecting the environment and habitability of our planet.

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 dept major handouts?)

These goals are included in the description of the undergraduate curriculum on the Department of EESC website (https://www.bc.edu/content/bc-web/schools/morrissey/departments/eesc/undergraduate.html#tab-core_requirements), 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 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 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.

4) **Who interprets the evidence? What is the process?**

The department full-time faculty meets annually to review all aspects of our program, and to make recommendations to the whole department for improvement. This process is led by the Director of Undergraduate Studies. The conclusions of those discussions are reviewed by all full-time faculty, and presented in department annual reports. This year we met on May 29, 2025 during an all-day faculty retreat.

Other faculty meetings are held throughout the year (approximately twice per month) in which we continuously work towards gathering and interpreting data for reviewing our core program and how well our curriculum is achieving our learning goals.

During our May 2024 faculty retreat, Professor Ethan Baxter reported on his experience teaching the Enduring Questions course Origin and Evolution of Earth for the fourth time. It reviewed atypically poorly and we discussed possible reasons why (large CSOM enrollment, AI influence, etc.). Tara Pisani Gareau reported on the successful first iteration of her new Complex Problems course Climate Change and the Corporation; students loved it, there were many great outside speakers, and it won an assessment award from the Core office. We also discussed the continued popularity of our core courses and the large fraction of upperclassmen in them, which poses some problems for meeting student demand and attracting underclassmen into EESC majors.

5) **What changes have been made as a result of using the data/evidence?** (Have there been any recent changes to your curriculum or program? Why were they made?)

The following Core Pilot Courses have been added to our Core curriculum:

- Global Implications of Climate Change (Pisani-Gareau, EESC; and Gareau, Sociology), Fall 2015, 2017, 2019, 2022
- A Perfect Moral Storm: The Science and Ethics of Climate Change (Wong, EESC; and Storey, Philosophy), Spring 2017
- Building a Habitable Planet: The Origins and Evolution of the Earth: Geoscience Perspectives (Baxter, EESC; and Delong-Bas, Theology), Spring 2017, 2019, 2021, 2025
- Living on Water (Kineke, EESC; and Leone, Fine Arts), Fall 2017, 2018, 2020
- Powering America (Ebel, EESC; and Valencius, History), Spring 2019, 2020, 2021, 2022; Fall 2022
- Making the Modern World (Krones, EESC; and Tonn, History), Fall 2020; Spring 2022

- Crisis and Storytelling in the Age of Climate Change (Palevsky, EESC; and Song, English), Fall 2021, 2023
- Climate Change and the Corporation: Risks, Rewards, and Responsibilities (Pisani Gareau, EESC; and Carter, CSOM), Fall 2024

6) **What evidence do you have that the changes have resulted in improved learning outcomes?**

A key recommendation to come out of our self-study and external review in 2024 was the need for a full curriculum review and renewal; this was last done 15 years ago. We initiated this undertaking at our May 2025 faculty retreat. The faculty agreed to a geoscience community-vetted protocol for conducting this process, centered on a 'backwards design' scheme that starts from our desired learning outcomes and develops curriculum that best enables our students to achieve them. We also identified the limitations and challenges associated with our current curriculum to ensure that these do not get repackaged into our undergraduate program as we redesign it. We think that this backwards-designed structure will facilitate our annual assessment process and continual improvement in learning outcomes.

7**) Date of the most recent program review.** (Your latest comprehensive departmental self-study and external review.)

Spring 2024