

FORM E-1-A FOR BOSTON COLLEGE DEPARTMENTS/PROGRAMS

DEPARTMENT OF MATHEMATICS

BACHELOR OF ARTS

BACHELOR OF SCIENCE

2019

- 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?)

The department's assessment plan identified four learning goals.

- i. Students will learn to perform computations and solve problems in calculus and linear algebra.
- ii. Students will learn to effectively use mathematical language and notation.
- iii. Students will demonstrate the ability to reason mathematically and to write clear and concise proofs.
- iv. Students will demonstrate knowledge of the key concepts and theorems of abstract algebra and of real analysis.

- 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?)

A statement of the department's commitment to assessing the success of our students, with descriptions of our goals, is available under the heading **Learning Outcomes** on the department's website at:

<https://www.bc.edu/bc-web/schools/mcas/departments/math/undergraduate.html>

- 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 procedure is to collect evidence in two ways, direct and indirect.

- i. The Undergraduate Committee periodically reviews final exams in specifically identified courses and rates carefully chosen problems with regard to the learning goals.
- ii. The Undergraduate Committee reviews student evaluations for those identified courses. In some cases, instructors are asked to add extra questions,

designed by the Committee, to directly address the learning goals.

- 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's Undergraduate Committee, chaired by the Assistant Chair for Undergraduates, is charged with assessment. The committee reviews the data described in item 3 during the fall semester, with the goal of recommendations to the full department in the spring.

- 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?)

(i) In the fall of 2017 (18F), two sections of MATH2216 Introduction to Abstract Mathematics were conducted, on an experimental basis, in a full Inquiry Based Learning format. This means that there were rarely formal lectures, but instead students were required to work on unfamiliar material (individually or in groups) and present their results to the class. Two traditional sections of the course were also offered. This fall the instructors will meet to discuss their experiences and student evaluations will be examined and compared.

(ii) In the spring of 2019 (19S) the Undergraduate Committee reviewed the syllabi for MATH1101 and MATH1105, our two intermediate level calculus courses. As a result of this review, we are planning a pilot project for MATH1101 in spring 2020. The revised syllabus will incorporate more material relevant to life science and economics majors, such as functions of several variables, optimization and elementary linear algebra. We revised the syllabus of MATH1105 to remove several topics that the students are familiar with from their AP Calculus background, so as to allow more time for advanced topics from infinite sequences and series. These changes will go into effect in fall 2019.

(iii) In the spring of 2019 the Undergraduate Committee designed and implemented an exit survey for our senior math majors. As of this writing the survey is still open to students. We are hoping the responses, when analyzed, will help us improve our course offerings and better meet the needs our BA and BS majors. The survey can be viewed at:
https://bostoncollege.co1.qualtrics.com/jfe/form/SV_0HUFIAE5pWJH0Xz.

(iv) In the spring of 2019 the Undergraduate Committee began to explore adding an applied mathematics track to our major. We expect discussion of this to continue over the summer and into next academic year.

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

The department conducted a self study in the Fall of 2007, which was followed by an external review on April 24-25, 2008.