Academic Assessment Plan

Bachelor of Science in Mathematics

May 31, 2016

The Bachelor of Science in Mathematics is designed to provide a solid computational and conceptual foundation, on which further mathematical development can be built, within a mathematics intensive career or continued study in graduate school.

Program Goals

1) To demonstrate functional competence in a range of computational tools and methods.
2) To develop a conceptual framework encompassing these tools and methods, utilizing the language and structures of mathematics.
3) To be able to apply mathematics to real-world situations and to communicate mathematical ideas effectively.

Student Learning Outcomes

1) Demonstrate basic computational competence in elementary analysis (calculus, differential equations) and abstract and linear algebra. ("How do I do this problem?")

2) Demonstrate understanding of the conceptual frameworks of these topics, with some understanding of their underlying mathematical structure; demonstrate an ability to construct mathematical proofs. ("What does this problem mean? Why are these techniques valid?")

3) Relate these subject areas to applications in the natural or social sciences, engineering, or other areas of mathematics ("What is this good for?")

4) Write, analyze and communicate in a lucid and critical manner.

5) Have a sense of the broader mathematical culture. ("What is mathematics? What is its role in society? How do mathematicians think?")

Process for Assessing each Student Learning Outcome

1. **Timeline for assessment and analysis**

See (2) below. Much of our means of assessment is on an ongoing basis through the Departmental Undergraduate Committee's annual evaluation of our STEM and major undergraduate courses.

2. **Means of assessment and desired level of student achievement**

   Outcomes (1-3) is evaluated within the courses themselves, through examinations, written homework, etc. on an ongoing basis, assessed annually by the Departmental Undergraduate Committee.

   Outcome (1) is generally evaluated through computational problems in many of our mathematics courses. The effectiveness of our courses will be reflected in the quality of the work of the students, assessed annually by the Departmental Undergraduate Committee.

   Outcome (2) is generally evaluated in our 3000-level and higher level courses, as we begin to ask students to demonstrate rigor and provide more open ended narrative exposition, in the formal language of mathematics. The effectiveness of these courses is self-evident to faculty involved in upper level mathematics instruction - Are our students able to function in that setting? - and is to be assessed annually by the Departmental Undergraduate Committee.

   Outcome (3) is evaluated through application oriented projects and open-ended exercises, in applied courses and as topics within a wide range of other courses. The effectiveness of our courses will be reflected in the quality of the work of the students, assessed annually by the Departmental Undergraduate Committee.

   Outcome (4) is evaluated throughout the student's undergraduate career, through written open-ended exercises. The primary evaluation occurs in our senior capstone course, in which the student produces a lengthy paper on a mathematical topic of their choice. The effectiveness of our program overall will be reflected in the quality of the work of these theses, assessed annually by the Departmental Undergraduate Committee.

   Outcome (5) is evaluated through overall levels of participation in a wide range of activities within the department aimed at fostering a sense of the broader mathematical culture: interdisciplinary research projects, career fairs, REU's, internships, The Math Club, AWSM, Celebration of Mind, tutoring, Putnam Exam, as well as courses such as History of Mathematics.

Terminal Assessment: We currently use the following tools to assess student performance towards the end of the degree program:

a) A comprehensive exit examination developed by the Mathematical Association of America.

b) Exit interviews with all graduating seniors.

c) A senior seminar, capstone course, with a senior paper as the primary outcome.

3. **Reporting of results**

   Results will be reported annually to the Dean of Fulbright College.