Program Goals and Learning Outcomes

This document contains the mathematics department statement of its program goals
and desired learning outcomes, approved in this form subject to ongoing departmental review in March
2008. These goals are presented under four headings:

I. Math Majors (frequently double majors, with math 2nd)
  A. Standard; some in a 5-year BA/MA or MS track - particularly, education joint with GSE
  B. Computer oriented
  C. Honors Track (BS degree).

II. Math Minors

III. Biomath Majors

IV. Other students:
  – within SAS
  – in other units, notably Engineering

I. General Program Goals, BA/BS in mathematics (640)

The Department of Mathematics educates its majors in a broad range of modern mathematics. Students will learn how to solve mathematical problems, to apply mathematics in other areas, and to create and communicate mathematical arguments.

Outcomes

1. Students will acquire problem-solving skills in a wide range of modern mathematics.

2. Students will be able to analyze quantitative information, applying advanced mathematical techniques and concepts where appropriate.

3. Students will be able to communicate rigorous mathematical ideas and mathematical reasoning effectively.

4. Students will be prepared to use mathematics in their future endeavors, both in mathematics and other disciplines.

5. Students in the B.S. program (Honors Track) will be prepared for graduate level work toward the doctorate.

6. A significant number of majors, particularly those in the B.S. program, will undertake research or independent study as undergraduates.

7. Students in combined math/education programs will have a broad perspective on mathematics, including the history of the subject, and an understanding of the connections between college mathematics and the state's curriculum framework.

8. Students will be able to make appropriate use of supporting technology in the solution of mathematical problems.

9. Students will be able to work cooperatively as part of a team on the solution of mathematical problems.

II. Math Minors (640)

Program Goals

The goal of the Minor in Mathematics is to provide the student with significant mathematical skills and a sense of the range of the discipline.

Outcomes

1. The student pursuing a minor in mathematics will gain an understanding of the special nature of mathematical thinking, and will be able to create and communicate mathematical arguments.

2. The student pursuing a minor in mathematics will be able to apply the knowledge and techniques learned to his or her major discipline.

3. If continuing on to graduate work, the student pursuing a minor in mathematics will be adequately prepared for advanced courses in the home discipline requiring mathematics, or for additional mathematics courses needed for those advanced courses.

III. Biomath majors (122).

Program Goals

The biomath major provides a thorough grounding in both mathematics and the biological sciences. Students will
- learn how to solve mathematical problems and to use mathematics and mathematical models in biology;
- be able to use rigorous mathematical concepts and to communicate them to others; and
- be well grounded in the biological sciences.

Outcomes

1. Students will acquire problem-solving skills in a wide range of modern mathematics.

2. Students will be able to apply mathematical concepts to problems in modern biology.

3. Students will be able to communicate rigorous mathematical ideas and mathematical reasoning effectively.

4. Students will be able to conduct laboratory work in the biological sciences..

5. Students will be adequately prepared for graduate study, for medical school, or for research jobs in the pharmaceutical industry and government laboratories.

IV. Other SAS students and students from other units.

Program goals:

- to assure minimum standards of quantitative skills as required by SAS;
- to prepare all students adequately for whatever courses they take as undergraduates requiring a mathematical background, and in particular those courses requiring one or more semesters of calculus; and
- to provide students in the mathematical sciences and in Engineering with all of the mathematical background they need to succeed in their majors.

Outcomes

1. Students in SAS disciplines not requiring mathematics will have demonstrated adequate knowledge of intermediate algebra at the level of Math 026 or 027 before graduation from Rutgers.

2. The general liberal arts student will be aware of the possibility of bringing abstract mathematics to bear on areas with no obvious mathematical content to the layman, such as political science, esthetics, or credit card security.

3. Students whose majors require calculus or more advanced mathematics will be adequately prepared for those courses in their majors that require specific mathematics courses.

4. Students aiming toward careers in elementary school education will be able [to pass state-mandated examinations before certification, and to satisfy the University's course requirements related to certification.