

Date: 1 May 2009

Subject: Revision of Math Major

From: John D. Harder, Chair CCI Sciences Subcommittee

The CCI Sciences Subcommittee considered the proposal for revision of the Math Major at its meeting on 21 April 2009. After careful examination and discussion of the proposal, it was unanimously approved by the Subcommittee with one recommendation.

Department of Mathematics proposes to revise the mathematics undergraduate curriculum in order to:

1. Capitalize on the newly developing strengths within the university, such as the Mathematical Biosciences Institute.
2. Create more choices of degree track for undergraduate majors, directed towards the diversity of new and expanding fields such as mathematical finance, mathematical biosciences, coding theory and cryptography.
3. Formalize some changes that have been occurring in an ad hoc way for several years

The goal of the revision is to establish six degree tracks as follows:

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| Traditional Track: | - preparation for graduate work in mathematics |
| Education Track | - for licensure in secondary mathematics education |
| Financial Track | - preparation for employment in financial mathematics |
| Bio-Math Track | - preparation for mathematical modeling and study of biology |
| Applied Track | - traditional option for students interested in physical sciences |
| Applied Discrete Track | - preparation in discrete mathematics and computer science |

All students will complete a core curriculum of 20–29 credit hours of foundational courses, the principal portion of which is a 4-course sequence in calculus. An additional 37–47 credit hours of advanced course work are required in one of the six tracks customized to different career paths in mathematics and allied disciplines. New courses are not proposed for the revised major.

Credit hours required for each of the proposed tracks:

Traditional	65-70	Includes 10-15 hrs of 100-level calculus, 5-hr increase with the addition of Statistics 421.
Education	65-70	Includes 10-15 hrs of 100-level calculus, 5-hr increase with the addition of Statistics 421.
Financial	83-88	Includes 10-15 hrs of 100-level calculus. Also required are 20 hr of non-math prerequisites (Econ 200-01, Acct 310, CSE 200).
Bio-Math	83-88	Includes 10-15 hrs of 100-level calculus. Also required are 19 hrs of non-math prerequisites (Phys 131-133, CSE 202), and 9 hrs of electives in math, statistics, physics, or chemistry.
Applied	84-94	Includes 10-15 hrs of 100-level calculus. Also required are 25 hrs of non-math prerequisites (Chem 121-123 and Bio 113-114) and 9 hrs of electives in math, statistics, physics, or chemistry.

Applied Discrete 70-81 Includes 10-15 hrs of 100-level calculus. Also required are 4 hr of prerequisite CSE courses.

With the exception of the Traditional and Education Tracks, the number of credit hours required for completion of the major in one of the six tracks remains essentially unchanged, which currently is 88 credit hours.

Concurrence has been obtained from academic units with interests in math instruction including: College of Biological Sciences, Department of Evolution, Ecology and Organismal Biology, College of Engineering (including the Departments of Computer Science, Electrical, and Mechanical Engineering), College of Medicine, Biomedics and the Center for Microbial Interface Biology, Nationwide Financial Services, and the Departments of Chemistry and Physics.

Discussion of the proposed revision by the Committee focused on assessment of learning objectives. The proposal lists 4 specific educational objectives, attainment of which is assessed with coordinated homework assignments and written examinations in sequential courses, e.g., the calculus series. Assessment is also pursued in exit surveys of mathematics majors, tracking of placement of graduates in advanced educational programs and professional employment. Additional assessment is available in some tracks e.g., the Praxis examination for students in the Math Education Track.

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The following concerns regarding assessment were raised and discussed:

1. Lack of embedded questions was noted but not considered a concern in the context of the multifaceted assessment plan.
2. Assessment plans should be developed for each track.
3. The four overall learning outcomes would lend themselves nicely to be mapped to each of the six tracks, but the questions or measures would be quite different, for example, for students in the Financial and Bio-Math Tracks.
4. Correction (page 15, Bio-Math Track): The title for Neuro 300 is "Introduction to Neuroscience", not Neurology

The Committee Recommends that the Math Department develop at least one measureable learning outcome and assessment for each of the six tracks in the proposed major.

The consensus of the Committee is that proposed revision of the Math Major is well justified and clearly described. It recognizes developing strengths in University and opportunities for interdisciplinary endeavors. The six-track approach should be attractive to students and raise awareness of career opportunities.

The Committee voted unanimously in favor of the proposed revision of the Math Major with recommendation underlined above.