

## 5c. Contributions to the University Mission: General Education

\*\*\*\*\*June 26, 2008 \*\*\*\*\*

### GER1 courses in the Mathematics Department

The mathematics department offers a wide spectrum of courses that meet the College's quantitative general education requirement, called GER1. Our GER1 courses are:

Math 104 (Mathematics of Powered Flight)

Math 106 (Introduction to Probability and Statistics)

Math 108 (Business Calculus)

Math 111 (Calculus I) and Math 131 (Calculus I with life science applications)

Math 112 (Calculus II) and Math 132 (Calculus II with life science applications).

The vast majority of William and Mary students fulfill their GER1 requirement either by entering college with AP credit for one of those courses, or by taking one of the courses at William and Mary<sup>1</sup>. In addition, the mathematics department offers two sections per year of Math 150 (Freshman Seminar).

### Resource issues associated with general education and freshman seminar courses

Class size in our GER1 courses has recently become a major issue. In previous years, the department had tried to offer a sufficient number of Calculus I and Calculus II sections to keep individual section size close to the level recommended by the Mathematical Association of America(MAA)<sup>2</sup>. But in the spring of 2008, the College cut a four-course-per-year teaching position from the mathematics department and told the department to make its course offerings fit the full-time faculty available in the department<sup>3</sup>. This led us to revise our schedule for fall 2008, increasing section size from 45 per section in Math 104 (Powered Flight) to 150, and from section size 35 in Math 108 (Business Calculus) to 75. We also increased the planned section size in the standard calculus courses Math 111 and Math 112 slightly, and cut the number of Calculus I sections to the level that would exactly serve the number of Calculus I students in fall 2006 and fall 2007. If additional steps are needed, we will further increase section size in Math 111(the standard Calculus I course), and take Math 106 (Introductory Probability and Statistics) to large section format, provided we can find someone to teach the enlarged course.

Finding faculty to teach our two Math 150 (Freshman Seminar) sections is a problem because, unlike other departments at the College, the mathematics department did not receive a new faculty position in return for offering freshman seminars. Our hope is that the dean's office will continue to provide money for two adjunct courses per year to allow the department to teach two freshman seminar sections without canceling other courses. As in previous years, regular faculty would be assigned to teach the Math 150 sections, and adjuncts would be used to replace their teaching in the more standard mathematics courses.

### Resources for the rest of the curriculum

We already mentioned losing a four-course-per-year teaching position in spring 2008. Given decreasing resources, we must now choose between spending our teaching resources on general education or on the

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<sup>1</sup>The College has identified a handful of quantitative courses in other departments that also fulfill the GER1 requirement.

<sup>2</sup>The MAA recommendation is that mathematics courses should be taught in section size no more than 30. We used to aim for section size 35 in calculus courses.

<sup>3</sup>meaning that the department should not count on a steady adjunct allocation beyond whatever replacement needs are justified by faculty taking leaves

program for majors. Because, there does not seem to be any other part of the program review that addresses this balance, we raise the issue here.

Part of the explanation given for cutting a four-course-per-year position from the department in spring 2008 was that the number of credit hours taught by our tenured and tenure track faculty each year was low by College-wide standards. This is not completely surprising for several reasons. First, in the past we have been trying to stay relatively close to the 30-students-per-section upper limits suggested by our professional society, particularly in courses needed in further study of mathematics and science. Second, consistent with recommendations of our last two undergraduate program reviews, we have tried to offer a predictable schedule of upper division courses, hoping to maximize our students' access to a reasonable spectrum of advanced undergraduate topics. As a result, most of our senior courses tend to be small (in the 5-10 enrollments range). Third, because it is problematic to find adjunct instructors who are right for our upper division mathematics courses, we tend to use tenured and tenure-track faculty in 300- and 400-level courses and to assign our adjuncts to the larger lower-level courses, a practice that further decreases the number of credit hours taught by tenured and tenure-track faculty.

We already described our initial move to larger sections in our freshman level courses. A second resource-reallocation step would be to assign more tenured and tenure track faculty to general education courses and simply offer fewer upper division courses per term, something we could do either by canceling selected upper division courses or by shifting some additional upper division courses to an alternate year format<sup>4</sup>. But this seems counterproductive because, whatever else we do, we want to offer a curriculum that adequately prepares the roughly 25% of each graduating class who choose mathematical sciences graduate school for the Group I graduate departments that admit them. For example, were it not for resource constraints, we would like to offer both Analysis II and Abstract Algebra II each year. We would welcome suggestions from outside reviewers.

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<sup>4</sup>Today we offer the following courses in an every-other-year format: Geometry (Math 416), Topology (Math 426), Functional Analysis (Math 428), Abstract Algebra II (Math 430), and Combinatorics (Math 432).