

STEM (Science, Technology, Engineering, and Mathematics) Transfer

The courses in the STEM group are the math courses that are studied by students in Science, Engineering and Math. These courses are

- Math 101A, B, and C: Calculus
- Math 103: Linear Algebra
- Math 104: Differential Equations
- Math 111: Introduction to MATLAB
- Math 181: Trigonometry
- Math 188: Precalculus

The STEM Group refers to the faculty who have worked on the portion of Program Review associated with the STEM courses. For the 2008-09 academic year, the faculty are Bob Bradshaw, Chieko Honma, and Victoria Loukianoff.

In the last four years, the department has continued to teach a full spectrum of the advanced courses throughout the academic year, including the Summer session.

The department has made advances in two areas, both in direct response to comments received from students who have transferred to universities. First, in addition to the traditional math offerings, the department has created a new course, Math 111 Introduction to Matlab. This course is a required course in several Engineering majors at the University of California and the California State University. After two years of work by the articulation officer, the course has now been accepted for transfer credit at both U. C. and CSU.

A second advance is the incorporation of two software packages, Mathematica and MATLAB, in the higher level courses, Math 101C, 103 and 104. Again this is in direct response to comments received by faculty from students. As we have increased the use of software, students who have transferred have told us that they are better prepared for upper division courses than those students who started at the university.

Within the traditional curriculum, members of the department have experimented with making the standard textbooks for Precalculus and Calculus an optional feature of the course. In place of the standard textbook, material is available from faculty websites. The impetus for the project was the high cost of textbooks.

For the Precalculus course, the faculty created a set of homework, answers, and short notes for the course. Three faculty have used the materials for their courses. Based on data from the Research Office, there is no significant difference in the performance of students in the subsequent course, Calculus I.

For the Calculus II and III courses, only homework assignments have been created. The students are expected to have some Calculus textbook, but not necessarily the official text for the course. The reason for the difference in approach is three-fold

1. The Calculus course is the first course where many students keep the text for future reference.
2. Since the Calculus course is three semesters, many students will be using the official text.
3. The Calculus course is the first math course in which reading the text is a vital portion of the course.

One unanticipated benefit of not using a text occurred during the Summer session. Often, students in the summer are coming from a four-year school and they already have the textbook in use at their university. By using the department homework assignments, the students were saved the expense of purchasing a second Calculus textbook.

At the Program Level, the department has increased its efforts to improve student access to the upper level courses. While this effort has been a priority of the department for several years, new majors such as BioEngineering have increased the number of students requiring Differential Equations and Calculus III. These new majors have also increased lab science requirements. The combination has made creating a cohesive, non-overlapping schedule for students a difficult logistical task.

In response to this issue, we

- a. Have continued our long-standing practice of working with the science and engineering departments to avoid conflicts,
- b. Have expanded the number of offerings of Calculus III to two each semester,
- c. Have added a Differential Equations course to the Summer Session, and
- d. Are making changes to the schedule to ensure that a student can take the full sequence of upper level courses in the evening time block.

In response to the growth in the number of offerings at the upper levels, we feel that when funding is available, it will benefit the students to fill the full-time faculty position that has been vacant since the retirement of Ron Staszko in June 2007.