Revised Course Proposal
MAT 1440G: Calculus

1. Catalog Description
   a. Course level: MAT 1440G
   b. Title: Calculus
   c. Credit: 4-0-4
   d. Term to be offered: F,S
   e. Short Title: Calculus
   f. Course Description: The definite integral and its applications, with algebraic concepts and skills integrated as needed. This course along with MAT 1430 takes the place of MAT 1400 and MAT 1441G. Credit will not be granted for both MAT 1440G and MAT 1441G.
   g. Prerequisite: C or better in both MAT 1430 and MAT 1330.
   h. The course is writing active.

2. Student Learning Objectives
   a. List student learning objectives that are designed to help students achieve one or more of the established goals of general education and university-wide assessment. In completing this course, students will be able to:
      i. read, interpret and solve word problems. (critical thinking)
      ii. write solutions using correct technical notation and grammar. (writing, critical thinking)
      iii. apply the theory of integration. (critical thinking)
      iv. apply scientific concepts related to integration (area, statistical averaging, work, distribution of pressure on a surface). (critical thinking)
   b. Indicate additional student learning objectives, if any, that are designed to help students achieve the goals of the course and/or a particular discipline or program. Upon successful completion of this course, students will:
      i. be prepared for more advanced courses in mathematics, and the sciences.
      ii. be prepared to study probability and statistics from a mathematical point of view.
      iii. appreciate the importance of mathematics and its applications to the sciences.
3. Course Outline

Week 1  Applications of Derivatives
• max/min problems
• Newton’s method

Week 2  Theory of Sequences and Sums
• definition of sequence
• definition of sigma notation
• sum of consecutive integers
• sum of squares

Weeks 3–4  Mathematical Arguments
• approximating signed areas by sums
• limits of sums
• anti-derivatives
• areas

Weeks 5–6  Riemann Integration
• Riemann sums
• definite integrals
• Fundamental Lemma of Calculus
• Fundamental Theorem of Calculus

Weeks 7–9  Techniques of Integration
• anti-derivative method
• substitution

Weeks 10–12  Applications of Integration
• areas
• hydrostatic pressure
• work
• averages

Weeks 13–15  Inverse Functions
• exponential and logarithmic functions
• trigonometric functions
• geometric methods
• algebraic methods

4. Evaluation of Student Learning

a. Evaluation may include daily homework, weekly quizzes, 3–4 in-class examinations, and a final exam.

b. This course satisfies the criteria for a writing active course through the emphasis on correct mathematical writing required when the student supplies complete reasoning as part of the solutions to problems.
5. Rationale

a. The course develops critical thinking skills and the ability to apply mathematics. It will be placed in the Mathematics segment of the general education program.

b. The course is offered at the 1000 level and is an introductory course in calculus. Prerequisite: C or better in both MAT 1430 and MAT 1330.

c. This course is a revision of MAT 1440C and should maintain the same curriculum identification number as MAT 1440C. This course does not duplicate any other course, but when taken after MAT 1330 and MAT 1430, can be a substitute for MAT 1441G.

d. Calculus is required in the following majors and programs: biology, chemistry, geology, mathematics, physics, mathematics minor, mathematics minor for teacher certification, and pre-engineering.

6. Implementation

a. The course will be taught by faculty members in the Department of Mathematics.


c. There are no additional costs to the student.

d. Term to be first offered: Spring 2001.

7. Community College Transfer

A community college course may be judged equivalent to this course.

8. Date Approved by the Department  4/10/00

9. Date Approved by the College Curriculum Committee  4/21/00

10. Date Approved by CAA

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