Math 26B : Calculus II for the Social & Life Sciences

California State University, Sacramento · Department of Mathematics & Statistics

This is the second course of a one year calculus sequence designed for students with majors in the social or life sciences. It also meets the requirements of some options in the computer science majors. The treatment in this course is less rigorous than in Math 30, 31, and 32. This sequence may meet the requirements of some medical and dental schools, but students should verify this ith the particular medical or dental school in question. Students who have not had a mathematics course within the past two years may need to use the Mathematics Laboratory or the Learning Skills Center for review. Many students who have completed the prerequisites have also found Math 29 to be valuable preparation for this one year sequence. Students will be given periodic writing assignments to encourage them to think through the concepts of the course.

Catalog Description

Continuation of Math 26A, integration and applications to the Social Sciences and Life Sciences. Multivariate analysis including partial differentiation and maximization subject to constraints: elementary differential equations: sequences and series. Calculus of the trigonometric functions as time allows. Students will be given periodic writing assignments that encourage them to think through concepts of the course. **Graded**: Graded Student. **Units**: 4.0.

Prerequisites

Math 26A or AP credit for Calculus AB in high school.

Learning Objectives

- Know the definition of the definite integral as the limit of sums and use finite sums to approximate the area under a curve.
- Know the Fundamental Theorem of Calculus and use this theorem to evaluate definite integrals.
- Use the definite integral in a variety of applications such as finding the area between curves or volume of revolution and use the fundamental theorem to evaluate these integrals.
- Extend the derivative from functions of one variable to functions of several variables and use partial derivatives to solve optimization problems.

Text

Applied Calculus for the Life and Social Sciences, by Ron Larson

Coverage

Chapters 5-7,and parts of 10.

Writing Component

This is an area B4 GE course and has a writing component. To satisfy the writing requirement graded assignments involving writing and understanding of complex technical prose, interpretation of theoretical ideas, and the use of mathematical ideas will be part of the course.

Area B-4 Mathematical Concepts and Quantitative Reasoning Student Learning Outcomes

Students will be able to:

1. Solve problems by thinking logically, making conjectures, and constructing valid mathematical arguments.
2. Make valid inferences from numerical, graphical and symbolic information.
3. Apply mathematical reasoning to both abstract and applied problems, and to both scientific and non-scientific problems.

Assignments

A variety of reading and problem solving assignments will be part of the course.

Examinations

There will be regular midterm examinations and a comprehensive final examination for this course.

Course Outline

I. Topics in Integration (4 weeks)
   A. Definite integrals, area, and the Fundamental Theorem
   B. Area between curves
   C. Average values and volumes
   D. Integration techniques
   E. Numerical integration techniques
   F. Improper integrals

II. Differential Equations (3 weeks)
   A. Separation of variables
   B. Applications
   C. First order linear differential equations

III. Multivariable Calculus (4 weeks)
   A. Functions of several variables
   B. Graphing in three dimensions
   C. Partial derivatives
   D. Extrema
   E. Multiple integration

IV. Taylor Polynomials and Series (3 weeks)
   A. Taylor polynomials
   B. Sequences and series
   C. Geometric series

D. Power series and Taylor series

V. Trigonometric functions (as time allows)

A. The trigonometric functions

B. Differentiation and integration of the trigonometric functions

C. Inverse trigonometric functions

D. Taylor polynomial approximation of trigonometric functions