

Synopsis:

This is the first in a three-semester course-sequence (Math 109 + 110 + 211) covering standard topics in introductory calculus for college undergraduates. It is assumed that each student has previously studied algebra, geometry, and trigonometry, and has encountered examples in which mathematical principles were used to analyze real-world situations (such as in elementary physics or accounting). With that background, this course explores the role of continuous processes and limits in devising basic calculation-rules for analyzing problems which involve variables that undergo change and that may attain extreme values. Specific topics include differentiation of algebraic, exponential, logarithmic, trigonometric and hyperbolic functions (and their inverses); implicit differentiation; curve-sketching; indeterminate forms; velocity and acceleration; optimization, related rates, and other applications of derivatives; introduction to integrals and the fundamental theorem of calculus, with application to the calculation of areas, volumes, and averages. The course will consist of readings, lectures, discussions, demonstrations, quizzes, and frequent homework exercise-sets.

Textbook:

James Stewart, *Single Variable Calculus: Early Transcendentals (5th Ed)*, Thompson-Brooks/Cole, Inc. (2003), ISBN 0-534-39330-6

Chapter One	Functions and Models
Chapter Two	Limits and Derivatives
Chapter Three	Differentiation Rules
Chapter Four	Applications of Differentiation
Chapter Five	Integrals
Chapter Six	Applications of Integration

Learning Outcomes:

- You will be able to compute derivatives of common mathematical functions
- You will know major techniques for sketching graphs and evaluating limits
- You will be able to determine what area lies inside a curvilinear region
- You will have acquired some experience with devising mathematical models
- You will understand how calculus is used in various scientific disciplines
- You will have a deeper appreciation for limits and for infinite processes
- You will be equipped to undertake further studies in college mathematics

Instructor:

Dr. Allan B. Cruse, Professor of Mathematics and Computer Science
Office Hours: Mon-Wed, 2:45-3:15pm and Tues-Thurs 1:30-2:30pm
Harney Science Center - Room H-212
Website: <http://nexus.cs.usfca.edu/~cruse/>
Telephone: (415) 422-6562
Email: cruse@usfca.edu

Exam Dates:

Midterm Exam I will be Friday, February 10.
Midterm Exam II will be Friday, March 10.
Midterm Exam III will be Wednesday, April 12.
Final Exam will be Thursday, May 18 (8 AM).

Grading scheme:

Homework + Class Participation	25%
Midterm Exams (3)	45%
Final Examination	30%

Class attendance:

This class meets three times weekly, on Mondays, Wednesdays and Fridays, 1:30pm – 2:35pm. Students are expected to be present for each of the class meetings. *This means that a student's course-grade would be adjusted downward if unexcused absences have occurred.*

Homework submissions:

Written homework normally is assigned at each class meeting, to be turned in at the beginning of the next class meeting.

[Please use standard-sized paper (i.e., 8-1/2 by 11 inches), fold your homework paper vertically, and at the top of the outside front page write your name, the course-number (Math 109), and the due-date for that assignment. Thank you.]

Note: To expedite the process of reading, correcting, recording and returning homework papers, a policy of not receiving any late submissions will be followed. (However, to make some allowance for emergencies, the lowest ten-percent of each student's homework-scores will be disregarded when computing the grade.)