

CALIFORNIA STATE UNIVERSITY, SACRAMENTO
Department of Mathematics and Statistics

SYLLABUS

Math 32: Calculus III

Prerequisites: Math 31

This is the third semester of the three semester calculus sequence for students majoring in Mathematics, Physical Science, Engineering, and Computer Science. It provides an introduction to the calculus of functions of several variables and to elementary vector analysis.

OUTLINE:

- I. Three-Dimensional Analytic Geometry 3 1/2 Weeks
 and Vectors
 - a. Three-dimensional coordinate system
 - b. Vectors
 - c. Dot and cross products
 - d. Vector equations of lines and planes
 - e. Vector functions of one variable and space curves
 - f. Arc length and curvature
 - g. Applications to motion in space
 - h. Cylindrical and spherical coordinates

- II. Differentiation of Functions of Several 4 Weeks
 Variables
 - a. Functions of several variables
 - b. Limits and continuity
 - c. Partial derivatives
 - d. Differentiability and tangent plane
 - e. Chain rule
 - f. Directional derivative and gradient
 - g. Extreme values
 - h. Other techniques such as Lagrange multipliers

- III. Multiple Integrals 3 1/2 Weeks
 - a. Double and triple integrals
 - b. Iterated integrals
 - c. Integrals in polar, cylindrical, and spherical
 coordinates
 - d. Geometrical and physical applications

IV. Vector analysis

3 Weeks

- a. Scalar and vector fields
- b. Divergence and curl
- c. Line integrals
- d. Conservative fields
 application to work and conservation of energy
- e. Green's theorem
 Stokes' theorem and divergence theorem in the
 plane