

SU DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE  
 SYLLABUS (*Tentative*)  
 MATH 310 *Calculus III*

- Background:** The Calculus ushered in modern science and challenged the vision of poets, theologians and philosophers. It serves as the basis for much of today's science and technology.
- Objectives:** To further understand the mathematics which is the foundation for modern science, with emphasis on applications, approximations, and the role of proof. To develop and understand the relationships among verbal, algebraic, and graphical representations of two-dimensional and three-dimensional objects. To understand how single-variable calculus generalizes to higher dimensions.
- Intended Audience:** All mathematics and science majors including those in the Dual-Degree Engineering Program.
- Prerequisite:** MATH 202 (with a grade of C or better).
- Text:** "Calculus: Early Transcendentals," by James Stewart; Brooks/Cole, 2008, Sixth edition.
- Recommended Technology:** Maple or Mathematica (computer software available in campus labs).

|  | <b>Hours</b> |
|--|--------------|
| Chapter 12 <i>Vectors and Geometry of Space</i><br>Three-dimensional coordinate systems, vectors, dot and cross products, equations of lines and planes in space, cylinders and quadratic surfaces, polar, cylindrical, and spherical coordinates.   | 8            |
| Chapter 13 <i>Vector Functions</i><br>Vector functions and space curves, derivatives and integrals of vector functions, arc length and curvature, velocity and acceleration in space.  | 8            |
| Chapter 14 <i>Partial Derivatives</i><br>Functions of several variables, limits and continuity, partial derivatives, tangent planes and linear approximations, chain rules, directional derivatives and gradients, extrema of functions and the second derivative test, Lagrange multipliers.                                | 14           |
| Chapter 15 <i>Multiple Integrals</i><br>Double integrals over rectangles and general regions, iterated integrals, double integrals in polar coordinates, applications of double integrals, surface area, triple integrals in rectangular, cylindrical, and spherical coordinates, change of variables in multiple integrals. | 14           |
| Chapter 16 <i>Vector Calculus</i><br>Vector fields and the Fundamental Theorem for Line Integrals, Green's Theorem, curl and divergence, parametric surfaces, surface integrals, Stokes' Theorem and the Divergence Theorem.   | 8            |
| <i>Tests</i>   | <u>4</u>     |
|  | 56           |

**EVALUATION**

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|---------------------|--------|
| Tests               | 35-60% |
| HW/Quizzes          | 20-40% |
| Comprehensive Final | 20-40% |

**NOTE:** Once a student has received credit, including transfer credit, for a course, credit may not be received for any course with material that is equivalent to it or is a prerequisite for it.