

Revised: Fall 2016

MTH 277

Vector Calculus

COURSE OUTLINE

Prerequisites:

MTH 174 or equivalent.

Course Description:

Presents vector valued functions, partial derivatives, multiple integrals, and topics from the calculus of vectors. Designed for mathematical, physical, and engineering science programs.

Semester Credits: 4 Lecture Hours: 4 Lab/Recitation Hours: 0

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Course Outcomes

At the completion of this course, the student should be able to:

- 1) Graph quadric surfaces and conic sections.
- 2) Use the rectangular, polar, cylindrical, and spherical coordinate systems.
- 3) Analyze and apply vector-valued and parametrized functions, employing their related theorems to describe motion in space, based upon tangent and normal vectors and the principles of curvature.
- 4) Find and interpret the rate of change of a function of several variables.
- 4) Find and interpret gradients and directional derivatives of functions of several variables
- 5) Express and evaluate area using double integrals in either rectangular or polar coordinate systems.
- 6) Express and evaluate the volume, mass, etc. of a surface using triple integrals.
- 7) Convert and integrate in either the rectangular, spherical, or cylindrical systems.
- 8) Compute line integrals for both scalar and vector valued functions.
- 9) Apply Green's Theorem
- 10) Find and interpret the divergence and curl of a vector-valued function.



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Required Materials:

Textbook

Textbook:

University Calculus, Hass, Weir, & Thomas, 3rd edition, Pearson/Addison-Wesley, ISBN # 9780321999580

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Topical Description: (Outline chapters and sections to be covered in the book – may include timeline)

Topical Description

<u>Topics</u>	<u>Sections</u>
1. Parametric Equations and Polar Coordinates	10.1-10.4
2. Vectors and the Geometry of Space	11.2-11.5
3. Vector-Valued Functions and Motion in Space	12.1-12.5
4. Multivariable Function and Partial Derivatives	13.1-13.7
5. Multiple Integrals	14.1-14.8
6. Vector Fields, Line Integrals and Green's Theorem	15.1-15.4

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Notes to Instructors

(List information about optional topics, departmental exams, etc)

1. A comprehensive final exam shall be given.
- 2.
- 3.
- 4.

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