

Multivariate Calculus (4)

(Effective Fall 2021)

Prerequisite: A grade of C or better in Mathematics 252-Calculus II.

Catalog Description: Vectors and analytic geometric in space. Vector-valued functions of several variables. Differentials, gradients, and extrema of functions of several variables. Multiple integrals and their applications. Introductory vector analysis including line and surface integrals.

Notes:

1. This course requires the use of a graphing calculator. Computer algebra systems are prohibited.
2. Some instructors may require a computer supplement in addition to the course text.

Learning Outcomes for Major: This course addresses one or more of the student learning outcomes for the major. Upon completion of his/her degree from the University of Tennessee at Martin with a major in mathematics, the graduate will be able to:

- i. apply mathematical concepts and principles to perform numerical and symbolic computations.
- ii. use technology appropriately to investigate and solve mathematical and statistical problems.
- iii. write clear and precise proofs.
- iv. communicate effectively in both written and oral form.
- v. demonstrate the ability to read and learn mathematics and/or statistics independently.

Teaching Objectives: The student will:

1. Understand and use the basic ideas and concepts behind vectors and three-dimensional analytic geometry.
2. Use the basic calculus of vector-valued functions and apply this to solving problems concerning motion in space.
3. Understand the concepts of limits and continuity of functions of several variables.
4. Understand the concept of partial derivatives and work problems using chain rule, directional derivatives, and gradients of multivariate functions.
5. Apply the calculus of several variables to finding tangents and normals, developing approximations, and locating extrema of functions of several variables.
6. Set up and evaluate multiple integrals in the rectangular, cylindrical, and spherical coordinate systems.
7. Apply multiple integration to finding areas, volumes, moments, and other situations.
8. Understand and employ basic vector analysis techniques including line integrals, Green's Theorem, surface integrals, Divergence Theorem, and Stokes' Theorem.

Text(s): [Calculus: Volume 3](#) (1st Edition), OpenStax. ISBN: 978-1938168079 A free ebook is available by clicking [here](#).

Outline:	Chapter	Title (Sections)	Days
	2	Vectors in Space (1-7)	7
	3	Vector-Valued Functions (1-4)	5
	4	Differentiation of Functions of Several Variables (1-8)	12
	5	Multiple Integration (1-7)	13
	6	Vector Calculus (1-8)	14
		One period tests	4
		Total days	<hr/> 55

Disability Services: The University of Tennessee provides reasonable accommodations (academic adjustments and auxiliary aids) to ensure equal access to educational content and university programs for students with disabilities. Any student eligible for and requesting accommodations due to a disability must provide instructors with a letter of accommodation from Disability Services. For additional information, please contact the Disability Services office at 209 Clement Hall, (731) 881-7605.