

Course Number: MATH 2574 Calculus III

Catalog Description

A continuation of MATH 2564. Topics include parametric curves, vectors and vector-valued function, surfaces, partial differentiation, multiple integrals and vector calculus.

Prerequisite

MATH 2554 and 2564 with grades of C or better, or appropriate placement scores.

Target Audience and Transfer

This course is designed for transfer students who are interested in technical or science based fields. It is the third in a sequence of three differential and integral calculus courses and transfers as such.

General Course Objectives

Upon successful completion of this course students should exhibit mastery of certain knowledge and basic skills. These skills will include, but not be limited to:

- 1) operations with vectors
- 2) graphing in 3-space
- 3) calculus of vector-valued functions including velocity, acceleration, arc-length and curvature
- 4) Differentiate multivariate functions
- 5) Optimize functions of several variables
- 5) Integrate and apply techniques of multiple integration
- 6) Vector analysis (including line integrals, Green's Theorem, Divergence Theorem, Stokes's Theorem)

Required Text:

Calculus, Early Transcendentals

Briggs, Cochran

Required Topics:

<u>Section</u>	<u>Topic</u>
11.1	Vectors in the Plane
11.2	Vectors in Three Dimensions
11.3	Dot Products
11.4	Cross Productions
11.5	Lines and Curves in Space
11.6	Calculus of Vector-Valued Functions
11.7	Motion in Space
11.8	Length of Curves
11.9	Curvature and Normal Vectors
12.1	Planes and Surfaces
12.2	Graphs and Level Curves
12.3	Limits and Continuity
12.4	Partial Derivatives
12.5	The Chain Rule
12.6	Directional Derivatives and the Gradient
12.7	Tangent Planes and Linear Approximation
12.8	Maximum/Minimum Problems
12.9	Lagrange Multipliers
13.1	Double Integrals over Rectangular Regions
13.2	Double Integrals over General Regions
13.3	Double Integrals in Polar Coordinates
13.4	Triple Integrals
13.5	Triple Integrals in Cylindrical and Spherical Coordinates
13.6	Integrals for Mass Calculations
13.7	Change of Variables in Multiple Integrals
14.1	Vector Fields

- 14.2 Line Integrals
- 14.3 Conservative Vector Fields
- 14.4 Green's Theorem
- 14.5 Divergence and Curl
- 14.6 Surface Integrals
- 14.7 Stokes' Theorem
- 14.8 Divergence Theorem

Required Instructional Activities

The content of the course should be taught with graphing calculators as an available tool when appropriate.

Required Forms of Assessment

Each instructor must include a set of 6 departmental final exam questions on his or her final exam. These questions will be in direct support of the specific objectives stated in the Core Course Objectives, will be based on material covered in the Required Text Coverage section, and be similar to the questions on the Departmental Review Sheet. These questions should be evenly weighted on the final and should compose at least 10% of the students' overall grade in the course. The questions will be graded using a departmental grading rubric utilizing a 10-point scale per question. The results of these questions and overall student performance will be reported when final grades are turned in. *Please note that the only resource other than a graphing calculator allowed for use by students during the final exam will be a departmental formula sheet. It is also a departmental policy that no TI-89 or TI-92 or comparable calculators be allowed for use during the final exam.*