MATH 2245 MULTIVARIABLE CALCULUS(3 credit hours)

Elmira College

SPRING 2025

Required Text:

James Stewart (2016). ***Calculus*** (8th ed.). Cengage Learning.

Supplemental readings might be included to illustrate or expand on textbook readings.

Pre-requisites: MATH 1526 Introduction to Calculus I.

Course Description

This course extends the principles of calculus from single-variable functions to functions with multiple variables. Topics include vectors, vector-valued functions, Green's Theorem, Stokes' Theorem, and Gauss' Theorem, multivariable functions, partial derivatives, multiple integrals, line integrals, surface integrals, vector fields, and their applications. Additionally, students will explore applications in physics, engineering, and other fields.

Course Objectives and Goals

- Develop an understanding of functions of multiple variables, including their domains, ranges, and graphical representations.
- Calculate partial derivatives and interpret their geometric significance in terms of slopes and rates of change.
- Utilize the gradient vector to find directional derivatives and tangent planes to surfaces.
- Identify critical points and determine whether they are maxima, minima, or saddle points.
- Compute line integrals and surface integrals, understand the physical interpretations of these integrals, including work and flux.

Evaluation of Performance

Your grade will be based upon your performance on exams, assignments, and participation.

Class Participation	10%
Quizzes	30%
Computer Labs	30%
Exams	30%
Total	100%

Grades will be assigned as follows:

A	93% and above	B-	80 - 82%	D+	67 - 69%
A-	90 - 92%	C+	77 - 79%	D	63 - 66%
B+	87 - 89%	C	73 - 76%	D-	60 - 62%

B 83 - 86% C- 70 - 72% F 59% or below

Withdrawal Policy: Please see Elmira College Bulletin for information on this policy.

Academic Honesty: Please read the section on Academic Honesty in the **Code of Conduct**. Briefly, academic dishonesty includes: cheating, fabrication, facilitating academic dishonesty, and plagiarism. Ask if you have any questions on whether something constitutes as academic dishonesty. All work must be original and new. Past assignments from current or other courses will not be accepted. Academic dishonesty will not be tolerated. It will result in zero on the assignment, and a report will be filed with the school. Continued practice will result in failure of the class. Institutional penalties may also apply with repeated acts of academic honesty.

Student Responsibility:

- It is your responsibility to keep track of assignments and due dates.
- You should ask questions concerning assignments and lectures, if you need any clarifications.
- If you are struggling in class, have concerns, and/or unsure about expectations, please stop by during office hours or make an appointment for another time.

Tentative Schedule of Topics

Topic	Materials	Tasks & Evaluations
Functions and Limits	Chapter 1	
Derivatives	Chapter 2	Quiz 1
Applications of Differentiation	Chapter 3	
Optimization Problems	Chapter 4	Exam 1
Volumes by Cylindrical Shells	Chapter 5	Computer Lab 1
Area of a Surface of Revolution	Chapter 6	
Cylinders and Quadric Surfaces	Chapter 7	
Partial Derivatives	Chapter 8	Quiz 2
Lagrange Multipliers	Chapter 9	Exam 2
Multiple Integrals	Chapter 10	Computer Lab 2
Surface Area	Chapter 11	
Triple Integrals in Cylindrical Coordinates	Chapter 12	
Triple Integrals in Spherical Coordinates	Chapter 13	
Green's Theorem	Chapter 14	Quiz 3
Stokes' Theorem	Chapter 15	Computer Lab 3
The Divergence Theorem	Chapter 16	Exam 3