

**Calculus III**

Time: M 12:30 – 2:20, TR 12:30 – 1:45  
Room: ACR 108

Instructor: Eric Funasaki  
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**Office hours:**

MWF 10 – 10:50, TR 8:30 – 9:20, TR 11 – 12:15, or by appointment.

**Textbook:**

*Calculus: Concepts & Contexts*, 4<sup>th</sup> edition, by James Stewart.

**Course Description:**

This course includes the study of the calculus of functions of several variables and topics in vector calculus including line and surface integrals, Green's Theorem, Divergence Theorem, and Stokes' Theorem.

**Prerequisite:**

Math 2414 Calculus II.

**Mathematics Program Learning Objectives:**

The student should be able to:

1. Apply knowledge of basic mathematics principles;
2. Identify and provide valid proofs or solutions for theorems or problems; and
3. Recognize and dispute invalid mathematical statements using counterexamples.

**Course Objectives:**

The student will be able to:

1. Find the derivative and evaluate integrals of vector functions;
2. Find the limit and partial derivative of functions of several variables;
3. Evaluate double and triple integrals of functions of several variables;
4. Evaluate line integrals using the Fundamental Theorem for Line Integrals; and
5. Use Green's Theorem to evaluate line integrals.

**EC-6 Core Teacher Competencies:**

1. Competency 013 (Mathematics Instruction): The teacher understands how students learn mathematical skills and uses that knowledge to plan, organize, and implement instruction and assess learning.
2. Competency 014 (Number Concepts and Operation): The teacher understands concepts related to numbers, operations and algorithms, and the properties of numbers.
3. Competency 015 (Patterns and Algebra): The teacher understands concepts related to patterns, relations, functions, and algebraic reasoning.

4. Competency 016 (Geometry and Measurement): The teacher understands concepts related to principles of geometry and measurement.
5. Competency 017 (Probability and Statistics): The teacher understands concepts related to probability and statistics and their applications.
6. Competency 018 (Mathematical Processes): The teacher understands mathematical processes and knows how to reason mathematically, solve mathematical problems, and make mathematical connections within and outside of mathematics.

### Course Assessment:

Your grade will be based on the following components:

- 10% In-class problems and participation
- 20% Homework assignments and quizzes
- 48% Exams
- 22% Comprehensive Final Exam

The grading scale will be:

90 – 100 A      80 – 89 B      70 – 79 C      60 – 69 D      0 – 59 F

### Course Schedule (tentative):

#### Week 1

- 8/22 M 9.1 Three-Dimensional Coordinate Systems, 9.2 Vectors
- 8/23 T 9.3 The Dot Product, 9.4 The Cross Product
- 8/25 R 9.4 The Cross Product

#### Week 2

- 8/29 M 9.1 Three-Dimensional Coordinate Systems, 9.2 Vectors, 9.3 The Dot Product, 9.4 The Cross Product
- 8/30 T 9.5 Equations of Lines and Planes, 9.6 Functions and Surfaces
- 9/1 R 9.6 Functions and Surfaces, 9.7 Cylindrical and Spherical Coordinates

#### Week 3

- 9/5 M Labor Day (no class)
- 9/6 T 10.1 Vector Functions and Space Curves, 10.2 Derivatives and Integrals of Vector Functions
- 9/8 R 10.2 Derivatives and Integrals of Vector Functions, 10.4 Motion in Space: Velocity and Acceleration

#### Week 4

- 9/12 M 10.1 Vector Functions and Space Curves, 10.2 Derivatives and Integrals of Vector Functions, 10.4 Motion in Space: Velocity and Acceleration
- 9/13 T 10.5 Parametric Surfaces
- 9/15 R Review for Exam 1

#### Week 5

- 9/19 M Exam 1
- 9/20 T 11.1 Functions of Several Variables, 11.2 Limits and Continuity
- 9/22 R 11.2 Limits and Continuity

#### Week 6

- 9/26 M 11.1 Functions of Several Variables, 11.2 Limits and Continuity
- 9/27 T 11.3 Partial Derivatives
- 9/29 R 11.4 Tangent Planes and Linear Approximations

Week 7

10/3	M	11.3 Partial Derivatives, 11.4 Tangent Planes and Linear Approximations
10/4	T	11.5 The Chain Rule
10/6	R	11.6 Directional Derivatives and the Gradient Vector

Week 8

10/10	M	11.5 The Chain Rule, 11.6 Directional Derivatives and the Gradient Vector
10/11	T	11.7 Maximum and Minimum Values
10/13	R	Review for Exam 2

Week 9

10/17	M	<b>Exam 2</b>
10/18	T	12.1 Double Integrals over Rectangles, 12.2 Iterated Integrals
10/20	R	12.2 Iterated Integrals, 12.3 Double Integrals over General Regions

Week 10

10/24	M	12.1 Double Integrals over Rectangles, 12.2 Iterated Integrals, 12.3 Double Integrals over General Regions
10/25	T	12.4 Double Integrals in Polar Coordinates
10/27	R	12.7 Triple Integrals

Week 11

10/31	M	12.4 Double Integrals in Polar Coordinates, 12.7 Triple Integrals
11/1	T	12.8 Triple Integrals in Cylindrical and Spherical Coordinates
11/3	R	12.9 Change of Variables in Multiple Integrals

Week 12

11/7	M	12.8 Triple Integrals in Cylindrical and Spherical Coordinates, 12.9 Change of Variables in Multiple Integrals
11/8	T	13.1 Vector Fields
11/10	R	Review for Exam 3

Week 13

11/14	M	<b>Exam 3</b>
11/15	T	13.2 Line Integrals
11/17	R	13.3 The Fundamental Theorem for Line Integrals

Week 14

11/21	M	13.2 Line Integrals, 13.3 The Fundamental Theorem for Line Integrals
11/22	T	13.4 Green's Theorem
11/24	R	Thanksgiving Break (no class)

Week 15

11/28	M	13.4 Green's Theorem
11/29	T	Review for Final Exam
12/1	R	Dead Day (no class)

Week 16

12/5	M	(no class)
12/6	T	(no class)
12/7	W	<b>Final Exam (10:15 am – 12:15 pm)</b>

**Attendance:**

Role will be taken. You are responsible for all material covered in class as well as any assignments and announcements that are made. If you miss an assignment, exam, or quiz you will receive a grade of zero unless I have been notified in advance.

Sul Ross State University policy is to drop a student with a grade of W or F when 9 hours of class are missed. For this course that is when you miss **6** classes.

**Cheating:**

Cheating will not be tolerated. Anyone caught cheating will receive a grade of zero on that assignment. This includes homework assignments where the student who copied another student's work and the student who allowed their work to be copied will both receive a grade of zero.

**Cell Phones and Other Electronic Devices:**

Your cell phone must be **off** while you are in class. You may not read or send text messages while class is in session. If there is an unusual situation where you simply must be able to read and send a message without delay, please place your phone in vibrate mode and leave the room before reading and responding. No other electronic devices may be used during class without the permission of the instructor.

**ADA Statement:**

Sul Ross State University is committed to equal access in compliance with the Americans With Disabilities Act of 1973. It is the student's responsibility to initiate a request for accessibility services. Students seeking accessibility services must contact Mary Schwartze, M.Ed., L.P.C., in Counseling and Accessibility Services, Ferguson Hall, Room 112. The mailing address is P.O. Box C-122, Sul Ross State University, Alpine, TX 79832. Telephone: 432-837-8691. E-mail: [mschwartz@sulross.edu](mailto:mschwartz@sulross.edu).

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