

## Midland College Syllabus

2021 – 2022

MATH 2415

Calculus III

4 Semester Credit Hours

(4 Lecture/0 Lab)

### Instructor Information:

Instructor: [Click here to enter text.](#)

Phone: [Click here to enter text.](#)

Office Hours: [Click here to enter text.](#)

Office: [Click here to enter text.](#)

Email: [Click here to enter text.](#)

**Notice:** Students MUST actively participate by completing an academic assignment required by the instructor by the official census date. Students who do not actively participate in an academically-related activity may be reported as never attended and dropped from the course.

### Course Description:

This course is designed to enable students to become proficient in advanced topics in calculus, including vectors and vector-valued functions, partial differentiation, Lagrange multipliers, multiple integrals, and Jacobians; application of the line integral, including Green's Theorem, the Divergence Theorem, and Stokes' Theorem. Prerequisite: A C or better in MATH 2414.

### Text, References and Supplies:

- Larson/Edwards, Calculus: Early Transcendental Functions, 7<sup>th</sup> ed., Cengage.
  - ISBN: 978-1-33-755251-6 (hardback book only)
  - ISBN: 978-1-33-788895-0 (loose-leaf book with WebAssign)
- Use of MATLAB is required.
- Scientific calculator

### Student Learning Outcomes

Upon successful completion of this course, students will:

1. Perform calculus operations on vector-valued functions, including derivatives, integrals, curvature, displacement, velocity, acceleration, and torsion.
2. Perform calculus operations on functions of several variables, including partial derivatives, directional derivatives, and multiple integrals.
3. Find extrema and tangent planes.
4. Solve problems using the Fundamental Theorem of Line Integrals, Green's Theorem, the Divergence Theorem, and Stokes' Theorem.
5. Apply the computational and conceptual principles of calculus to the solutions of real-world problems.

**Student Contributions, Responsibilities and Class Policies:**

Students will be expected to comply with the policies outlined in the [Midland College Catalog](#). Instructor policies concerning attendance and academic behavior are consistent with the policies in the catalog. Regular attendance is required to do well in this class. Students will be evaluated based on the results of assessments outlined in the syllabus and Instructor Handout. At least 70% of the course grade will come from proctored assignments.

**Attendance Policy:**

It is the responsibility of the students to know the policies and procedures associated with absences. These policies are set by instructors. Excused absences may include, but are not limited to, illness, severe weather, and death in the family. Instructors will determine whether or not an absence is excused. Please visit the [Midland College Catalog](#)

Your lecture instructor will inform you on the first day of class as to the tentative dates and content for each exam. Students are expected to complete each exam. Your instructor will inform you on the first day of class as to make-up procedures for missed exams and any exemption procedures if they apply (See Instructor Handout).

**Withdrawal Policy:**

Students who have enrolled in a Texas public institution of higher education as a first-time freshman in fall 2007 or later are permitted to drop no more than six courses during the entire undergraduate career. This limit includes all transfer work taken at a Texas institution of higher education and to second baccalaureate degrees. This statute was enacted by the State of Texas in spring 2007 (Texas Education Code 51.907). Any course that a student drops after Census Day is counted toward the six-course limit if "(1) the student was able to drop the course without receiving a grade or incurring an academic penalty; (2) the student's transcript indicates or will indicate that the student was enrolled in the course; and (3) the student is not dropping the course in order to withdraw from the institution." Please visit the [Midland College Catalog](#)

**Scholastic Dishonesty:**

Midland College does not tolerate scholastic dishonesty or academic misconduct in any form. Please read the Student Rights & Responsibilities section in the [Midland College Catalog](#) for more information.

**Evaluation of Students:**

Students will be evaluated based on grades which may including the following but are not limited to:

<b>Assessments</b>	<b>Percentage of Grade</b>	<b>Grade Range</b>
Quizzes/Assignments/MATLAB	10-20%	90-100 A
Exams	55-70%	89-80 B
Final Exam	20-25%	79-70 C 69-60 D 59-0 F

### **Course Schedule:**

This class meets for 4 contact hours per week. For a tentative schedule of the class meetings and material to be covered during those meetings, please refer to the schedule distributed to each student on the first class meeting (See Instructor Handout).

### **Course Outline:**

We will cover Chapters 11-15 at a rate of about three sections per week.

#### Chapter 11: Vectors and the Geometry of Space

- 11.1 Vectors in the Plane
- 11.2 Space Coordinates and Vectors in Space
- 11.3 The Dot Product of Two Vectors
- 11.4 The Cross Product of Two Vectors in Space
- 11.5 Lines and Planes in Space
- 11.6 Surfaces in Space
- 11.7 Cylindrical and Spherical Coordinates

#### Chapter 12: Vector-Valued Functions

- 12.1 Vector-Values Functions
- 12.2 Differentiation and Integration of Vector-Valued Functions
- 12.3 Velocity and Acceleration
- 12.4 Tangent Vectors and Normal Vectors
- 12.5 Arc Length and Curvature

#### Chapter 13: Functions of Several Variables

- 13.1 Introduction to Functions of Several Variables
- 13.2 Limits and Continuity
- 13.3 Partial Derivatives
- 13.4 Differentials
- 13.5 Chain Rules for Functions of Several Variables
- 13.6 Directional Derivatives and Gradients
- 13.7 Tangent Planes and Normal Lines
- 13.8 Extrema of Functions of Two Variables
- 13.9 Applications of Extrema
- 13.10 Lagrange Multipliers

#### Chapter 14: Multiple Integration

- 14.1 Iterated Integrals and Area in the Plane
- 14.2 Double Integrals and Volume
- 14.3 Change of Variables: Polar Coordinates
- 14.4 Center of Mass and Moments of Inertia
- 14.5 Surface Area
- 14.6 Triple Integrals and Applications

- 14.7 Triple Integrals in Other Coordinates
- 14.8 Change of Variables: Jacobians
- Chapter 15: Vector Analysis
  - 15.1 Vector Fields
  - 15.2 Line Integrals
  - 15.3 Conservative Vector Fields and Independence of Path
  - 15.4 Green's Theorem
  - 15.5 Parametric Surfaces
  - 15.6 Surface Integrals
  - 15.7 Divergence Theorem
  - 15.8 Stokes's Theorem

### **Non-Discrimination Statement**

Midland College does not discriminate on the basis of race, color, national origin, sex, disability or age in its programs and activities. The following individual has been designated to handle inquiries regarding the non-discrimination policies:

#### **Tana Baker**

Title IX Coordinator/Compliance Officer  
3600 N. Garfield, SSC 131  
Midland, Texas 79705  
(432) 685-4781  
[tbaker@midland.edu](mailto:tbaker@midland.edu)

For further information on notice of non-discrimination, visit the ED.gov Office of Civil Rights website, or call 1 (800) 421-3481.

### **Americans with Disabilities Act (ADA) Statement:**

Midland College provides services for students with disabilities through Student Services. In order to receive accommodations, students must visit [www.midland.edu/accommodation](http://www.midland.edu/accommodation) and complete the Application for Accommodation Services located under the Apply for Accommodations tab. Services or accommodations are not automatic, each student must apply and be approved to receive them. All documentation submitted will be reviewed and a "Notice of Accommodations" letter will be sent to instructors outlining any reasonable accommodations.

### **Math & Science Division Information:**

Division Office: AHSF 124 (432) 685-4561  
Division E-Mail: [mns@midland.edu](mailto:mns@midland.edu)  
Department Chair: Dr. Krista Cohlmlia (432) 685-4541  
Dean: Dr. Miranda Poage  
Secretary: Sarah Anderson  
Clerk: Liliana Orcutt

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