

Midland College Syllabus

2021 - 2022

MATH 2413

Calculus I

4 Semester Credit Hours

(4 Lecture/0 Lab)

Core Curriculum Course

Instructor Information:

Instructor: Jessica Struck

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 limits and continuity; the Fundamental Theorem of Calculus; definition of the derivative of a function and techniques of differentiation; applications of the derivative to maximizing or minimizing a function; the chain rule, mean value theorem, and rate of change problems; curve sketching; definite and indefinite integration of algebraic, trigonometric, and transcendental functions, with an application to calculation of areas. Prerequisite: A C or better in MATH 1316 or a C or better in MATH 2412 or a sufficient score on a math placement test.

Core Objectives:

This course fulfills the three-hour Mathematics requirement in the Midland College Core Curriculum. The Core Curriculum is a set of courses that provide students with a foundation of knowledge, skills and educational experiences that are essential for all learning. The Core Curriculum is available in the [Midland College Catalog](#). As part of the core, this course addresses the following three objectives:

Critical Thinking Skills – Students will demonstrate critical thinking skills by sketching graphs of algebraic and transcendental functions considering limits, continuity, and differentiability at a point, and identifying appropriate calculus concepts and techniques to provide mathematical models of real-world situations and determine solutions to applied problems using differentiation rules in course assignments, instructor created exams, and a departmental final exam.

Communication Skills – Students will demonstrate communication skills in written, oral, and visual form within the classroom setting through instructor posed questions, collaborative peer assignments, and exams.

Empirical and Quantitative Skills – Students will demonstrate empirical and quantitative skills by developing solutions for tangent and area problems using the concepts of limits, derivatives, and integrals, using differentiation rules to differentiate algebraic and transcendental functions, and apply the Fundamental Theorem of Calculus to evaluate definite integrals and articulate the relationship between derivatives and integrals through course assignments, instructor created exams, and a departmental final exam.

Text, References and Supplies:

- Larson/Edwards, Calculus: Early Transcendental Functions, 7th ed., Cengage.
 - ISBN: 978-1-33-755251-6 (hardback book only)
 - ISBN: 978-1-33-788895-0 (loose-leaf book with WebAssign)
- Scientific calculator (Non-Graphing)
- WebAssign may be required by some instructors.

Student Learning Outcomes

Upon successful completion of this course, students will:

1. Develop solutions for tangent and area problems using the concepts of limits, derivatives, and integrals.
2. Draw graphs of algebraic and transcendental functions considering limits, continuity, and differentiability at a point.
3. Determine whether a function is continuous and/or differentiable at a point using limits.
4. Use differentiation rules to differentiate algebraic and transcendental functions.
5. Identify appropriate calculus concepts and techniques to provide mathematical models of real-world situations and determine solutions to applied problems.
6. Evaluate definite integrals using the Fundamental Theorem of Calculus.
7. Articulate the relationship between derivatives and integrals using the Fundamental Theorem of Calculus.

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.

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](#)

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:

Assessments	Percentage of Grade	Grade Range
Exams	65-80%	90-100 A
Quizzes/Activities	0-10%	89-80 B
Final Exam	20-25%	79-70 C 69-60 D 59-0 F

At least 70% of a course grade will come from proctored assignments. Students will be evaluated based on the results of examinations given throughout the semester. 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).

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).

Common Assessment:

All sections of this course have a common assessment. The common assessment for this course is shown in the schedule and is noted as such (see Instructor Handout).

Course Outline:

Chapter 2: Limits and Their Properties

- 2.2 Finding Limits Graphically and Numerically
- 2.3 Evaluating Limits Analytically
- 2.4 Continuity and One-Sided Limits
- 2.5 Infinite Limits

Chapter 3: Differentiation

- 3.1 The Derivative and the Tangent Line Problem
- 3.2 Basic Differentiation Rules and Rates of Change
- 3.3 Product and Quotient Rules and Higher-Order Derivatives
- 3.4 The Chain Rule
- 3.5 Implicit Differentiation
- 3.6 Derivatives of Inverse Functions
- 3.7 Related Rates
- 3.8 Newton's Method

Chapter 4: Applications of Differentiation

- 4.1 Extrema on an Interval
- 4.2 Rolle's Theorem and the Mean Value Theorem
- 4.3 Increasing and Decreasing Functions and the First Derivative Test
- 4.4 Concavity and the Second Derivative Test
- 4.5 Limits at Infinity
- 4.6 A Summary of Curve Sketching
- 4.7 Optimization Problems
- 4.8 Differentials

Chapter 5: Integration

- 5.1 Antiderivatives and Indefinite Integration
- 5.2 Area
- 5.3 Riemann Sums and Definite Integrals
- 5.4 The Fundamental Theorem of Calculus
- 5.5 Integration by Substitution
- 5.6 Indeterminate Forms and L'Hopital's Rule
- 5.7 The Natural Logarithmic Function: Integration
- 5.8 Inverse Trigonometric Functions: Integration

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

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 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

Department Chair: Dr. Krista Cohlma

(432) 685-4541

Dean: Dr. Miranda Poage

Secretary: Sarah Anderson

Clerk: Liliana Orcutt

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