Midland College
Syllabus
2008-09
MATH 2413
Calculus I
4 Semester Credit Hours
(4 Lecture/ Lab)

Course Description:
This course is designed to enable students to become proficient in introductory analytic geometry, the theory of limits, differential calculus of algebraic and trigonometric functions, applications of differentiation, antiderivatives, and the definite integral. Course Fee.

Text and Materials:
Pub. Houghton Mifflin Company
A scientific calculator is needed for some of the problems. NO GRAPHING CALCULATORS.

Course Goals:
After successful completion of this course students will be able to use math terminology, work problems involving functions, limits, continuity, differentiation, and integration, and solve applied problems. See the attached Course Outline for specific skills.

Class Policies:
Students are expected to attend class regularly; they may be dropped if they have more than six absences in an MWF class, or more than four absences in a TT class. Students are expected to behave in a manner that will not interfere with the learning process.

Midland College does not tolerate scholastic dishonesty or academic misconduct in any form. Please read the MC Student Handbook on this subject.

Evaluation of Students:

<table>
<thead>
<tr>
<th>Range</th>
<th>Component</th>
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<tbody>
<tr>
<td>0 - 10</td>
<td>Quizzes</td>
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<tr>
<td>60 - 80</td>
<td>Exams</td>
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<tr>
<td>10 - 30</td>
<td>Final</td>
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<tr>
<td>0 - 10</td>
<td>Homework/Projects</td>
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The grade scale is in accordance with Midland College Faculty Handbook.
90 - 100 for an A,
80 - 89 for a B,
70 - 79 for a C,
60 - 69 for a D,
0  -  59 for an F.

Course Schedule:
We will cover Chapters 1-4 and 5.1-5.5 at a rate of about three sections per week. See the attachment for a detailed schedule.
Intellectual Competencies:

1. Reading – Understanding the material incorporated in the text used in this course will require the student to analyze and interpret various mathematical concepts.

2. Listening – The primary teaching methods used in this course are discussion and lecture. Understanding the oral presentation of material will require the student to analyze and interpret various mathematical concepts.

3. Critical Thinking – Critical thinking, as exemplified by problem solving, is inherent in the study of any scientific discipline. Mathematical problems will be considered, discussed, and analyzed in this course.

ADA Statement: Any student who, because of a disabling condition, may require some special arrangements in order to meet course requirements should contact the instructor as soon as possible. These conditions may include documented physical or educational disabilities. Please be aware that services or accommodations are not automatic. Each student must request them and secure the proper authorizations.

Exemplary Objectives: Competency | Course Number | Course Title
--- | --- | ---
1 | 2 | 3 | 4 | 5 | 6 | 7 | MATH 2413 & 2414 & 2415 | Calculus I & II

Competencies:

4. To apply arithmetic, algebraic, geometric, higher-order thinking, and statistical methods to modeling and solving real-world situations.

5. To represent and evaluate basic mathematical information verbally, numerically, graphically and symbolically.

6. To expand mathematical reasoning skills and formal logic to develop convincing mathematical arguments.

7. To use appropriate technology to enhance mathematical thinking and understanding and to solve mathematical problems and judge the reasonableness of the results.

8. To interpret mathematical models such as formulas, graphs, tables and schematics and draw inferences from them.

To develop the view that mathematics is an evolving discipline, interrelated with human culture, and understanding its connections to the other disciplines.
Instructor Information:

Name:

Office:

Phone:

E-mail:

Hours:

Division Dean: Dr. Margaret Wade, 125 SF, 685-4615

Division Secretary: Norma Duran, 124 SF, 685-4612
Brenda Smith, 124 SF, 685-6413
Course Outline

Chapter 1: Limits and Their Properties
- 1.1 A Preview of Calculus
- 1.2 Finding Limits Graphically and Numerically
- 1.3 Evaluating Limits Analytically
- 1.4 continuity and One-Sided Limits
- 1.5 Infinite Limits
- Section Project: Graphs and Limits of Trigonometric Functions

Chapter 2: Differentiation
- 2.1 The Derivative and the Tangent Line Problem
- 2.2 Basic Differentiation Rules and Rates of Change
- 2.3 Product and Quotient Rules and Higher-Order Derivatives
- 2.4 The Chain Rule
- 2.5 Implicit Differentiation
- Section Project: Optical Illusions
- 2.6 Related Rates

Chapter 3: Applications of Differentiation
- 3.1 Extrema on an Interval
- 3.2 Rolle's Theorem and the Mean Value Theorem
- 3.3 Increasing and Decreasing Functions and the First Derivative Test
- Section Project: Rainbows
- 3.4 Concavity and the Second Derivative Test
- 3.5 Limits at Infinity
- 3.6 A Summary of Curve Sketching
- 3.7 Optimization Problems
- Section Project: Connecticut River
- 3.8 Newton's Method
- 3.9 Differentials

Chapter 4: Integration
- 4.1 Antiderivatives and Indefinite Integration
- 4.2 Area
- 4.3 Riemann Sums and Definite Integrals
- 4.4 The Fundamental Theorem of Calculus
- Section Project: Demonstrating the Fundamental Theorem
- 4.5 Integration by Substitution
- 4.6 Numerical Integration

Chapter 5: Logarithmic, Exponential, and Other Transcendental Functions
- 5.1 The Natural Logarithmic Function: Differentiation
- 5.2 The Natural Logarithmic Function: Integration
- 5.3 Inverse Functions
- 5.4 Exponential Functions: Differentiation and Integration
- 5.5 Bases Other Than e and Applications
- Section Project: Using Graphing Utilities to Estimate Slope