Midland College
Syllabus
2008-09
MATH 2415
Calculus III
4 Semester Credit Hours
(4 Lecture/0 Lab)

Course Description: Math 2415 is designed to enable students to become proficient in indeterminate forms, improper integrals, sequences, series, and the differential and integral calculus of several variables. Prerequisite: “C” or better in Math 2414 (4 hours credit). Course Fee.


A scientific calculator is needed. NO GRAPHING CALCULATORS.

Course Goals/ Objectives: After successful completion of this course, students will be able to use appropriate calculus terminology, and work problems in sequences and series, vectors, partial differentiation, and multiple integration.

Student Contributions, And Class Policies: Students are expected to regularly attend class; they may be dropped if they have more that six absences in a three-day a week class, more than four absences in a two-day a week class, or six total class hours. Students will act in an appropriate manner that will not interfere with the learning situation of other students as determined by the instructor.

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

Evaluation of Student:

<table>
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<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Quizzes</td>
<td>0-10%</td>
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<tr>
<td>Tests</td>
<td>60-80%</td>
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<tr>
<td>Final</td>
<td>10-30%</td>
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<tr>
<td>Project/homework</td>
<td>0-10%</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 a F.

Course Schedule: We will cover Chapter 10 - 15.

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:

<table>
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<tr>
<th>Competency</th>
<th>Course Number</th>
<th>Course Title</th>
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<td>MATH 2413 &amp; 2414 &amp; 2415</td>
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Competencies:

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

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

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

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

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

7. 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:

Office 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 10 Conics, Parametric Equations, and Polar Coordinates
- 10.1 Conics and Calculus
- Plane Curves and Parametric Equations
- Section Project: Cycloids
- 10.3 Parametric Equations and Calculus
- 10.4 Polar Coordinates and Polar Graphs
- Section Project: Anamorphic Art
- 10.5 Area and Arc Length in Polar Coordinates
- 10.6 Polar Equations of Conics and Kepler’s Laws

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
- Section Project: Distances in Space
- 11.6 Surfaces in Space
- 11.7 Cylindrical and Spherical Coordinates

Chapter 12 Vector-Valued Functions
- 12.1 Vector-Valued Functions
- Section Project: Witch of Agnesi
- 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
- Section Project: Moiré Fringes
- 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
- Section Project: Wildflowers
- 13.8 Extrema of Functions of Two Variables
- 13.9 Applications of Extrema of Functions of Two Variables
- Section Project: Building a Pipeline
- 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
- Section Project: Center of Pressure on a Sail
- 14.5 Surface Area
- Section Project: Capillary Action
- 14.6 Triple Integrals and Applications
- 14.7 Triple Integrals in Cylindrical and Spherical Coordinates
- Section Project: Wrinkled and Bumpy Spheres
- 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
• **Section Project: Hyperbolic and Trigonometric Functions**
• 15.5 Parametric Surfaces
• 15.6 Surface Integrals
• **Section Project: Hyperboloid of One Sheet**
• 15.7 Divergence Theorem
• 15.8 Stokes’s Theorem
• **Section Project: The Planimeter**