# Minnesota State University Moorhead

## MATH 261: Calculus I

#### A. COURSE DESCRIPTION

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Credits: 4
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Lecture Hours/Week: 3

Lab Hours/Week: 2

OJT Hours/Week: \*.\*

#### Prerequisites:

This course requires any of these three prerequisite categories

1. Both of these

MATH 127 - College Algebra

MATH 143 - Trigonometry

Or

2. Both of these

MATH 127L - College Algebra with Lab

MATH 143 - Trigonometry

Or

3. MSUM Math Above MATH 127

Corequisites: MATH 260 and PHYS 200

MnTC Goals: Goal 04 - Mathematical/Logical Reasoning

Calculus of one variable-differentiation, introduction to the integral. Students entering Math 261 should have a solid background in algebra and trigonometry. Must have successfully completed College Algebra and Trigonometry or acceptable placement score. MnTC Goal 4.

### B. COURSE EFFECTIVE DATES: 11/12/1996 - Present

#### C. OUTLINE OF MAJOR CONTENT AREAS

- 1. Formal definition of limits and continuity.
- 2. Techniques for finding limits, including limits involving infinity.
- 3. Formal definition of the derivative and the concept of the derivative as a rate of change.
- 4. Differentiation techniques.
- 5. Implicit differentiation and related rates.
- 6. Using the first and second derivatives to understand and interpret graphs of functions.
- 7. Extrema of functions, optimization problems, and other applications of the derivative.
- 8. Indefinite and definite integrals.
- 9. The Fundamental Theorem of Calculus.
- 10. Finding the area under the graph of a function, numerical integration.

### **D. LEARNING OUTCOMES (General)**

- 1. Understand limits and the derivative and how to use them to describe real-world phenomena.
- 2. Read and interpret information presented in graphical form.
- 3. Use the derivative to solve real world optimization problems.
- 4. Understand numerical solutions to problems and error analysis.

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## E. Minnesota Transfer Curriculum Goal Area(s) and Competencies

Goal 04 - Mathematical/Logical Reasoning

- 1. Illustrate historical and contemporary applications of mathematical/logical systems.
- 2. Clearly express mathematical/logical ideas in writing.
- 3. Explain what constitutes a valid mathematical/logical argument(proof).
- 4. Apply higher-order problem-solving and/or modeling strategies.

## F. LEARNER OUTCOMES ASSESSMENT

As noted on course syllabus

### **G. SPECIAL INFORMATION**

None noted

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