



M150                  Calculus                  Fall 2011

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
August 22 Algebra Review	23 Algebra Review	24 1.1	25 1.2	26 <i>Quiz #1</i>
29 1.3	30 1.4	31 1.5	September 1 Maple Lab	2 <i>Quiz #2</i>
5 Labor Day (No class)	6 2.1	7 2.1	8 REVIEW	9 Exam #1
12 2.2	13 2.2	14 2.3	15 2.4	16 <i>Quiz #3</i>
19 Derivatives	20 2.5 Review	21 2.6	22 Maple Lab	23 <i>Quiz #4</i>
26 3.1	27 3.2	28 3.2	29 REVIEW	30 Exam #2
October 3 3.3	4 3.3	5 <i>Quiz #5</i>	6 Fall Break	7 Fall Break
10 3.4	11 3.5	12 3.6	13 Maple Lab	14 <i>Quiz #6</i>
17 3.7	18 3.7	19 3.8	20 REVIEW	21 Exam #3
24 4.1	25 4.2	26 4.2	27 4.3	28 4.3 <i>Quiz #7</i>
30 4.3	November 1 4.4	2 Advising (No class)	3 Maple Lab	4 <i>Quiz #8</i>
7 4.5	8 4.6	9 REVIEW	10 Veteran's Day	11 Exam #4
14 5.1/5.2	15 5.1/5.2	16 5.3	17 5.4	18 <i>Quiz #9</i>
21 5.6/5.7	22 5.8	23 Thanksgiving Break	24 Thanksgiving Break	25 Thanksgiving Break
28 6.1	29 6.2	30 6.2	December 1 Maple Lab	2 <i>Quiz #10</i>
5 REVIEW	6 REVIEW	7 REVIEW	8 REVIEW	9 REVIEW

Final: Thursday, December 15    8:00-9:50am

# Southwest Minnesota State University

## MATH 150: Calculus I

### A. COURSE DESCRIPTION

Credits: 5

Lab Hours/Week: \*.\*

Prerequisites: None

Lecture Hours/Week: \*.\*

Corequisites: None

OJT Hours/Week: \*.\*

MnTC Goals: Goal 04 - Mathematical/Logical Reasoning

Differential calculus of elementary functions, including applications. Introduction to integration. The required preparation is MATH 125: Trigonometry & Special Functions, or MATH 135: Precalculus, or three years of high school mathematics including trigonometry.

### B. COURSE EFFECTIVE DATES: 08/01/1996 – Present

### C. OUTLINE OF MAJOR CONTENT AREAS

1. Preparatory Review
  - a. Graphs
  - b. Modeling
  - c. Rates of Change
  - d. Functions and Their Graphs
  - e. Fitting Models to Data
2. Limits and Their Properties
  - a. Finding Limits Graphically and Numerically
  - b. Evaluating Limits Analytically
  - c. Continuity and One-Sided Limits
  - d. Infinite Limits
3. Differentiation
  - a. The Derivative
  - b. Tangent Lines
  - c. Differentiation Rules
  - d. Rates of Change
  - e. Product and Quotient Rules
  - f. Higher-Order Derivatives
  - g. The Chain Rule
  - h. Implicit Differentiation
  - i. Related Rates
4. Applications of Differentiation
  - a. Extrema on an Interval
  - b. The Mean Value Theorem
  - c. Increasing and Decreasing Functions
  - d. The First Derivative Test

- e. Concavity and the Second Derivative Test
  - f. Limits at Infinity
  - g. Curve Sketching
  - h. Optimization Problems
  - i. Newton's Method
  - j. Differentials
5. Integration
- a. Antiderivatives
  - b. Indefinite Integration
  - c. Area
  - d. Riemann Sums
  - e. Definite Integrals
  - f. The Fundamental Theorem of Calculus
  - g. Integration by Substitution
  - h. Numerical Integration
6. Logarithmic, Exponential, and Other Transcendental Functions
- a. Differentiation and Integration of the Natural Logarithmic Function
  - b. Inverse Functions
  - c. Differentiation and Integration of Exponential Functions
  - d. Bases Other Than e
  - e. Applications
  - f. Differentiation and Integration of Inverse Trigonometric Functions
  - g. Hyperbolic Functions

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

1. Gain an appreciation of the impact of the applications in mathematics in modern life.
2. Gain knowledge of the basic mathematical techniques used in science and engineering.
3. Gain knowledge of correct mathematical reasoning, proofs, and avoiding fallacious reasoning.
4. Apply mathematics to many areas of historical and contemporary interest, including economics, engineering, natural science and social science.
5. Explain the logical steps needed to solve problems.

#### **E. LEARNING OUTCOMES (MN Transfer Curriculum)**

##### 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**

None or as noted on course syllabus

#### **G. SPECIAL INFORMATION**

None noted