

# Minnesota State College Southeast

## MATH 2440: Calculus I

### A. COURSE DESCRIPTION

Credits: 4

Lecture Hours/Week: 4

Lab Hours/Week: \*.\*

OJT Hours/Week: \*.\*

Prerequisites:

This course requires either of these prerequisites

MATH 1225 - Pre-Calculus

MATH 1220 - College Algebra

Corequisites: None

MnTC Goals: Goal 04 - Mathematical/Logical Reasoning

Differential and integral calculus of functions of a single variable. (Meets MnTC Goal 4) (Prerequisite: MATH 1225 Pre-Calculus or MATH1220 College Algebra) (4 credits: 4 lecture/0 lab)

**B. COURSE EFFECTIVE DATES:** 05/17/2017 - Present

### C. OUTLINE OF MAJOR CONTENT AREAS

1. Limits and Derivatives
2. Differentiation Rules
3. Applications of Differentiation
4. Integrals
5. Applications of Integration
6. Techniques of Integration

### D. LEARNING OUTCOMES (General)

1. Explain the concept of limit from a graphical, numerical, and algebraic point of view. Be able to illustrate and calculate limits of a variety of algebraic and transcendental functions, and limits involving infinity
2. Describe what it means for a function to be continuous. Identify various types of discontinuities
3. Compute a derivative using the definition
4. Find derivatives using differentiation rules and implicit differentiation
5. Recognize the derivative as a rate of change and a slope. Use derivatives to solve application problems such as optimization and related rates
6. Use the first and/or second derivative tests and limits to analyze important features of the graph of a function
7. Recognize limits in indeterminate forms (quotient, product, difference, power) and apply L'Hospital's Rule appropriately to evaluate them
8. Define the definite integral as a limit of Riemann sums
9. Describe the relationship between derivative and definite integral as expressed in both parts of the Fundamental Theorem of Calculus, and apply it to evaluate definite integrals using antiderivatives

**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. Apply higher-order problem-solving and/or modeling strategies.

**F. LEARNER OUTCOMES ASSESSMENT**

As noted on course syllabus

**G. SPECIAL INFORMATION**

None noted