MINNESOTA WEST COMMUNITY & TECHNICAL COLLEGE
COURSE OUTLINE

Faculty are required to have the outline submitted to the Academic Affairs Office. The course outline is the form used for approval of new courses by the Collegewide Curriculum Committee.

DEPT. MATH COURSE NO. 1121

NUMBER OF CREDITS: 5

COURSE TITLE CALCULUS I

CATALOG DESCRIPTION Introduces the basics ideas of differential and integral calculus: topics include limits and continuity, differentiation of functions, applications of derivatives, definite and indefinite integrals, numerical integration, and applications of definite integrals.

AUDIENCE For students needing a class in the foundations of calculus.

FULFILLS MN TRANSFER CURRICULUM AREA(S) (Leave blank if not applicable)
Area 4 : by meeting the following competencies: a, b, c, d

PREREQUISITES OR NECESSARY ENTRY SKILLS/KNOWLEDGE: MATH 1113 or placement by exam

LENGTH OF COURSE One semester

THIS COURSE IS USUALLY OFFERED:
Every other year ☒ fall ☒ spring ☒ summer ☐ undetermined ☐

Four goals are emphasized in course at Minnesota West Community & Technical College:

1) ACADEMIC CONTENT:
   
   The academic objectives of this course are:
   (a) to develop a basic understanding of elementary differential and integral calculus concepts and skills.
   (b) to develop practical problem-solving skills using the derivative and the integral.
   (c) to acquire an appreciation of the historical development and present use of the calculus.
   (d) to explore problems from real-world situations by developing models.

2) THINKING SKILLS:
This course will help students improve the effectiveness of their thinking skills through:

(a) developing problem-solving strategies.
(b) using mathematical models to understand patterns.
focusing on logical, observational, insightful, and evaluative thinking

3) COMMUNICATIONS SKILLS:
This course will help students improve their oral and written communication skills by:

(a) oral interpretation of problems.
(b) writing concise solution papers to mathematical exercises and problems.
(c) promoting visualization of mathematical skills and concepts using graphing techniques.
(d) using short writes for expressing mathematical ideas and definitions.
(e) working in small groups to solve problems.

4) HUMAN DIVERSITY:
This course will help students recognize, understand, and appreciate human diversity through:

(a) working at times in small groups to experience ways diverse persons interpret and solve mathematical problems.
(b) witnessing more than one way to solve a particular problem to enrich each person’s point of view.

TOPICS TO BE COVERED:

1. Review of functions of various types.
2. Families of functions and modeling
3. Limits and continuity.
4. The key concept of the derivative—as a slope and as a function.
5. First and second derivatives and simple applications.
6. Differentiability and linear approximation.
7. Techniques and short cuts for finding derivatives algebraically.
8. Introduction to a Calculator / Computer Algebra System
9. Applications for using the derivative in problem solving—curve sketching, optimization, economics marginality, modeling projects, and hyperbolic functions.
10. The key concept of the integral and its connection to areas, Riemann sums.
11. Theorems of integral calculus
12. Constructing antiderivatives graphically, numerically, and analytically.
13. Introduction to differential equations.
14. Some applications of integral calculus
LIST OF EXPECTED COURSE OUTCOMES:

The academic objectives of this course are:
1. to develop a basic understanding of elementary differential and integral calculus concepts and skills.
2. to develop practical problem-solving skills using the derivative and the integral.
3. to acquire an appreciation of the historical development and present use of the calculus.
4. to explore problems from real-world situations by developing models.

LEARNING/TEACHING TECHNIQUES used in the course are:

- Collaborative Learning
- Problem Solving
- Student Presentations
- Interactive Lectures
- Creative Projects
- Individual Coaching
- Lecture
- Films/Videos/Slides
- Demonstrations
- Other (describe below)
- Lab(Computer)

ASSIGNMENTS AND ASSESSMENTS FOR THIS CLASS INCLUDE:

- Reading
- Tests
- Oral Presentations
- Individual Projects
- Textbook Problems
- Collaborative Projects
- Group Problems
- Worksheets
- Term Paper
- Other (describe below)

EXPECTED STUDENT LEARNING OUTCOMES:

The student will be able:
1. to develop a basic understanding of elementary differential and integral calculus concepts and skills.
2. to develop practical problem-solving skills using the derivative and the integral.
3. to acquire an appreciation of the historical development and present use of the calculus.
4. to explore problems from real-world situations by developing models.

The information in this course outline is subject to revision

To receive reasonable accommodations for a documented disability, please contact the campus Student Services Advisor or campus Disability Coordinator as arrangements must be made in advance. In addition, students are encouraged to notify their instructor.

Veteran Services: Minnesota West is dedicated to assisting veterans and eligible family members in achieving their educational goals efficiently. Active duty and reserve/guard military members should advise their instructor of all regularly scheduled military appointments and duties that
conflict with scheduled course requirements. Instructors will make every effort to work with the student to identify adjusted timelines. If you are a veteran, please contact the Minnesota West Veterans Service Office.

This document is available in alternative formats to individuals with disabilities by contacting the Student Services Advisor or by calling 800-658-2330 or Minnesota Relay Service at 800-627-3529 or by using your preferred relay service.

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