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. MATHEMATICS COURSE NO. 1122

NUMBER OF CREDITS: 5

COURSE TITLE CALCULUS II

CATALOG DESCRIPTION Continues Calculus I. Begins with calculations of areas and the definite integral. Other topics include the calculus of transcendental functions, techniques of integration, applications of integration, differential equations and modeling, and infinite sequences and series, Taylor polynomials, and an introduction to vector three-space.

AUDIENCE For students needing one year of general calculus involving the derivative and integral.

FULFILLS MN TRANSFER CURRICULUM AREA(S) (Leave blank if not applicable)
Area 4: by meeting the following competencies: (Mathematical and Logical Reasoning will have already been fulfilled by the prerequisite of Calculus 1)

PREREQUISITES OR NECESSARY ENTRY SKILLS/KNOWLEDGE: Math 1121 (Calculus 1)

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:
   a) To develop the basic understanding between the differential and the integral calculus.
   b) To acquire an appreciation of the historical and cultural development of the calculus.
   c) To develop basic calculating and problem-solving skills using the differential and integral.

2) THINKING SKILLS:
   a) Developing problem-solving strategies.
   b) Using and developing mathematical models to understand patterns and to solve problems.
   c) Exploring problems from real-world situations.
   d) Focusing on logical, observational, insightful, and evaluative thinking.
3) COMMUNICATIONS SKILLS:
   a) Oral interpretation of problems.
   b) Writing concise solution papers to mathematical exercises and problems.
   c) Promoting visualization of mathematical patterns using graphing techniques.
   d) Using short writes and projects for expressing mathematical ideas, developing models, and developing problem-solving communication skills involved in teamwork.

4) HUMAN DIVERSITY:
   a) Working at times in small groups to experience ways that diverse persons solve mathematical problems.
   b) Changing partners in the groups from time to time to enrich each person’s point of view.

TOPICS TO BE COVERED:
   a) Review of derivatives and antiderivatives.
   b) Areas and the Definite Integral.
   c) Evaluating integrals and The Fundamental Theorem of Calculus.
   d) Integration by Substitution and by Parts.
   f) Approximating Definite Integrals with the Trapezoid Rule and Simpson Methods and Errors.
   g) Improper Integrals.
   h) Applications of Definite Integrals—Student Projects—Geometry, Physics, Economics, Probability and Distribution Functions.
   i) Differential Equations Introduction and Modeling
   j) Slope or direction Fields.
   k) Euler’s Method of Approximation Solutions to Differential Equations.
   l) Separation of Variables.
   m) Growth and Decay Applications.
   n) Logistic and Predator-Prey Systems
   o) Sequences
   p) Series—geometric, arithmetic
   q) Estimating Sums
   r) Convergence of Series.
   s) Power Series
   t) Binomial Series
   u) Taylor Polynomials and Series.
   v) Applications of Taylor polynomials
   w) Using Series to solve differential equations
   x) Three-Dimensional coordinate systems
   y) Vectors—Dot and Cross products
   z) Introduction to Equations of Surfaces

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
- Worksheets
- Group Problems
- Collaborative Projects
- Other (describe below)
- Paper
- Term Paper
- Portfolio

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.

A Member of the Minnesota State Colleges and Universities System
An Affirmative Action Equal Opportunity Educator/Employer