

Course Outline for: MATH 1400 Survey of Calculus**A. Course Description:**

1. Number of credits: 4
2. Lecture hours per week: 4
3. Prerequisites: MATH 1100 (C- or better); OR
High School GPA: 2.80-3.29 and completion of high school Pre-Calculus or AP Calculus with a grade of C- or better; OR
ACT Math Sub-Score: 25+; OR
Accuplacer Advanced Algebra Score of 275-289 and Quantitative Reasoning score of 285+
4. Corequisites: None
5. MnTC Goals: Goal 4 Mathematical/Logical Reasoning

The concepts and techniques of differential and integral calculus are covered for those who do not need a comprehensive calculus sequence (MATH 1510-1520). The mathematical applications of the content will involve topics that are found in business, technology, and the social sciences.

B. Date last reviewed/updated: April 2024**C. Outline of Major Content Areas:**

1. Limits of functions and difference quotients.
2. Continuity of functions.
3. Differentiation as a measure of rate of change.
4. Differentiation rules.
5. Differentials.
6. Definite integral as a measure of area.
7. Calculus applied to exponential and logarithmic functions.
8. Antiderivatives or indefinite integrals.
9. Evaluation techniques for integrals.
10. Partial derivatives for functions of several variables.
11. Extreme value problems.
12. Applications and modeling using differentiation and integration.

D. Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

1. Evaluate limits of functions and difference quotients. (Goal 2c; 4a, 4b, 4d)
2. Determine values for which a function is continuous and/or differentiable. (Goal 2a; 4a, 4b, 4c, 4d)
3. Evaluate derivatives and integrals of basic functions including exponential and logarithmic functions. (Goal 4a, 4b, 4d)

4. Construct and evaluate definite integrals representing area, consumer surplus, producer surplus, continuous money flow. (Goal 2a, 2c; 4a, 4b, 4d)
5. Solve introductory differential equations. (Goal 4a, 4d)
6. Evaluate partial derivatives for functions of several variables. (Goal 4a, 4b, 4d)
7. Solve extreme value problems including applying the method of Lagrange. (Goal 2a, 2b; 4a, 4b, 4d)

E. Methods for Assessing Student Learning:

Methods for assessment may include, but are not limited to, the following:

1. In-class testing
2. Take-home testing
3. Assignments
4. Quizzes
5. Attendance
6. Group or individual projects
7. Research

F. Special Information:

This course may be required for business and natural resources programs at some four-year colleges. Some instructors may require use of technology, which may include a graphing calculator or computer algebra tools.