Course Information Form (CIF)

Course Code: MAT 128 (IAI M1 900-1, MTH 901)

Course Title: Calculus and Analytic Geometry I

Department: Mathematics
PCS Code: 1.1 - Baccalaureate/Transfer
CIP Code: 27.0101
Repeatability: 0

Effective Date: Summer 2026

Credit Hours

Catalog Notation: 5-0-5
Credit Hour Distribution:

Lecture: 5	Lab: 0	Clinical: 0	**Total: 5**

General Course Information

Catalog Description

Derivative and its applications; integral and its applications; limits and continuity; trigonometric, exponential, logarithmic, and hyperbolic functions. Credit not given for both MAT 128 and MAT 143.

General Course Objectives

Students will understand the properties and elementary applications of limits, derivatives, and integrals and develop proficiency in the differentiation and elementary integration of polynomials, rational functions, and trigonometric, exponential, and logarithmic functions. The students will also continue to build their skills in problem solving, quantitative reasoning, and the use of technology.

Minimum Placement Levels

English	Reading	Math
None	None	None

Prerequisites

Credit in MAT 124 and MAT 125 with grades of C or higher, or placement

Methods of Evaluation

5-6 exams, 8-15 quizzes and homework, and a cumulative final exam.

Instructional Materials and Additional Supplies

Calculus, 4th edition, by Rogawski and Adams; Freeman Publishing 978-1-319-05073-3 - Print Text Required: TI-84 Plus graphing calculator; $85-$120.

Course Content

General Learning Outcomes (GLOs)

- Reasoning and Inquiry: Students will demonstrate the ability to solve problems using deductive reasoning and logic, quantitative reasoning, or the scientific method.

Course Segments and Student Learning Outcomes

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Review of Functions and Prerequisite Topics	1. Apply basic concepts of linear functions including slope and equations of lines. 2. Determine the equation of a circle from given information. 3. Use a graphics calculator to explore the graphs of simple functions. 4. Determine the domain of a function. 5. Analyze functions (including piecewise-defined). Apply the algebra of functions and find inverse functions.	5	0	0
Limits and Continuity	1. Evaluate limits using algebra and limit theorems (using proper notation). 2. Prove the existence of simple limits using epsilon-delta methods. 3. Apply the definition of continuity and be able to classify discontinuities.	6	0	0
The Derivative	1. Use the definition to find the derivative of a function. 2. Apply derivative theorems to find the derivatives of polynomial, rational, and trigonometric functions. 3. Apply the chain rule to composite functions. 4. Determine the derivative of a function defined implicitly. Relate differentiability and continuity.	12	0	0
Applications of the Derivative	1. Use implicit differentiation to solve related rate problems. 2. Apply the differential of a function and relate it to the local linearity of a differentiable function. 3. Find the roots of an equation using Newton's Method. Apply Rolle's Theorem and the Mean Value Theorem to relate a function to its derivative. 4. Relate the derivative to the increase and decrease of a function. 5. Use the first and second derivative tests to find maxima and minima. 6. Find maxima and minima to solve applied problems.	11	0	0
Analysis of a Function's Graph	1. Apply the notion of concavity and points of inflection. 2. Use limits to find the asymptotes of a curve. 3. Relate the symmetry of a graph to the evenness or oddness of a function. 4. Relate a function's derivatives to graphical features.	4	0	0
The Integral	1. Relate rectangular approximations of area under a curve, Riemann sums, and the definite integral. 2. Find antiderivatives of functions. 3. Use the Fundamental Theorem of Calculus to evaluate definite integrals. 4. Apply the properties of the integral. 5. Use change-of-variables to evaluate indefinite and definite integrals. 6. Use numerical integration (Trapezoidal Rule, Simpson's Rule, and a graphics calculator).	10	0	0

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Applications of the Integral	1. Use integration to find the area under a curve. 2. Set up an integral to compute the area between two curves. 3. Solve simple differential equations, including applications to rectilinear motion. 4. Set up integrals to compute volumes of solids by discs, washers, and shells.	6	0	0
Exponential and Logarithmic Functions	1. Use the properties of exponential and logarithmic functions. 2. Differentiate and integrate functions involving logarithms and functions with variable exponents. 3. Solve separable differential equations and use them to construct exponential growth and decay models.	8	0	0
Inverse Trigonometric and Hyperbolic Functions	1. Review the definitions, basic properties, and graphs of inverse trigonometric functions. 2. Differentiate inverse trigonometric functions. 3. Evaluate integrals that result in inverse trigonometric functions. 4. Define the hyperbolic sine and cosine functions. 5. Differentiate and integrate the hyperbolic sine and cosine.	2	0	0
Review and Tests	1. Earn at least a 70 percent on each of five hour exams and the final exam.	11	0	0

Total Contact Hours

Lecture Hours	Lab Hours	Clinical Hours
75	0	0