

**Course Code:** MAT 129 (IAI M1 900-2, MTH 902)

**Course Title:** Calculus and Analytic Geometry II

**Department:** Mathematics

**Effective Date:** Summer 2026

**PCS Code:** 1.1 - Baccalaureate/Transfer

**CIP Code:** 27.0101

**Repeatability:** 0

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## Credit Hours

**Catalog Notation:** 4-0-4

**Credit Hour Distribution:**

Lecture: 4

Lab: 0

Clinical: 0

**Total: 4**

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## General Course Information

### Catalog Description

Conic sections, polar coordinates, methods of integration, applications of integration, parametric equations, indeterminate forms, infinite series.

### General Course Objectives

Students will develop proficiency in integration; understand how definite integrals are applied; understand convergence, divergence, and series representations of functions; and understand the calculus of parametric and polar curves in two dimensions. Graphing calculator usage is integrated throughout the course.

### Minimum Placement Levels

English	Reading	Math
None	None	None

### Prerequisites

Credit in MAT 128 with a grade of C or higher, or placement

### Methods of Evaluation

4-5 exams, 5-15 quizzes and homework, and a cumulative final exam.

### Instructional Materials and Additional Supplies

Precalculus, Functions and Graphs, 13th edition, by Swokowski and Cole; Cengage Learning, 2019.

9781337552332 - Print Text

Required: Instructor will choose either the TI-84 Plus graphing calculator (\$85-\$120), or the TI-Nspire CAS CX (\$160). See instructor for calculator requirement.

## 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
Methods of Integration	<ol style="list-style-type: none"> <li>Integrate by using fundamental formulas and the method of substitution. Integrate powers of trigonometric functions.</li> <li>Integrate functions involving <math>a^2-u^2</math>, <math>a^2+u^2</math> or <math>u^2-a^2</math>, and <math>ax^2+bx+c</math> by trigonometric substitution.</li> <li>Do integration by parts. Integrate rational functions by partial fractions.</li> </ol>	10	0	0
Applications of the Integral	<ol style="list-style-type: none"> <li>Model, set up, and evaluate integrals for: the arc length of the graph of a function on a closed interval, average value of a function, the work done by a force, the surface area of a solid of revolution, the centroid of a plane region, and fluid force on objects.</li> </ol>	7	0	0
Parametric Equations	<ol style="list-style-type: none"> <li>Apply and interpret the graphs of parametric equations.</li> <li>Determine the points of intersection of two polar equations.</li> <li>Change an equation from rectangular coordinates to polar coordinates, and change from polar coordinates to rectangular coordinates.</li> <li>Find the slope of the tangent line to a polar curve at a given point.</li> <li>Determine areas bounded by polar curves.</li> </ol>	8	0	0
Indeterminate Forms and Improper Integrals	<ol style="list-style-type: none"> <li>Use L'Hopital's Rule to evaluate limits of the form <math>0/0</math> and infinity/infinity.</li> <li>Change limits of the form <math>0 \times \text{infinity}</math> and infinity-infinity to forms <math>0/0</math> or infinity/infinity and evaluate them.</li> <li>Use logarithms and L'Hopital's Rule to evaluate limits of the form <math>1^\infty</math>, <math>\text{infinity}^0</math>, and <math>0^0</math>.</li> <li>Determine the divergence or convergence of improper integrals and evaluate those which converge.</li> </ol>	4	0	0
Sequences and Series	<ol style="list-style-type: none"> <li>Determine the convergence or divergence of: a sequence and determine its limit when it converges; geometric and telescoping series and determine their value when they converge; series by using the nth term test, comparison test, ratio test, integral test, and the alternating series test.</li> <li>Determine absolute or conditional convergence of an alternating series.</li> <li>Expand a function in a Taylor series about a given point.</li> <li>Approximate functions using a Taylor series and estimate the error.</li> <li>Determine the interval and radius of convergence of a power series.</li> </ol>	16	0	0
Conic Sections	<ol style="list-style-type: none"> <li>Apply the properties of the parabola, ellipse, and hyperbola. Identify foci, vertices, and asymptotes; sketch graphs of conic sections.</li> <li>Construct the equation of a conic from information given about it.</li> <li>Translate axes.</li> </ol>	6	0	0
Review and Tests	<ol style="list-style-type: none"> <li>Earn at least a 70 percent on each of four hour exams and the final exam.</li> </ol>	9	0	0

#### Total Contact Hours

Lecture Hours	Lab Hours	Clinical Hours
60	0	0