

Prepared by the Department of Mathematics

Date of Departmental Approval: November 6, 2017

Date approved by Curriculum and Programs: January 18, 2018

Effective: Fall 2018

1. **Course Number:** MAT250
Course Title: Calculus II
2. **Description:** Continuation of MAT240 Calculus I. Topics include calculus of exponential, logarithmic, and trigonometric functions; techniques of integration, moments and centroids; indeterminate forms and improper integrals; Taylor's formula; and infinite series. 4 class hours.
3. **Student Learning Outcomes (instructional objectives: intellectual skills):**
Upon successful completion of this course, students are able to do the following:
 - recite definitions and demonstrate intuitive understanding of limits, derivatives, and definite integrals; state and prove major theorems of calculus.
 - find derivatives of inverse functions, natural logarithmic functions, natural exponential functions, inverse trigonometric functions, and hyperbolic functions.
 - apply basic integration formulas, integration by parts, integration of rational functions by partial fractions, trigonometric integration, trigonometric integration by substitution, and improper integrals to evaluate definite and indefinite integrals.
 - solve separable differential equations.
 - graph conic sections and quadratic equations.
 - find equation of conic sections by eccentricity.
 - graph polar coordinates, conics, and parametric equations.
 - convert from polar to Cartesian equations and from Cartesian to polar equations.
 - determine convergence and divergence of sequences and infinite series using geometric and alternating, and harmonic series, integral, comparison, ratio, and root tests.
 - find power series, Taylor series, and Maclaurin series.
 - solve application problems.
4. **Credits:** 4 credits
5. **Satisfies General Education Requirement:** No
6. **Prerequisite(s):** A grade of C- or higher in MAT240 (Calculus I) or MAT185 (Business Calculus II)
7. **Semester(s) Offered:** Varies
8. **Suggested General Guidelines for Evaluation:** Comprehensive final examination, hour tests, problems, cases, and quiz papers.
9. **General Topical Outline (Optional):** Please see the attached course outline.

MAT250 Calculus II

- I. Logarithmic and Exponential Functions
 - A. Inverse Functions
 - B. Natural Logarithmic Function
 - C. Natural Exponential Function
 - D. Differentiation and Integration
 - E. Laws of Growth and Decay

- II. Inverse Trigonometric and Hyperbolic functions
 - A. Inverse Trigonometric Functions
 - B. Derivatives and Integrals of Inverse Trigonometric Functions
 - C. Hyperbolic Functions
 - D. Inverse Hyperbolic Functions

- III. Techniques of Integration
 - A. Integration by parts
 - B. Trigonometric Integrals
 - C. Trigonometric substitutions
 - D. Integrals of Rational Functions
 - E. Integrals Involving Quadratic Expressions
 - F. Miscellaneous Substitutions
 - G. Tables of Integrals
 - H. Applications

- IV. Indeterminate Forms, Improper Integrals, and Taylor's Formula
 - A. Indeterminate Forms
 - B. Integrals with Infinite Limits of Integration
 - C. Integrals with Discontinuous Integrands

- V. Infinite Series
 - A. Infinite Sequences
 - B. Convergent and Divergent Infinite Series
 - C. Positive Term Series
 - D. Alternating Series
 - E. Absolute Convergence
 - F. Power Series
 - G. Power Series Representation of Functions
 - H. Taylor and MacLaurin Series
 - I. Binomial Theorem