

BROOME COMMUNITY COLLEGE
Binghamton, New York

COURSE TITLE CALCULUS II MAT 182

CLASS LECTURE HOURS 4 **LAB HOURS** 0 **CREDIT HOURS** 4

DIVISION DEAN Julia Peacock

DEPT. CHAIRPERSON Mary Woestman **DATE** Spring 2003

PREREQUISITE: MAT 181 Calculus I

Learning objectives of Course:

The Student should be able to:

1. Define a sequence and a series.
2. Test series for convergence.
3. Test alternating series for absolute or conditional convergence.
4. Perform operations with power series.
5. Find the radius of convergence of a power series.
6. Develop Taylor and Maclaurin series expansions for a function.
7. Employ various integration techniques including integration by parts, trigonometric substitution and partial fractions.
8. Evaluate improper integrals.
9. Solve elementary differential equations.
10. Compute limits using L'Hopital's Rule.
11. Transform from rectangular to polar coordinates and from polar to rectangular.
12. Graph in polar coordinates.
13. Compute area in polar coordinates.
14. Compute arc length in polar coordinates.
15. Use graphing calculator as an aid in analyzing problems.
16. Graph parametric equations.
17. Use Calculus with parametric equations.
18. Recognize graphs and perform calculus on various conics.

CATALOG COURSE DESCRIPTION:

Applications of the definite integral including area, volume, arc length and differential equations. Techniques of integration including parts, partial fractions and trigonometric substitution. Improper integrals, detecting convergence and L'Hopital's rule. Sequences and infinite series, tests for convergence, power series, Taylor series. Polar curves, parametric equations and conics with calculus.

4 Class hours; Prerequisite: MAT 181 Calculus I or equivalent.

MAT 182
CALCULUS II

COURSE OUTLINE:

Exponentials, Logarithms and other Transcendental Functions

The Natural Logarithm Revisited
Inverse Functions
The Exponential Function Revisited
Growth and Decay Problems
Separable Differential Equations
Euler Method
The Inverse Trigonometric Functions
The Calculus of the Inverse Trigonometric Functions
The Hyperbolic Functions (inverse optional)

Integration Techniques

Review of Formulas and Techniques
Integration by Parts
Trigonometric Techniques of Integration
Integration of Rational Functions Using Partial Fractions
Integration Tables and Computer Algebra Systems
Indeterminate Forms and L'Hopital's Rule
Improper Integrals

Infinite Series

Sequence of Real Numbers
Infinite Series
The Integral Test and Comparison Tests
Alternating Series
Absolute Convergence and the Ratio Test
Power Series
Taylor Series
Applications of Taylor Series
Fourier Series (optional)

Parametric Equations and Polar Coordinates

Plane Curves and Parametric Equations
Calculus and Parametric Equations
Arc Length and Surface Area in Parametric Equations
Polar Coordinates
Calculus and Polar Coordinates
Conic Sections
Conic Sections in Polar Coordinates