

I. **CATALOG DESCRIPTION**

Mathematics; Math 251; Single Variable Calculus II

Lecture: 4 hours per week = 4 units

Further application of definite integrals, differentiation and integration of transcendental functions, techniques of integration, L'Hopitals rule and improper integrals, infinite sequences and series, power series.

Prerequisite: Math 250

II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: One

III. EXPECTED OUTCOMES FOR STUDENTS:

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

- A. Apply integration to some practical concepts, including work, fluid pressure, rectilinear motion and arc length.
- B. Differentiate and integrate exponential functions, logarithmic functions and inverse trigonometric functions.
- C. Integrate any single variable situation using the following various techniques:
 - 1) Integration by parts
 - 2) Trigonometric substitution
 - 3) Partial Fractions
 - 4) Reducing Formulas
 - 5) Some trigonometric manipulations
 - 6) Tables of integration
- D. Recognize and evaluate improper integrals
- E. Recognize Indeterminate Forms of Limits and apply the appropriate procedure including L'Hopitals rule
- F. Work with sequences and infinite series
Determine the absolute convergence, conditional convergence or divergence of an infinite series using tests of convergence and theorems. Find the radius of convergence and the interval of convergence for power series. Construct and use Maclaurin and Taylor Polynomial and Series.

IV. CONTENT

- A. Further applications of integration (may include the following)
 - 1) Length of a plane curve
 - 2) Area of a surface of revolution
 - 3) Rectilinear motion
 - 4) Work
 - 5) Fluid pressure and force
- B. Logarithm and exponential functions
 - 1) Inverses
 - 2) Exponential functions
 - 3) Natural Logarithm
- C. Inverse Trigonometric Functions
- D. Techniques of Integration
 - 1) Integration by parts
 - 2) Integrating powers of sine and cosine
 - 3) Integrating powers of secant and tangent
 - 4) Trigonometric substitutions

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5) Integrating rational functions; partial fractions

6) Miscellaneous substitutions

7) Integration tables

E. Improper integrals

F. Application of L'Hopital's rule and indeterminate forms

G. Infinite Series

1) Sequence

2) Define infinite series

3) Convergence tests

4) Power series

5) Taylor and Maclaurin

V. METHODS OF INSTRUCTION:

A. Lecture

B. Discussion

C. Drill at the chalkboard

D. Group study

E. Computer aided instruction

F. Calculator aided instruction

VI. TYPICAL ASSIGNMENTS:

A. Daily reading and/or problem assignments will reinforce and extend classroom presentations

B. Written assignments will include solutions of various problems illustrative of the appropriate mathematical concepts and processes.

VII. EVALUATION(S)

A. Four to six regularly scheduled tests

B. Quizzes and/or homework assignments, and/or group projects

C. Comprehensive final exam

VIII. TYPICAL TEXT(S)

Larson/Hostetler/Edwards, Calculus of a Single Variable,

Houghton Mifflin, 1998

IX. OTHER SUPPLIES REQUIRED OF STUDENTS: TI-85 Graphing Calculator