

SYLLABUS

COURSE # & TITLE: MATH 189, Calculus II

OF CREDITS: 4 (3+2P)

CATALOG DESCRIPTION:

A continuation of Math 188; extending to topics in Techniques of Integration, Numerical Integration, Applications of Integration, Infinite Series, Power Series, Maclaurin & Taylor Series and Taylor Polynomials.

Semester Offered: Fall, Spring, Summer

Prerequisites: Grade of "C" or better in Math 188, Calculus I.

Common Student Learning Outcomes

Upon successful completion of San Juan College programs and degrees, the student will...

Learn *Students will actively and independently acquire, apply and adapt skills and knowledge to develop expertise and a broader understanding of the world as lifelong learners.*

Think *Students will think analytically and creatively to explore ideas, make connections, draw conclusions, and solve problems.*

Communicate *Students will exchange ideas and information with clarity and originality in multiple contexts.*

Integrate *Students will demonstrate proficiency in the use of technologies in the broadest sense related to their field of study.*

Act *Students will act purposefully, reflectively, and respectfully in diverse and complex environments.*

GENERAL LEARNING OBJECTIVES:

Upon completion of the course, the student should understand the following content areas:

1. Indefinite and Definite Integration
2. Various Methods/Techniques of Integration
3. Applications of Integration
4. Parametric Equations & Polar Coordinates
5. Infinite Sequences & Series

SPECIFIC LEARNING OUTCOMES:

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

- 1.1 Distinguish the difference between differentiation and antidifferentiation
- 1.2 Distinguish the difference between elementary indefinite & definite integration
- 1.3 Understand the fundamental theorem of calculus

- 2.1 Integrate by the Substitution Method and Integration by Parts
- 2.2 Integrate by Trigonometric Integrals and Trigonometric Substitution
- 2.3 Integrate Rational Functions by Partial Fractions
- 2.4 Integrate by utilizing Tables of Integrals

- 2.5 Approximate Integrals by the Midpoint Rule, Trapezoid Rule and Simpson's Rule
- 2.6 Determine Approximation Errors through use of the Midpoint, Trapezoid and Simpson's Rule
- 2.7 Integrate by Improper Integrals

- 3.1 Integrate Definite Integrals to calculate area
- 3.2 Integrate Definite Integrals to calculate areas between curves
- 3.3 Evaluate Application of Integration; calculate Volumes of Solids

- Disk & Washer Method
- Cylindrical Shells Method
- Arc Length
- Surface Area (of Revolution)

- 3.4 Evaluate Application of Integration; Work, Physics & Engineering, Economics & Biology

- 4.1 Evaluate Curves by Parametric Equations
- 4.2 Evaluate Differentiation & Integration with Parametric Curves
- 4.3 Convert Polar Coordinates to Cartesian Coordinates and vice versa
- 4.4 Calculate areas and lengths of Polar Coordinates

- 5.1 Analyze Sequences (infinite & finite) and Series
- 5.2 Analyze Series for Convergence (Absolute/Conditional) or Divergence by several Test Methods

- The Integral Test
- The Comparison Test
- The Alternating Series Test
- The Ratio & Root Tests
- The P-Series & Alternating P-Series Tests

- 5.3 Analyze the Power Series; involving the Radius of Convergence and Interval of Convergence
- 5.4 Analyze Maclaurin and Taylor Series
- 5.5 Find representations of functions with Taylor Polynomials

OTHER REQUIREMENTS:

The TI-82, TI-83, TI-84, TI-85 or TI-86 graphing calculator is required for the course. A **TI-83 Plus or TI-84 Plus Graphing Calculator** is strongly recommended. Graphing calculators capable of symbolic manipulation (such as TI-89 or TI-92 and other such calculators) will not be allowed on examinations, the final exam and where the instructor finds fit.

Dean, School of Science: Frank Williams Date: 5/2/06

A current syllabus must be on file in the dean's office for every course being taught during a given semester.