

SYLLABUS

COURSE # & TITLE: MATH 187, Applications of Calculus **# OF CREDITS:** 4

CATALOG DESCRIPTION:

An introduction to the methods of differential and integral calculus. Polynomial, rational, exponential, and logarithmic functions are used in topics such as rates of change, limits, derivatives, continuity, extrema, graphing, antiderivatives, definite integrals, and techniques of integration. Applications involving optimization, related rates, growth and decay models, and marginality will be studied primarily in context of business related topics.

Semester Offered: Spring
Prerequisites: Grade of "C" or better in Math 185; College Algebra

Common Student Learning Outcomes

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

<i>Learn</i>	<i>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.</i>
<i>Think</i>	<i>Students will think analytically and creatively to explore ideas, make connections, draw conclusions, and solve problems.</i>
<i>Communicate</i>	<i>Students will exchange ideas and information with clarity and originality in multiple contexts.</i>
<i>Integrate</i>	<i>Students will demonstrate proficiency in the use of technologies in the broadest sense related to their field of study.</i>
<i>Act</i>	<i>Students will act purposefully, reflectively, and respectfully in diverse and complex environments.</i>

GENERAL LEARNING OUTCOMES:

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

- 1.) Functions and their graphs.
- 2.) Limits.
- 3.) The derivative.
- 4.) Techniques of differentiation.
- 5.) Applications involving derivatives.
- 6.) Exponential and logarithmic functions.
- 7.) Definite and indefinite integrals.
- 8.) Applications of integrals.

OUTCOMES:

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

- 1.1 Define, determine, and algebraically manipulate functions.
- 1.2 Use linear functions to graph and model applications.
- 1.3 Find variable rates of change.

- 2.1 Find the limits of functions algebraically, graphically, and numerically.
- 2.2 Define and use the derivative concept.
- 2.3 Find derivatives of sums, products, quotients, and compositions of power, polynomial, rational, exponential, and logarithmic functions.
- 2.4 Find higher order derivatives.
- 2.5 Use the derivative for finding instantaneous rates of change.

- 3.1 Determine the continuity and differentiability of a function.
- 3.2 Find extrema and inflection points.
- 3.3 Find intervals where functions are increasing or decreasing or concave up or concave down.

- 4.1 Maximize or minimize quantities using derivatives.
- 4.2 Use implicit differentiation and the concept of related rates in applications.
- 4.3 Find marginal cost, revenue, and profit.


- 5.1 Define exponential and logarithmic functions.
- 5.2 Use exponential and logarithmic functions in growth and decay problems.
- 5.3 Solve basic finance and economic related problems.

- 6.1 Find antiderivatives of sums and difference of power functions.
- 6.2 Find antiderivatives using substitution.
- 6.3 Apply basic integration techniques to find indefinite integrals.

- 7.1 Define the definite integral
- 7.2 Calculate definite integrals using the Fundamental Theorem of Calculus
- 7.3 Use definite integrals to solve supply and demand situations.

OTHER REQUIREMENTS:

A TI-83 or TI-84 graphing calculator is required for this course. Graphing calculators capable of symbolic manipulation (such as TI-89 or TI-92 and other such calculators) will not be allowed on examinations and where the instructor finds fit.

DIVISION DEAN: _____ 

DATE: 1-4-07

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