IMPERIAL COMMUNITY COLLEGE DISTRICT
IMPERIAL VALLEY COLLEGE

COURSE OUTLINE

DIVISION: Science, Mathematics and Engineering   **DATE:**   October 12, 2005

COURSE TITLE: Introductory Calculus with Applications **COURSE NO.:** MATH 170   **UNITS:** 4

   LEC HRS.   4   **LAB HRS.**   **HRS. TBA**

   If cross-referenced, please complete the following

   COURSE NO.(s)   **COURSE TITLE**

 I.   **COURSE/CATALOG DESCRIPTION:**

   To prepare for courses for which calculus is recommended and/or required. To study
   the ideas and concepts of advanced mathematics as applied to a modern computerized
   society. Topics covered include pre-calculus concepts, functions, differentiation,
   integration, differential equations, and functions of several variables. (Formerly MATH
   124.)

 II.   A.   **PREREQUISITES, if any:**

      MATH 150 with a grade of "C" or better.

   B.   **COREQUISITES, if any:**

      None

   C.   **RECOMMENDED PREPARATION, if any:**

 III.   **GRADING CRITERIA:**

      X   Course must be taken on a "letter-grade" basis only.

            Course may be taken on a "credit" basis or for a letter grade.

            Course must be taken on a "credit" basis only.

IV. MEASURABLE COURSE OBJECTIVES AND MINIMUM STANDARDS FOR GRADE OF "C":

1. Students will demonstrate an understanding and comprehension of basic ideas and elementary concepts of algebra.

2. Students will demonstrate an understanding of functions and intuitive understanding of limits.

3. Students will demonstrate an understanding and a working knowledge of the derivative.

4. Students will demonstrate proficiency in problem solving when dealing with applications of differentiation.

5. Students will distinguish the various approaches when solving integration problems.

6. Students will demonstrate the ability to solve problems in a step-by-step manner when dealing with applications of integration.

7. Students will demonstrate an understanding of logarithmic and exponential functions, and differential equations, and their use in applications.

8. Students will analyze functions of several variables.

V. CORE CONTENT TO BE COVERED IN ALL SECTIONS:

CORE CONTENT	APPROX. % OF COURSE

1. Pre-calculus Review
   A. The real number line and order
   B. Absolute value and distance on the real number line
   C. Exponents and radicals
   D. Factoring polynomials
   E. Fractions and rationalization
	10%

2. Functions and Limits
   A. The Cartesian plane and the distance formula
   B. Graphs of equations
   C. Lines in the plane
   D. Functions
   E. Limits
   F. Continuity
	10%

3. Differentiation
   A. The derivative and the slope of a curve
   B. Some rules of differentiation
   C. Rates of change: Velocity
   D. The product and quotient rules
   E. The chain rule
   F. Higher order derivatives
	15%

4. Applications of the Derivative
   A. Increasing and decreasing functions
   B. Extrema and the first-derivative test
   C. Concavity and the second-derivative test
   D. Optimization problems
   E. Practical applications in various areas
   F. Asymptotes
   G. Curve sketching
   H. Differentials
	15%

5. Integrations
   A. Anti-derivatives and the indefinite integral
   B. The general power rule
   C. The definite integral as the limit of a sum
   D. Integration by substitution
   E. Integration by parts
   F. Improper integrals
   G. Numerical integration
	15%

6. Applications of the integral
   A. Area and the Fundamental Theorem of Calculus
   B. The area of a region between two curves
   C. The volume of a solid of revolution
   D. Practical applications in various areas
	10%

7. Exponential and logarithmic functions and differential equations
   A. Exponential functions
   B. Differential and integration of exponential functions
   C. The natural logarithmic function
   D. Differential and integration of logarithmic functions
   E. Differential equations
   F. Exponential growth and decay
   G. Applications of differential equations
	15%

8. Functions of several variables
   A. Functions of several variables
   B. Partial derivatives
   C. Extrema of functions of two variables
	10%

VI. **METHOD OF EVALUATION TO DETERMINE IF OBJECTIVES HAVE BEEN MET BY STUDENTS:** (check all that apply)

Essay	X	**Class Activity**	X	**Written Assignments**	X
Problem Solving Exercise	X	**Final Exam**	X	**Oral Assignments**	X
Skill Demonstration	X	**Objective**	X	**Quizzes**	X
Other	X				

VII. **INSTRUCTIONAL METHODOLOGY:** (Check all that apply)

Lecture	X	**Discussion**	X	**Demonstration**	X
Audio Visual	X	**Group Activity**	X	**Lab Activity**	X
Computer Assisted Instruction	X	**Individual Simulation/ Assistance**	X	**Case Study**	X

Two (2) hours of independent work done out of class per each   hour of lecture or class work, or 3 hours lab, practicum, or the equivalent per unit. _____

Other

VIII. **TEXTBOOK(S) AND SUPPLEMENT(S):**

Goldstein, Lay, Schneider. *Calculus and Its Applications*. 8th edition. New Jersey: Prentice Hall, 1999.

Tan, Soo T. *College Mathematics*. 4th edition. Boston: Brooks/Cole (ITP), 1999.