IMPERIAL COMMUNITY COLLEGE DISTRICT
IMPERIAL VALLEY COLLEGE

COURSE OUTLINE

DIVISION: Science, Mathematics and Engineering   **DATE:**   September   2006

COURSE TITLE: Calculus I   **COURSE NO.:**   MATH 192   **UNITS:** 5

   LEC HRS.   5   **LAB HRS.**   **HRS. TBA**

   If cross-referenced, please complete the following

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

I.   COURSE/CATALOG DESCRIPTION:

Concepts dealing with limits, continuity, differentiation and applications, integration and applications, exponential and logarithmic functions, and other transcendental functions will be covered.

II.   A.   PREREQUISITES, if any:

MATH 190 or equivalent with a grade of "C" or better, or appropriate placement.

B.   COREQUISITES, if any:

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. The student will demonstrate skills in understanding the concept of limit and be knowledgeable in finding limits.

2. The student will demonstrate an understanding and a working knowledge of the derivative.

3. The student will demonstrate proficiency in problem solving when dealing with applications of differentiation.

4. The student will demonstrate knowledge in anti-differentiation.

5. The student will demonstrate an understanding and a working knowledge of the definite integral.

6. The student will demonstrate a thorough understanding of logarithmic and exponential functions, and their use in applications dealing primarily with growth and decay phenomena.

7. The students will demonstrate the ability to deal with trigonometric, inverse trigonometric and hyperbolic functions and many common applications thereof.

V. CORE CONTENT TO BE COVERED IN ALL SECTIONS:

CORE CONTENT	APPROX. % OF COURSE

1. Limits
   A. Tangents, areas and limits
   B. Limits of functions
   C. The formal definition of limit
   D. Properties of limits
   E. One-sided limits
   F. Continuity
	15%

2. The Derivative
   A. The derivative as a function
   B. Rules of calculating derivatives
   C. Derivatives of the trigonometric functions
   D. The derivative as a velocity
   E. Higher order derivatives
   F. The chain rule
   G. Implicit differentiation and rational power functions
   H. Linear approximation and differentials
   I. Newton's method
	15%

3. Applications of the Derivative
   A. Extreme values and the Mean Value Theorem
   B. Increasing and decreasing functions
   C. Relative Extrema
   D. Significance of the Second Derivative Concavity
   E. Curve sketching
   F. Extrema on closed Bounded Intervals; max-min problems
   G. The derivative as a rate of change
	15%

4. Anti-differentiation
   A. Anti-derivatives
   B. Integrals by substitution
   C. Differential equations
	10%

5. The Definite Integral
   A. Review of Sigma Notation
   B. The Area Problem: Approximating Sums
   C. Reimann Sums: The Definite Integral
   D. The Fundamental Theorem of Calculus
   E. Finding Areas by Integration
   F. Rules of Approximating Integrals
	15%

6. Logarithmic and Exponential Functions
   A. Review of Logarithms and Inverse Functions
   B. The Natural Logarithm Function
   C. The Natural Exponential Function
   D. Exponentials and Logs to other bases
   E. Exponential growth and decay
	15%

7. Trigonometric, Inverse Trigonometric and Hyperbolic Functions
   A. Integrals of the Trigonometric Functions
   B. Integrals involving products of Trigonometric Functions
   C. The Inverse Trigonometric Functions
   D. Derivatives of the Inverse Trigonometric Functions
   E. The Hyperbolic Functions
	15%

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 Assistance	X	Simulation/ Case Study	X
On-Line	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. REQUIRED AND MAJOR OPTIONAL READING(S), INCLUDING TEXTBOOK(S) AND SOFTWARE

Larson, R., Hostetler, R. and Edwards, B. *Calculus of a Single Variable*. 8th edition. Houghton Mifflin , 2005.

Stewart, James. *Calculus.* 5th edition. Brooks/Cole, 2003.

Stewart, James. *Single Variable Calculus: Early Transcendentals*. 5th edition. Brooks/Cole, 2003.

Edwards, C. and Penney, D. *Calculus, Early Transcendentals.* 6th edition. Prentice Hall , 2003.

Strauss, M., Bradley, G. and Smith,K. *Single Variable Calculus*. 3rd edition. Prentice Hall , 2002.

Technology: Graphing Calculators

Journals: *Math Teacher*, NCTM
The College Mathematics Journal, MA