IMPERIAL COMMUNITY COLLEGE DISTRICT
IMPERIAL VALLEY COLLEGE

COURSE OUTLINE

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

COURSE TITLE: Calculus III **COURSE NO.:** MATH 210 **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 partial differentiation, multiple integration, vectors, and vector analysis.

II. A. PREREQUISITES, if any:

MATH 194 with a grade of "C" or better.

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 a broad understanding of the basic operations with vectors in various coordinate spaces and a variety of 3-dimensional figures.

2. The student will demonstrate their knowledge of vectors to differentiation and integration of vector-valued functions.

3. The student will demonstrate the use of functions of several variables and apply techniques to relevant situations.

4. The student will demonstrate an understanding of double and triple integrals and the ability to solve problems when dealing with applications of multiple integrations.

5. The student will evaluate and demonstrate knowledge of diverse topics in vector analysis.

V. CORE CONTENT TO BE COVERED IN ALL SECTIONS:

CORE CONTENT	APPROX. % OF COURSE
1. Vectors in the plane and in space A. Vectors in the plane B. The Dot Product C. Space coordinates: Vectors in space D. The Cross Product E. Equations for lines and planes F. Cylindrical and spherical coordinates G. Quadric surfaces and cylinders	20%
2. Vector-valued functions A. Properties of vector-valued functions B. Derivatives and integrals of vector-valued functions, tangent vectors and arc length C. Functions D. Velocity and acceleration E. Curvature	15%
3. Differentiation of functions of several variables A. Functions of several variables B. Partial differentiation C. Tangent planes D. Relative and absolute extrema E. Approximations and differentials F. Chain rules G. Directional derivatives; the gradient H. Constrained optimization: The method of Lagrange Multipliers reconstructing a function from its gradient	22.5%
4. Double and triple integrals A. The double integral over a rectangle B. Double integrals over more general regions C. Double integrals in polar coordinates D. Calculating mass and centers of mass E. Surface area F. Triple integrals in Cartesian coordinates G. Triple integrals in cylindrical and spherical coordinates	22.5%
5. Topics in vector analysis A. Vector fields B. Work and line integrals C. Line integrals: Independence of Path D. Green's Theorem E. Surface Integrals F. Stokes' Theorem G. The Divergence Theorem	20%

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**	**Simulation/** X	**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. TEXTBOOK(S) AND SUPPLEMENT(S):

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

Larson, R., Hostetler, R. and Edward, B. *Multivariable Calculus.* 8th edition. Houghton Mifflin, 2006.

Stewart, James. *Multivariable Calculus: Concepts and Contexts.* 3rd edition. Brooks/Cole, 2005.

Edwards, C. and Penney, D. *Multivariable Calculus.* 6th edition. Prentice Hall, 2002.

Williamson, R. and Trotter, H. *Multivariable Mathematics.* 4th edition. Prentice Hall, 2004.