IMPERIAL COMMUNITY COLLEGE DISTRICT IMPERIAL VALLEY COLLEGE

COURSE OUTLINE

DIVISION: Science, Mathematics and Engineering

DATE: <u>September 2006</u>

COURSE TITLE: <u>Introduction to Linear Algebra with Applications</u> COURSE NO.: <u>MATH 230</u> UNITS: <u>3</u>

LEC HRS. 3 LAB HRS. HRS. TBA

If cross-referenced, please complete the following

COURSE NO.(s) _____ COURSE TITLE

I. COURSE/CATALOG DESCRIPTION:

A first course in linear algebra intended for students majoring in mathematics, the physical science, engineering or business. Topics included are: systems of linear equations, matrices and determinants, vector spaces, linear transformations, eigenvalues and eigenvectors, and selected applications.

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:

<u>X</u> 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 solve systems of linear equations and inequalities using elimination methods.
- 2. The student will apply the techniques of matrix algebra to the solution of systems of linear equations and inequalities.
- 3. The student will compute the determinant of a square matrix and apply determinants to matrix operations.
- 4. The student will perform vector operations in tow or more dimensions and determine vector linear relationships, matrix dimension and rank.
- 5. The student will find the projection of vectors on planes in space using matrices and the Gram-Schmidt process.
- 6. The student will demonstrate the transformations of linear systems and find the kernel and range of such transformations.
- 7. The student will compute the scalar eigenvalue and eigenvector of a square matrix and diagonalize square matrices.
- 8. The student will choose appropriate techniques of linear algebra to solve application problems from different fields.

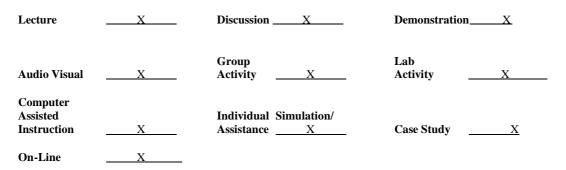
V. CORE CONTENT TO BE COVERED IN ALL SECTIONS:

CORE CONTENT	<u>APPROX. %</u> <u>OF COURSE</u>
 Linear Systems A. Systems of linear equations and inequalities B. Various methods of solutions 	5%
2. MatricesA. DefinitionsB. PropertiesC. Operations	10%
3. DeterminantsA. DefinitionsB. PropertiesC. Operations	10%
 4. Vector Spaces A. Definitions B. Properties C. Operations D. Linear relationships E. Matrix dimension and rank 	20%
5. Inner-product spacesA. OrthogonalityB. Projections of vectors	10%
6. Linear TransformationsA. Definitions and typesB. Kernal and range	10%
 7. Eigenvalues and eigenvectors of matrices A. Definitions B. Properties C. Diagonalization of a matrix 	15%
8. Selected applications from various fields to be presented throughout the course content	20%

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

Essay	X	Class Activity <u>X</u>	Written Assignments X
Problem Solving Exercise	X	Final Exam <u>X</u>	Oral Assignments <u>X</u>
Skill Demonstration	X	Objective <u>X</u>	Quizzes X
Other	X		

VII. INSTRUCTIONAL METHODOLOGY: (Check all that apply)



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):

Lay, David. Linear Algebra and Its Applications. 3rd edition. Addison Wesley, 2006.

Larson, R. and Edward, B. *Elementary Linear Algebra*. 4th edition. Houghton Mifflin, 2000.

Kolman, B.and Hill, D. *Introductory Linear Algebra: An Applied First Course*. 8th edition. Prentice Hall, 2005.

Strang, Gilbert. Linear Algebra and Its Applications. 4th edition. Brooks/Cole, 2006.

Leon, Steven. Linear Algebra with Applications. 7th edition. Prentice Hall, 2006.