IMPERIAL COMMUNITY COLLEGE DISTRICT
IMPERIAL VALLEY COLLEGE

COURSE OUTLINE

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

COURSE TITLE: Elementary Differential Equations   **COURSE NO.:** MATH 220   **UNITS:** 3

LEC HRS. 3   **LAB HRS.**   **HRS. TBA**

If cross-referenced, please complete the following

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

I.   COURSE/CATALOG DESCRIPTION:

First order differential equations with applications. Linear differential equations of higher order. Applications of second order differential equations, differential equations with variable coefficients, Laplace transforms.

II.   A. PREREQUISITES, if any:

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

B. COREQUISITES, if any:

None

C. RECOMMENDED PREPARATION, if any:

None

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 solve first order differential equations.

2. The student will solve application problems involving first order differential equations.

3. The student will solve differential equations of order greater than one.

4. The student will solve application problems involving second order differential equations.

5. The student will solve differential equations using power series.

6. The student will solve application problems using Laplace transform.

V. CORE CONTENT TO BE COVERED IN ALL SECTIONS:

CORE CONTENT	APPROX. % OF COURSE

1. First-Order Differential Equations
   A. Separation of variables
   B. Homogeneous differential equations
   C. Exact differential equations
   D. Linear differential equations
   E. Substitutions.
	15%

2 Applications of First-Order Differential Equations
   A. Orthogonal trajectories
   B. Applications of linear differential equations
   C. Applications of nonlinear equations.
	15%

3. Higher-Order Differential Equations
   A. Preliminary theories of higher order differential equations
   B. Constructing and solution
   C. Homogeneous and nonhomogeneous linear equations
   D. Variation of parameters.
	15%

4. Applications
   A. Simple harmonic motion
   B. Damped motion
   C. Forced motion
   D. Electric circuits and other analogous systems.
	15%

5. Power Series
   A. Cauchy-Euler equation
   B. Power series solutions
   C. Solutions about singular points
   D. Bessel's and Legendre's equations.
	20%

6. Laplace Transforms
   A. Laplace transforms
   B. Inverse Laplace transforms
   C. Operational properties
   D. Applications.
	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**	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. TEXTBOOK(S) AND SUPPLEMENT(S):

Zill, Dennis. *A First Course in Differential Equations with Modeling Applications.* 8th edition. Brooks/Cole, 2005.

Edwards, H. and Penney, D. *Elementary Differential Equations.* 5th edition. Prentice Hall, 2004.

Ricardo, Henry. *A Modern Introduction to Differential Equations.* 1st edition. Houghton Mifflin, 2003.

Nagle, R., Saff, E. and Snider, A. *Fundamentals of Differential Equations.* 6th edition. Addison Wesley, 2004.

Trench, William. *Elementary Differential Equations.* 1st edition. Brooks/Cole, 2000.