

**IMPERIAL COMMUNITY COLLEGE DISTRICT
IMPERIAL VALLEY COLLEGE**

COURSE OUTLINE

DIVISION: Science, Mathematics, and Engineering

DATE: September 2006

COURSE TITLE: Discrete Mathematics **COURSE NO.:** MATH 240 **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:

This course is an introduction to the theory of discrete mathematics and introduces elementary concepts in logic, set theory, graph theory, number theory and combinatorics. This forms a basis for upper division courses in mathematics and computer science, and is intended for the transfer student planning to major in these disciplines. The topics covered in this course include methods of proof, sets and relations, number theory, induction, recursion, counting principles, permutations, combinations, and graph theory.

II. A. PREREQUISITES, IF ANY:

MATH 192 with a grade "C" or better.

B. CO-REQUISITES, IF ANY:

None

C. RECOMMENDED PREPARATION, IF ANY:

None

III. GRADING CRITERIA:

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 use proof techniques in logic to determine the validity of logic statements.
2. The student will solve problems in which the number of possibilities is finite using basic counting techniques, permutations and combinations.
3. The student will demonstrate an understanding of the concept of sets and the ability to carry out set operations.
4. The student will demonstrate an understanding of number theory as it applies to finite sets.
5. The student will solve recurrence relations.
6. The student will demonstrate an understanding of introductory graph theory with its application to real-life problems.

V. CORE CONTENT TO BE COVERED IN ALL SECTIONS:

	<u>CORE CONTENT</u>	<u>APPROX % OF COURSE</u>
1.	Logic A. Compound statements B. Proofs C. Truth tables D. Logical arguments	15%
2.	Principles of Counting A. Inclusion-Exclusion B. Addition and Multiplication rules C. Pigeon-Hole principle D. Permutations E. Combinations F. Binomial theorem	20%
3.	Set Theory A. Sets B. Operations on sets C. Binary relations D. Equivalence relations E. Partial orders	15%
4.	Number Theory A. Mapping B. Inverses and composition C. One-to-One correspondence and the cardinality of a set D. Division algorithm E. Divisibility and the Euclidean algorithm F. Prime numbers G. Congruence and its applications	20%
5.	Recursion A. Mathematical induction B. Recursively defined sequences C. Characteristic polynomial D. Generating functions	15%
6.	Graph Theory A. Definitions and basic properties B. Isomorphism C. Eulerian circuits D. Hamiltonian cycles	15%

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

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

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

Lecture	<u> X </u>	Discussion	<u> X </u>	Demonstration	<u> X </u>
Audio Visual	<u> X </u>	Group Activity	<u> X </u>	Lab Activity	<u> X </u>
Computer Assisted Instruction	<u> X </u>	Individual Simulation/ Assistance	<u> X </u>	Case Study	<u> X </u>
On-Line	<u> X </u>				

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.

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

Epp, Susanna, *Discrete Mathematics with Applications*. 3rd Edition Brooks/Cole, 2004.

Goodaire and Parmenter, *Discrete Mathematics with Graph Theory*. 2nd Edition Prentice Hall, Upper Saddle River, N.J., 2002.

Grimaldi, Ralph, *Discrete Mathematics and Combinatorial Mathematics*. 5th Edition Addison Wesley, 2004.

Dossey, Otto, Spence, and Vanden Eynden, *Discrete Mathematics*. 5th Edition Addison Wesley, 2006.

Johnsonbaugh, Richard, *Discrete Mathematics*. 6th Edition Prentice Hall, 2005.