

**PALOMAR COLLEGE**  
**COURSE OUTLINE OF RECORD FOR**  
**DEGREE CREDIT COURSE**

Transfer course     A.A. degree applicable course  
 (check all that apply)

**COURSE NUMBER AND TITLE:**        Math 245    Discrete Mathematics

**UNIT VALUE:**                    3

**MINIMUM NUMBER OF SEMESTER HOURS:**        48

**BASIC SKILLS REQUIREMENTS:**        Appropriate language and computational skills

**ENTRANCE REQUIREMENTS**

**PREREQUISITE:**    A minimum grade of "C" in Math 140, or Math 130, or a passing score on the appropriate placement test.

**COREQUISITE:**    None

**RECOMMENDED PREPARATION:**    None

**SCOPE OF COURSE:**        The study of propositional and predicate logic, number theory and methods of proof, elements of set theory, relations and functions, the Pigeonhole Principle, sequences, infinite sets, basic counting techniques, permutations, combinations, and applications directed to the field of computer science.

**SPECIFIC COURSE OBJECTIVES:**        Successful students will be able to:

1.    Use logic to explore the truth and falsity of statements and patterns of proofs, and apply basic principles of logical reasoning in set theory, mathematical induction, functions and relations, and in solving recurrence relations.
2.    Apply the logic of compound and quantified statements, translate these statements into symbolic form, and test symbolic arguments for validity.
3.    Use properties of basic mathematical concepts, such as sets, relations, and functions as applications of logic and theorem proving.
4.    Perform various operations with relations and functions, define and solve different types of recurrence relations, and analyze functions such as one-to-one and onto functions.
5.    Solve problems using permutations and combinations, calculate the probability of a given event occurring, and solve problems by applying the exclusion – inclusion and Pigeonhole Principle.
6.    Apply critical thinking skills to express mathematical ideas with clarity and precision both orally and in writing.

**CONTENT IN TERMS OF SPECIFIC BODY OF KNOWLEDGE:** At least the following topics will be covered:

1. The logic of compound statements and of quantified statements
  - Logical form and logical equivalence
  - Conditional statements
  - Valid and invalid arguments
  - Predicate and quantified statements
  - Arguments with quantified statements
2. Elementary number theory and methods of proof
  - Direct proof and counterexample
  - Indirect argument: contradiction and contrapositive
  - Classical proof: The irrationality of  $\sqrt{2}$
3. Sequences and mathematical induction
  - Sequences
  - Mathematical induction
  - Strong mathematical induction and the Well – Ordering Principle
4. Set theory
  - Basic definitions of set theory
  - Properties of sets
  - The empty set, partitions, power sets, and Boolean algebras
5. Counting
  - Counting and probability
  - Permutations and combinations
  - The Binomial Theorem
6. Functions
  - Functions defined on general sets
  - One-to-one, onto, and inverse functions
  - The Pigeonhole Principle
  - Composition of functions
7. Relations
  - Relations on sets
  - Reflexivity, symmetry, and transitivity
  - Equivalence relations
8. Additional topics may be included at instructor’s discretion

**REQUIRED READING:** Susanne S. Epp. Discrete Mathematics with Applications. 2<sup>nd</sup> Edition. Boston: PWS Publishing Company, 1995

**SUGGESTED READING:** None

**REQUIRED WRITING:** Problem-solving exercises on homework assignments and written tests are more appropriate. In addition, students may be required to write reports from one paragraph to several pages explaining concepts or explaining and interpreting solutions to non-routine or applied problems.

## OUTSIDE ASSIGNMENTS:

Students are expected to spend a minimum of three hours per unit per week in class and on outside assignments, prorated for short-term classes.

Students are expected to read the text, study lecture notes, and complete daily homework assignments. Homework assignments may include practice solving routine problems, explaining concepts, and solving applications or non-routine problems. Other outside assignments may include problem-solving reports or journals.

## INSTRUCTIONAL METHODOLOGY:

Check all that apply:

- lecture  
 laboratory  
 lecture-laboratory combination  
 directed study

This course may be offered as a distance learning course and meets Title 5 regulations 55370, 55372, 55374, 55376, 55378, and 55380.

Yes  No

If yes, check all that apply.

- Television Course (Video one-way, e.g. ITV, video cassette, etc.)  
 Online Course (Text one-way, e.g. newspaper, correspondence, electronic file, etc.)  
 Two-Way Video Conferencing (Two-way interactive video and audio)  
 One-Way Video Conferencing (One-way interactive video and two-way interactive audio)  
 Computer Assisted Instruction (A specialized form of mediated instruction relying primarily on student access to information and prepared lessons or teaching materials through a computer terminal, but not under immediate supervision of a qualified instructor.)

**GRADING POLICY AND STANDARDS** (include methods of determining whether the stated objectives have been met by students):

Computation of semester grade may include the following methods of evaluation: In-class exams, take-home exams, computer lab assignments, homework assignments, essays, or other evaluation methods. A comprehensive final examination (in class) is required. For example, the semester grade may be computed as follows:

Written exams	40 – 80%
Comprehensive final	20 – 40%
Homework or other outside assignments	0 – 20%

**IS COURSE REPEATABLE FOR REASON(S) OTHER THAN DEFICIENT GRADE?**

Yes \_\_\_ No X Number of times course may be taken for credit: \_\_\_

If yes, identify specific provision of Title 5 Division 2 section(s), 55761-55763 and 58161 which qualifies course as repeatable:

**CONTACT PERSON:** Jorge Saavedra **EXTENSION:** 2870

SIGNATURES ON FILE