GAVILAN COLLEGE
5055 Santa Teresa Blvd
Gilroy, CA 95020

Course Outline

Course: MATH 26 Division: 10 Also Listed As:

Term Effective: 200930, INACTIVE COURSE

Short Title: DISCRETE MATHEMATIC

Full Title: Discrete Mathematics

Contact Hours/Week	Units	Number of Weeks	Total Contact Hours
Lecture: 4	4	17.34	Lecture: 69.36
Lab: 0			Lab: 0
Other: 0			Other: 0
Total: 4			Total: 69.36

Credit Status: D - Credit - Degree Applicable

Grading Modes: L - Standard Letter Grade
P - Pass/No Pass

Repeatability: Repeatability: N - Course may not be repeated

Schedule Types: 02 - Lecture and/or discussion

Course Description:

Topics covered include set theory, logic, relations and functions, mathematical induction and recursion, combinatorics, discrete probability, trees and graphs, analysis of algorithms, algebraic structures. Emphasis on topics of interest to computer science majors. This course has the option of a letter grade or pass/no pass. Also listed as CSIS 26. PREREQUISITE: Mathematics 10 with a grade of 'C' or better or equivalent.

ARTICULATION and CERTIFICATE INFORMATION
Associate Degree:
GAV B4, effective 200030
CSU GE:
CSU B4, effective 200030
IGETC:
IGETC 2A, effective 200030
CSU TRANSFER:
Transferable CSU, effective 200030
UC TRANSFER:
Transferable UC, effective 200030

PREREQUISITES:
Completion of MATH 10, as UG, with a grade of C or better.
OR
Completion of MATH 8B, as UG, with a grade of C or better.
OR
Score of 28 on Pre-Calculus

COREQUISITES:

STUDENT LEARNING OUTCOMES:
1. The students will gain a good understanding of discrete mathematics.
2. These topics include logic and proof, induction and recursion, combinatorics, algorithms and their analysis, discrete structures, applications and modeling.

TOPICS AND SCOPE:
Inactive Course: 12/08/2008
WEEK HOURS CONTENT
1-2 8 Logic and Proof: Logical form and logical evidence. Logical Implication. Valid and invalid arguments. Predicates and quantified statements. Arguments with quantified statements.
EXERCISES/READING/HOMEWORK: Read these chapters and do the homework exercises. Do exercises on statements and nonstatements, compound statements, apply DeMorgan's Laws. Set up truth tables, logical equivalences and tautologies. Use variations of IF and contrapositive statements.
3-4 8 Number theory and methods of proof: Direct proof and methods of contradiction. Argument by contradiction. Indirect argument. Algorithm applications.
EXERCISES/READING/HOMEWORK: Read these chapters and do the homework exercises. Do exercises on proofs and counter examples. Try different types of proofs on various exercises.
5-6 8 Sequences and mathematical induction. Types and uses of sequences. Mathematical induction. Strong mathematical induction and the Well-Ordered Principle. Correctness of algorithms.
EXERCISES/READING/HOMEWORK: Read these chapters and do the homework exercises. Do exercises using the properties of sequences. Use mathematical induction for proving theories. Use the Well-Ordered Principle

for proofs.
7-8 8 Set theory: Basic definitions of set theory. Properties of sets. The empty set, partitions, and power sets. Russell's Paradox.
EXERCISES/READING/HOMEWORK: Read these chapters and do the homework exercises. Do exercises using set operations and set proofs. Use empty sets, partitions, and power sets for proofs.
9-10 8 Counting the elements of a list. Possibility trees and the product rule. Counting elements of disjoint sets. Counting subsets of a set. The algebra of combinations and binomial theorem.
EXERCISES/READING/HOMEWORK: Read these chapters and do the homework exercises. Use the rules for counting in solving problems. Use the product rule to determine counts. Use the addition rule for disjoint sets and combination rule for subsets.
11-12 8 Functions defined on general sets. Finite-state automata. One-to-one and onto, inverse functions. Composition of functions.
EXERCISES/READING/HOMEMWORK: Read these chapters and do the homework exercises. Use the rules of finite-state automata to solve problems. Use the one-to-one and onto properties to solve problems. Use composition with functions.
13-14 8 Recursively defined sequences. Solving recurrence relations by iterations. Real-valued, exponential, and logarithmic functions. O-notation.
EXERCISES/READING/HOMEWORK: Read these chapters and do the homework exercises. Use recurrence relations to solve problems. Use iteration to solve recurrence problems. Use real-valued functins to graph values. Use exponential and logarithmic functions to graph values.
15-16 8 Relations on sets. Reflexity, symmetry, and transitivity. Equivalence and paratial order relations. Graphs and trees. Paths and circuits.
EXERCISES/READING/HOMEWORK: Read these chapters and do homework exercises. Use relation theorms on sets and subsets to solve problems. Use reflexivity, symmetry, and trasitivity to solve problems. Use graphs, trees, paths and circuits to solve problems.
17 4 Final exam and final projects.
Included in content section of course outline.
COURSE OBJECTIVES:
Weeks 1 & 2
Students use logical form and equivalence.
Students use logical implications.
Students recognize valid and invalid arguments.
Students use predicates and quantified statements.
Students use arguments with quantified statements.
Weeks 3 & 4
Students use different methods of proofs.
Students construct proofs and counter examples.
Students use number theory facts of develop computer algorithms.

Weeks 5 & 6
Students construct sequences.
Students use mathematical induction.
Students use the Well-ordered Principle for proofs.
Weeks 7 & 8
Students use set operations in set proofs.
Students use properties of sets to construct proofs.
Students use empty sets, partitions and p ower sets in proofs.
Weeks 9 & 10
Students use the counting rules for solving problems.
Students use the product rule for determining counts.
Students use addition rule for disjoint sets.
Weeks 11 & 12
Students can use finite-state automata.
Students can use one-to-one and onto properties to solve problems.
Students can use composition with functions.
Weeks 13 & 14
Students use recurrence relations to solve problems.
Students use real-valued, exponential, and log functions to solve problems.
Students use O-notation to solve problems.
Weeks 15 & 16
Students use relation theorems to solve problems.
Students use reflexivity, symmetry, and transitivity to solve problems.
Students use graphs, trees, paths, and circuits to solve problems.

METHODS OF INSTRUCTION:
Lecture, demonstrations.
METHODS OF EVALUATION:
The types of writing assignments required:
Written homework
Reading reports
The problem-solving assignments required:
Homework problems
Quizzes
Exams
The types of skill demonstrations required:
None
The types of objective examinations used in the course:
Multiple choice
True/false
Matching items
Completion
Other category:
Group project/homework and computer and lab activities
The basis for assigning students grades in the course:
Writing assignments: 10% - 20%
Problem-solving demonstrations: 65% - 85%
Skill demonstrations: 0% - 0%
Objective examinations: 10% - 20%
Other methods of evaluation: 5% - 15%

REPRESENTATIVE TEXTBOOKS:
Discrete Mathematics with Applications by Susanna Epp

or other appropriate college level text.
Reading level of text: 12th grade.

SUPPLEMENTAL DATA:
Basic Skills: N
Classification: A
Noncredit Category: Y
Cooperative Education:
Program Status: 2 Stand-alone
Special Class Status: N
CAN:
CAN Sequence:
CSU Crosswalk Course Department: MATH
CSU Crosswalk Course Number: 26
Prior to College Level: Y
Non Credit Enhanced Funding: N
Funding Agency Code: Y
In-Service: N
Occupational Course: E
Maximum Hours:
Minimum Hours:
Course Control Number: CCC000350153
Sports/Physical Education Course: N
Taxonomy of Program: 170100