MATH 4 Course Outline as of Fall 2001

CATALOG INFORMATION

Dept and Nbr: MATH 4 Title: DISCRETE MATH
Full Title: Discrete Mathematics
Last Reviewed: 9/14/2020

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	4.00	Lecture Scheduled	4.00	17.5	Lecture Scheduled	70.00
Minimum	4.00	Lab Scheduled	0	17.5	Lab Scheduled	0
		Contact DHR	0		Contact DHR	0
		Contact Total	4.00		Contact Total	70.00
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 140.00 Total Student Learning Hours: 210.00

Title 5 Category:	AA Degree Applicable
Grading:	Grade Only
Repeatability:	00 - Two Repeats if Grade was D, F, NC, or NP
Also Listed As:	
Formerly:	

Catalog Description:
A lower division Discrete Mathematics course including formal logic, Boolean logic, and logic circuits, mathematical induction, introduction to number theory, set theory, principles of combinatorics, functions, relations, recursion, algorithm efficiency, and graph theory.

Prerequisites/Corequisites:
Completion of Math 27 (formerly MATH 57).

Recommended Preparation:
Math 1A.

Limits on Enrollment:

Schedule of Classes Information:
Description: A lower division Discrete Mathematics course including formal logic, Boolean logic, and logic circuits, mathematical induction, introduction to number theory, set theory, principles of combinatorics, functions, relations, recursion, algorithm efficiency, and graph theory. (Grade Only)
Prerequisites/Corequisites: Completion of Math 27 (formerly MATH 57).
Recommended: Math 1A.

Limits on Enrollment:
Transfer Credit: CSU;UC. (CAN CSCI26)
Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	**Area**		Effective:	Inactive:
	B	Communication and Analytical Thinking	Fall 2001	
	MC	Math Competency	Fall 1981	
CSU GE:	**Transfer Area**		Effective:	Inactive:
	B4	Math/Quantitative Reasoning	Fall 2001	
IGETC:	**Transfer Area**		Effective:	Inactive:
	2A	Mathematical Concepts & Quantitative Reasoning	Fall 2001	

CSU Transfer:	Transferable	Effective:	Fall 2001	Inactive:
UC Transfer:	Transferable	Effective:	Fall 2001	Inactive:

CID:

Certificate/Major Applicable:
Not Certificate/Major Applicable

COURSE CONTENT

Outcomes and Objectives:
tudents will be able to :
1. Properly structure mathematical algorithms and proofs.
2. Do proofs by induction.
3. Apply elementary number theory.
4. Be able to apply set theory.
5. Apply combinatorics including use of pigeonhole principle, permutations, combinations, and probability.
6. Apply functions, inverse functions, and finite state automata.
7. Solve recurrence relations.
8. Analyze the efficiency of algorithms.

Topics and Scope:

1. Logic
   Logical form and equivalence, conditional statements, valid and invalid arguments, predicates, quantified statements, and arguments with quantified statements.
2. Elementary number theory.
   Direct proofs, conterexamples, rational numbers, divisibility, floor and ceiling functions, proofs by contradiction, proofs by contraposition, and algorithms.
3. Mathematical Induction
   Sequences, weak and strong induction, well ordering principle,

orrectness of algorithms.
algorithms.
correctness of algorithms. n
rule, inclusion/exclusion, permatutations, combinations, and counting of multisets.

5. Set Theory
Definitions, binary operations, properties, partitions, power sets, and Boolean algebras.

6. Functions
Definition, one-to-one, onto, inverse functions, finite state automata, and composition of functions.

7. Recursion
Sequences defined recursively, solving recurrence relations by iteration, and solutions of second-order linear homogeneous recurrence relations with constant coefficients.

8. Algorithm Efficiency
Comparison of real valued functions and their graphs, O-notation, and calculations of efficiency.

9. Relations
Relations on sets, reflexivity, symmetry, transitivity, and equivalence relations.

10.Graph Theory
Definitions, paths and circuits, matrix representations, and trees.

Assignment:

1. Students will have daily outside readings, problem set assignments from required text(s), or instructor chosen supplementary materials.
2. Instructional methodology may include, but not be limited to, lecture, demonstrations, oral recitation, discussion, supervised practice, independent study, outside project(s), or other assignments.

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

None, This is a degree applicable course but assessment tools based on writing are not included because problem solving assessments are more appropriate for this course.	Writing 0 - 0%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Homework problems, Quizzes, Exams	Problem solving 30 - 90%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

None	Skill Demonstrations 0 - 0%

Exams: All forms of formal testing, other than skill performance exams.

Multiple choice, True/false, Matching items, Completion	Exams 10 - 70%

Other: Includes any assessment tools that do not logically fit into the above categories.

None	Other Category 0 - 0%

Representative Textbooks and Materials:

1. Discrete Mathematics, Second Edition by Susanna S. Epp
   PWS Publishing Company
   ITP, An International Thompson Publishing Company, 1995.
2. Discrete Mathematics, Fifth Edition by Richard Johnsonbaugh
   Prentice Hall, 2000.