

School of Computing and Information Sciences

Course Title: Discrete Mathematics

Date: 3/20/10

Course Number: MAD-2104

Number of Credits: 3

Subject Area: Foundations	Subject Area Coordinator: Geoffrey Smith email: smithg@cis.fiu.edu
Catalog Description: Sets, functions, relations, permutations and combinations, propositional logic, matrix algebra, graphs and trees, Boolean algebra, switching circuits.	
Textbook: Kenneth Rosen, <i>Discrete Mathematics and Its Applications</i> , 6 th edition. (McGraw Hill, 2007)	
References:	
Prerequisites Courses: None	
Corequisite Courses: COP 2210	

Type: Required for CS Major

Prerequisites Topics:

Course Outcomes:

1. Master definitions and theorems involving sets, relations and functions.
2. Be familiar with propositional logic.
3. Be familiar with mathematical reasoning, including mathematical induction and recursion.
4. Be exposed to combinatorics.
5. Be familiar with graph theory.
6. Be exposed to Boolean Algebras.

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Relationship between Course Outcomes and Program Outcomes

BS in CS: Program Outcomes	Course Outcomes
a) Demonstrate proficiency in the foundation areas of Computer Science including mathematics, discrete structures, logic and the theory of algorithms	1, 2, 3, 4, 5, 6
b) Demonstrate proficiency in various areas of Computer Science including data structures and algorithms, concepts of programming languages and computer systems.	
c) Demonstrate proficiency in problem solving and application of software engineering techniques	
d) Demonstrate mastery of at least one modern programming language and proficiency in at least one other.	
e) Demonstrate understanding of the social and ethical concerns of the practicing computer scientist.	
f) Demonstrate the ability to work cooperatively in teams.	
g) Demonstrate effective communication skills.	

Assessment Plan for the Course & how Data in the Course are used to assess Program Outcomes

Student and Instructor Course Outcome Surveys are administered at the conclusion of each offering, and are evaluated as described in the School's Assessment Plan:
<http://www.cis.fiu.edu/programs/undergrad/cs/assessment/>

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Outline

Topic	Number of Lecture Hours	Outcome
1. <u>Sets, Relations, and Functions</u> 1.1. Operations on sets 1.2. Equivalence relations 1.3. Cardinality	10	1
2. <u>Logic and Mathematical Reasoning</u> 2.1. Propositional logic 2.2. Mathematical induction and recursion	10	2, 3
3. <u>Combinatorics</u> 3.1. Combinatorial identities 3.2. Binomial theorem	5	4
4. <u>Directed and Undirected Graphs</u> 4.1. Isomorphism of graphs 4.2. Paths 4.3. Adjacency matrices 4.4. Euler paths 4.5. Four-color problem 4.6. Planar graphs 4.7. Trees and tree traversal	10	5
5. <u>Boolean Algebras</u> 5.1. Disjunctive normal form 5.2. Minimization of Boolean functions (Karnaugh maps)	5	6

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Course Outcomes Emphasized in Laboratory Projects / Assignments

Outcome	Number of Weeks
1	3
2	2
3	2
4	2
5	3
6	1

Oral and Written Communication

No significant coverage

Written Reports		Oral Presentations	
Number Required	Approx. Number of pages	Number Required	Approx. Time for each
0	0	0	0

Social and Ethical Implications of Computing Topics

No significant coverage

Topic	Class time	student performance measures

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Approximate number of credit hours devoted to fundamental CS topics

Fundamental CS Area	Core Hours	Advanced Hours
Algorithms:		
Software Design:		
Computer Organization and Architecture:		
Data Structures:		
Concepts of Programming Languages		

Theoretical Contents

Topic	Class time
Discrete structures	40 hours

Problem Analysis Experiences

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Solution Design Experiences

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The Coverage of Knowledge Units within Computer Science Body of Knowledge¹

Knowledge Unit	Topic	Lecture Hours
DS1. Functions, relations, and sets	1	10
DS2. Basic logic	2.1, 5	10
DS3. Proof techniques	2.2	5
DS4. Basics of counting	3	5
DS5. Graphs and trees	4	10

¹See <http://www.computer.org/education/cc2001/final/chapter05.htm> for a description of Computer Science Knowledge units