School of Computer Science

Course Title: Discrete Mathematics **Date:** November 6, 2003

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.	
Typical Textbook: Kenneth Rosen, *Discrete Mathematics and Its Applications, 5th edition.* (McGraw Hill, 2003)	
References:	
Prerequisite Courses: None.	
Corequisite Courses: COP 2210	

Type: Required

Prerequisites Topics:

Course Outcomes:

O1. Master definitions and theorems involving sets, relations and functions.

O2. Be familiar with propositional logic.

O3. Be familiar with mathematical reasoning, including mathematical induction and recursion.

O4. Be exposed to combinatorics.

O5. Be familiar with graph theory.

O6. Be exposed to Boolean Algebras.

School of Computer Science
MAD 2104
Discrete Mathematics

Outline

Topic	Number of Lecture Hours	Outcome
1. Sets, Relations, and Functions 1.1. Operations on sets 1.2. Equivalence relations 1.3. Cardinality	10	O1
2. Logic and Mathematical Reasoning 2.1. Propositional logic 2.2. Mathematical induction and recursion	10	O2, O3
3. Combinatorics 3.1. Combinatorial identities 3.2. Binomial theorem	5	O4
4. Directed and Undirected Graphs 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	O5
5. Boolean Algebras 5.1. Disjunctive normal form 5.2. Minimization of Boolean functions (Karnaugh maps)	5	O6

School of Computer Science
MAD 2104
Discrete Mathematics

Course Outcomes Emphasized in Laboratory Projects / Assignments

Outcome	Number of Weeks
O1	3
O2	2
O3	2
O4	2
O5	3
O6	1

Oral and Written Communication:

No significant coverage

Social and Ethical Implications of Computing Topics

No significant coverage

Approximate number of credit hours devoted to fundamental CS topics

Topic	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

No significant coverage

Solution Design Experiences

No significant coverage

School of Computer Science
MAD 2104
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Theoretical Contents

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Problem Analysis Experiences

No significant coverage

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The Coverage of Knowledge Units within Computer Science Body of Knowledge[1]

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

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