

Knight Foundation School of Computing and Information Sciences

Course Title: Discrete Mathematics

Date: 11/6/2003

Course Number: MAD 2104

Number of Credits: 3

Subject Area: Foundations	Subject Area Coordinator: Hadi Amini email: amini@cs.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, <i>Discrete Mathematics and Its Applications</i> , 5 th 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.

Knight Foundation School of Computing and Information Sciences
MAD 2104
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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	<u>10</u>	<u>O1</u>
2. <u>Logic and Mathematical Reasoning</u> 2.1. Propositional logic 2.2. Mathematical induction and recursion	<u>10</u>	<u>O2, O3</u>
3. <u>Combinatorics</u> 3.1. Combinatorial identities 3.2. Binomial theorem	<u>5</u>	<u>O4</u>
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	<u>10</u>	<u>O5</u>
5. <u>Boolean Algebras</u> 5.1. Disjunctive normal form 5.2. Minimization of Boolean functions (Karnaugh maps)	<u>5</u>	<u>O6</u>

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

Knight Foundation School of Computing and Information Sciences
MAD 2104
Discrete Mathematics

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

Approximate number of credit hours devoted to fundamental CS topics

Topic	Core Hours	Advanced Hours
Algorithms:		
Software Design:		
Computer Organization and Architecture:		
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MAD 2104
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Theoretical Contents

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Problem Analysis Experiences

No significant coverage

Solution Design Experiences

No significant coverage

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

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:
<https://abet.cs.fiu.edu/csassessment/>

¹See https://www.acm.org/binaries/content/assets/education/cs2013_web_final.pdf for a description of Computer Science Knowledge units