BOSTON UNIVERSITY
METROPOLITAN COLLEGE
COMPUTER SCIENCE DEPARTMENT

MET CS 248 DISCRETE MATHEMATICS

Course Overview

This course will cover the fundamentals of Discrete Mathematics. It will begin with a thorough coverage of rules of logic and proof techniques followed by the study of combinatorics, set theory, relations, graphs and trees. The course will end with the coverage of groups and elements of the coding theory

Learning Objectives

By the end of the course, the student will have learned:

1. Rules of logic and how they are used in reasoning and proving theorems.
2. Permutations and combinations
3. How to prove theorems directly, by contradiction and contraposition.
4. Set operations, product sets and relations
5. Operations with integers modulo n
6. Functions and recurrence relations
7. Partially and totally ordered sets
8. Properties of simple graphs and digraphs
9. Rooted trees, Depth-First Search and Breadth-First Search Algorithms
10. Groups, Elements of Coding Theory

Textbook

Ralph P. Grimaldi , Discrete and Combinatorial Mathematics
Fifth edition, Addison-Wesley Publishing Company, ISBN#: 0-201-72634-3

Evaluation and Grading

Lecture material should be reviewed before the next class since any questions on old material will be addressed only at the beginning of class. The reading assignments in the textbook should be done before the material is covered in lecture, and then reviewed afterwards. All assignments must be legible, well formatted, on time and complete.

Homework assignments will be made in class and will be due the following class.

There will be a midterm and final exams. If any grading criteria event will be missed it will be the responsibility of the student to arrange with the professor a mutually agreeable schedule for completion of work.

Grades will be based on:

Class participation and Homework	30%
Final Exam	70%

Academic Honesty

The course is governed by the Academic Conduct Committee policies regarding plagiarism (any attempt to represent the work of another person as one's own). You can discuss general ideas with other people, but the work you submit must be your own. Collaboration is not permitted.

Instructor Information

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Office hours: Tuesday 4-6, Thursday 4-6

Classes are scheduled at CGS: 871 Commonwealth Ave, Room 515

Schedule of Classes

5/21	Fundamental Principles of Counting, Permutations, Permutations with Repetitions	Chapter 1
5/23	Combinations, Principal of Inclusion and Exclusion	Chapter 1
5/28	Statements, Propositional Logic, Proof Techniques Predicate Logic, the Use of Quantifiers	Chapter 2
5/30	Sets and Subsets, Set Operations and the Laws of Set Theory Mathematical Induction	Chapter 3
6/4	Cartesian Products, Definition of Relations, Properties of Relations, Relational Databases	Chapter 5
6/6	Zero-One Matrices and Directed Graphs, Equivalence Relations	Chapter 7

	and Partitions, Modular Arithmetic	
6/11	Definition of functions, One-to-one and Onto Functions, Function Composition and Inverse Functions	Chapter 5
6/13	Definition and Examples of Graphs, Subgraphs, Graph Isomorphism	Chapter 11
6/18	Trails, Paths and Circuits in Graphs, Hamiltonian and Eulerian Paths and Cycles. Rooted Trees, Traversals, Depth-First Search and Breadth-First Search Algorithms.	Chapter 11 Chapter 12
6/20	Antisymmetric Relations, Partially Ordered Sets, Totally Ordered Sets, Topological Sorting Algorithm,	Chapter 7
6/25	Definition of Groups, Examples and Elementary Properties, Homomorphism and Isomorphism of Groups, Elements of Coding Theory	Chapter 16
6/27	Final Exam	

Homework Exercise Set

Exercise Set: p.11, #1,3,4,5,6,7,8,10,15,16,19,21,26,27,31,34

p. 24, #7,9,12,15,18,19,20,21

p. 54, #1,3,4,6,8,10,15
p.66,# 1(a),5,6,18

p. 54, #1,3,4,6,8,10,15
p.66,# 1(a),5,6,18

p.134, #8,14
p.146, # 6,7,18,19

p. 208, #1(a,b,c), 14, 18

p. 258, # 1,2,8,11,27
p. 265, # 2,3,4

p. 343, #1,5 (a,b,c,d,e,f),6,13

p. 528, #3,9,11

p. 585, #1(a)
p. 603, #1,2,5,6,7,10(a)

p.751, #1(a-e), 5, 18(a)