cmpe 220 - Fall 2013-3 bingol

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Midterm #1: 04.11.2013/09:00									x											
Midterm #2: 02.12.2013/09:00														x						
Final: TBA																				

day	23	7	**14**	21	28	4	11	18	25	2	9	16	23	30
month	9	10				11				12				
week	1	2	3	4	5	6	7	8	9	10	11	12	13	14

#	Goal	mt1	mt2	fin	Topics \weeks
					Discrete and Combinatorial Mathematics, 5e
					Ralph P. Grimaldi
					Logic
					2. Fundamentals of Logic.
1	1				Basic Connectives and Truth Tables.
1	1				Logical Equivalence: The Laws of Logic.
1	1				Logical Implication: Rules of Inference.
1	1				The Use of Quantifiers.
1	1				Quantifiers, Definitions, and the Proofs of Theorems.
0					Summary and Historical Review.
0					**Sets, Functions, Relations**
0					**3. Set Theory.**
1	1				Sets and Subsets.
1	1				Set Operations and the Laws of Set Theory.
1	1				Counting and Venn Diagrams.
0					A First Word on Probability.
0					The Axioms of Probability (Optional).
0					Conditional Probability: Independence (Optional).
0					Discrete Random Variables (Optional).
0					Summary and Historical Review.
0					**5. Relations and Functions.**
1	1				Cartesian Products and Relations.
1	1				Functions: Plain and One-to-One.
1	1				Onto Functions: Stirling Numbers of the Second Kind.
1	1				Special Functions.
1	1				The Pigeonhole Principle.
1	1				Function Composition and Inverse Functions.
0					Computational Complexity.
0					Analysis of Algorithms.
0					Summary and Historical Review.
0					**7. Relations: The Second Time Around.**
1	1				Relations Revisited: Properties of Relations.
1	1				Computer Recognition: Zero-One Matrices and Directed Graphs.
1	1				Partial Orders: Hasse Diagrams.
1	1				Equivalence Relations and Partitions.
0					Finite State Machines: The Minimization Process.
0					Summary and Historical Review.
0					**Algebra**
0					**14. Rings and Modular Arithmetic.**
1	1				The Ring Structure: Definition and Examples.
1	1				Ring Properties and Substructures.
1	1				The Integers Modulo n.
0					Ring Homomorphisms and Isomorphisms: The Chinese Remainder Theorem.
0					Summary and Historical Review.
0					**15. Boolean Algebra and Switching Functions.**
0					Switching Functions: Disjunctive and Conjunctive Normal Forms.
0					Gating Networks: Minimal Sums of Products: Karnaugh Maps.
0					Further Applications: Don't-Care Conditions.
0					The Structure of a Boolean Algebra (Optional).
0					Summary and Historical Review.
0					**16. Groups, Coding Theory, and Polya's Theory of Enumeration.**
1	1				Definition, Examples, and Elementary Properties.
0					Homomorphisms, Isomorphisms, and Cyclic Groups.
0					Cosets and Lagrange's Theorem.
0					The RSA Cipher (Optional).
0					Elements of Coding Theory.
0					The Hamming Metric.
0					The Parity-Check and Generator Matrices.
0					Group Codes: Decoding with Coset Leaders.
0					Hamming Matrices.
0					Counting and Equivalence: Burnside's Theorem.
0					The Cycle Index.
0					The Pattern Inventory: Polya's Method of Enumeration.
0					Summary and Historical Review.
0					**17. Finite Fields and Combinatorial Designs.**
1	1				Polynomial Rings.
1	1				Irreducible Polynomials: Finite Fields.
0					Latin Squares.
0					Finite Geometries and Affine Planes.
0					Block Designs and Projective Planes.
0					Summary and Historical Review.
0					**Integers**
0					**4. Properties of the Integers: Mathematical Induction.**
1	1				The Well-Ordering Principle: Mathematical Induction.
1	1				Recursive Definitions.
1	1				The Division Algorithm: Prime Numbers.

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		Topic	
1	1	The Greatest Common Divisor: The Euclidean Algorithm.	
1	1	The Fundamental Theorem of Arithmetic.	
0		Summary and Historical Review.	
0		**Combinatorics**	
0		**1. Fundamental Principles of Counting.**	■
1	1	The Rules of Sum and Product.	
1	1	Permutations.	
1	1	Combinations: The Binomial Theorem.	
1	1	Combinations with Repetition.	
0		The Catalan Numbers (Optional).	
0		Summary and Historical Review.	
0		**8. The Principle of Inclusion and Exclusion.**	■
1	1	The Principle of Inclusion and Exclusion.	
1	1	Generalizations of the Principle.	
1	1	Derangements: Nothing Is in Its Right Place.	
0		Rook Polynomials.	
0		Arrangements with Forbidden Positions.	
0		Summary and Historical Review.	
0		**9. Generating Functions.**	
0		Introductory Examples.	
0		Definition and Examples: Calculational Techniques.	
0		Partitions of Integers.	
0		The Exponential Generating Functions.	
0		The Summation Operator.	
0		Summary and Historical Review.	
0		**10. Recurrence Relations.**	■
1	1	The First-Order Linear Recurrence Relation.	
1	1	The Second-Order Linear Homogeneous Recurrence Relation with Constant Coefficients.	
1	1	The Nonhomogeneous Recurrence Relation.	
0		The Method of Generating Functions.	
0		A Special Kind of Nonlinear Recurrence Relation (Optional).	
0		Divide and Conquer Algorithms.	
0		Summary and Historical Review.	
0		**Graph Theory**	
0		**11. An Introduction to Graph Theory.**	■■
1	1	Definitions and Examples.	
1	1	Subgraphs, Complements, and Graph Isomorphism.	
1	1	Vertex Degree: Euler Trails and Circuits.	
1	1	Planar Graphs.	
1	1	Hamilton Paths and Cycles.	
1	1	Graph Coloring and Chromatic Polynomials.	
0		Summary and Historical Review.	
0		**12. Trees.**	■■
1	1	Definitions, Properties, and Examples.	
1	1	Rooted Trees.	
1	1	Trees and Sorting.	
1	1	Weighted Trees and Prefix Codes.	
1	1	Biconnected Components and Articulation Points.	
0		Summary and Historical Review.	
0		**Uncovered**	
0		**6. Languages: Finite State Machines.**	
0		Language: The Set Theory of Strings.	
0		Finite State Machines: A First Encounter.	
0		Finite State Machines: A Second Encounter.	
0		Summary and Historical Review.	
0		**13. Optimization and Matching.**	
0		Dijkstra's Shortest Path Algorithm.	
0		Minimal Spanning Trees: The Algorithms of Kruskal and Prim.	
0		Transport Networks: The Max-Flow Min-Cut Theorem.	
0		Matching Theory.	
0		Summary and Historical Review.	
0		**Appendices.**	
0		A1. Exponential and Logarithmic Functions.	
0		A2. Matrices, Matrix Operations, and Determinants.	
1	1	A3. Countable and Uncountable Sets.	■
0		**Solutions.**	
0		**Index.**	