

OFFICIAL SYLLABUS

MATH 224: Discrete Mathematics

(Adopted - Spring 2006; Committee: M. Agustin, S. Rigdon, S. Staples)

Catalog Description: [Dist.NSM] Mathematical concepts and techniques essential to computer science: logic, sets, algorithms methods of proof, induction and recursion, simple counting techniques, graph theory. Does not count toward a major in mathematics. Prerequisite: CS 140 or 141.

Textbook: *Discrete Mathematics and Its Applications*, 6th Edition, by K. H. Rosen, WCB-McGraw-Hill: Boston

Chapter	Section	Class Periods*	Chapter	Section	Class Periods*
1	The Foundations: Logic, Sets, and Functions	2.5	5	Counting	4
	1.1 Logic	0.5		5.1 The Basics of Counting	1
	1.2 Propositional Equivalences	0.5		5.2 The Pigeonhole Principle	1
	1.3 Predicates and Quantifiers	0.5		5.3 Permutations and Combinations	1.5
	1.4 Nested Quantifiers	0.5		5.6 Generating Permutations and Combinations	0.5
	1.6 Introduction to Proofs	0.5			
2	Basic Structures: Sets, Functions, Sequences, and Sums	3.5	6	Discrete Probability	0.5
	2.1 Set	0.5		6.1 An Introduction to Discrete Probability	0.5
	2.2 Set Operations	1	7	Advanced Counting Techniques	2
	2.3 Functions	1		7.1 Recurrence Relations	1
	2.4 Sequences and Summations	1		7.2 Solving Recurrence Relations	1
3	The Fundamentals: Algorithms, the Integers, and Matrices	6	8	Relations	1
	3.1 Algorithms	1		8.1 Relations and Their Properties	0.5
	3.2 The Growth of Functions	1		8.2 n-ary Relations and Their Applications	0.5
	3.3 Complexity of Algorithms	0.5	9	Graphs	2.5
	3.4 Integers and Division	0.5		9.1 Introduction to Graphs	0.5
	3.5 Primes and Greatest Common Divisors	0.5		9.2 Graph Terminology	0.5
	3.6 Integers and Algorithms	1		9.3 Representing Graphs and Graph Isomorphism (Isomorphism optional)	0.5
	3.7 Applications of Number Theory (including RSA encryption)	1.5		9.4 Connectivity	0.5
				9.5 Euler and Hamilton Paths	0.5
4	Mathematical Reasoning, Induction, and Recursion	4	10	Trees	1
	4.1 Mathematical Induction	0.5		10.1 Introduction to Trees	1
	4.2 Strong Induction and Well-Ordering	0.5			
	4.3 Recursive Definitions & Structural Induction	1			
	4.4 Recursive Algorithms	1			
	4.5 Program Correctness	1			

EXAMS : 3 Holidays/Inclement weather: 0

TOTAL: 30

*Assumes two 75-minute class periods per week

Any instructor should cover all of the material specified; additional sections are optional.