

Fall 2015 Math 431: Structures and Methods of Combinatorics

Lecture: TTh 11:10am–12:25pm, Blocker 121

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Below is a list of the topics we intend to cover, along with a rough time outline. Actual schedule is subject to change without notice. Last updated August 9th, 2015.

Week	Topic	Chapters
9/1 – 9/3	Introduction to Combinatorics	
	Review: The Pigeon-Hole Principle	1.1–1.2
	Review: Mathematical Induction	2.1–2.2
9/8 – 9/10	Permutations	3.1
	Words and Alphabets	3.2
	Binomial Coefficients	3.3
9/15 – 9/17	The Binomial Theorem	4.1
	The Multinomial Theorem	4.2
	Inclusion-Exclusion and the Sieve Formula	7.1
9/22 – 9/24	Compositions	5.1
	Set Partitions	5.2
	Integer Partitions	5.3
9/29 – 10/1	Review	
	Exam 1	
10/6 – 10/8	Directed and Undirected Graphs	9.1–9.3
	Hamiltonian Cycles	9.2
	Graph Isomorphisms	9.4
10/13 – 10/15	Trees	10.1
	Minimum Weight Spanning Trees	10.2
	Adjacency and Incidence Matrices	10.3
	Counting Spanning Trees	10.4
10/20 – 10/22	Bipartite Graphs	11.1–11.2
	Coloring and Matching	11.3–11.4
10/27 – 10/29	Planar Graphs	12.1
	Polyhedra and Dual Graphs	12.2
	Ramsey Theory	13.1–13.2
11/3 – 11/5	Review	
	Exam 2	
11/10 – 11/12	Partially Ordered Sets	16.1
	The Möbius Function	16.2
	Lattices	16.3
11/17 – 11/19	Recurrence Relations	
	Ordinary Generating Functions	8.1
	Exponential Generating Functions	8.2
11/24	Applications of Generating Functions	
11/26	Thanksgiving Holiday (<i>no class</i>)	
12/1 – 12/3	Extra Topics	
12/8	Review	
12/11	Exam 3	