

**CS W4205 COMBINATORIAL MATHEMATICS**  
Fall 09 course outline  
subject to minor perturbations

day	date	#	name and content
Wed	9-Sep	1.	§§0.1-0.4 Intro to Ordering, Selection, and Counting
Mon	14-Sep	2.	§§0.5-0.8 Intro to Permutations, Graphs, Number Theory, and Designs
Wed	16-Sep	3.	§§1.1-1.4 Sequences, Recurrences, Pascal's Recurrence
Mon	21-Sep	4.	§§1.4-1.6 Differences and Sums, Falling Powers, Stirling Numbers
Wed	23-Sep	5.	§§1.7-1.9 Generating Functions, Asymptotics
Mon	28-Sep	•	<b>NO CLASS SCHEDULED</b>
Wed	30-Sep	6.	§§2.1-2.4 Solving Recurrences with OGF's, Char Eq's
Mon	5-Oct	7.	§§2.5-2.7 Simultaneous Rec, Fibonacci Number Identities, Non-Const Coeffs
Wed	7-Oct	8.	§2.8 Divide&Conquer, Josephus
Mon	12-Oct	9.	§§3.1-3.3 Normalizing Sums, Perturbation, Summing with OGF's
Wed	14-Oct	10.	§§3.4-3.5 Finite Calculus, Iteration & Partitioning,
Mon	19-Oct		<b>MIDTERM EXAM #1 on Lectures 1-9 (chs 0,1,2,§§3.1-3.3)</b>
Wed	21-Oct	11.	§3.6 Incl-Excl
Mon	26-Oct	12.	§4.1 Binom Coeff Identities §4.2 <i>Binomial Inversion (maybe)</i>
Wed	28-Oct	13.	§§4.3-4.4 Application to Statistics, Solving Catalan Recurrence
Mon	2-Nov	•	<b>COLUMBIA Election Holiday</b>
Wed	4-Nov	14.	§5.1 Stirling Subset Numbers
Mon	9-Nov	15.	§5.2 Stirling Cycle Numbers §5.3 <i>Inversions, Ascents (maybe)</i>
Wed	11-Nov	16.	§§5.4-5.5 Derangements, EGF's §5.6 <i>Posets and Lattices (maybe)</i>
Mon	16-Nov	17.	§§6.1-6.3 Euclidean Algorithm, CRT, Polynomial Divisibility
Wed	18-Nov	18.	§§6.4-6.5 Prime Moduli (Fermat, Wilson), Euler Phi §6.6 <i>Mu (maybe)</i>
Mon	23-Nov	19.	§9.1 Burnside-Polya Counting, start Burnside's Lemma
Wed	25-Nov	•	<b>TBA</b>
Mon	30-Nov	20.	§§9.2-9.4 finish BL, Counting Small Graphs, Partitions of Integers
Wed	2-Dec		<b>MIDTERM EXAM #2 on Lectures 10-17 (§§3.4-3.6, chs4,5, §§6.1-6.3)</b>
Mon	7-Dec	21.	§§9.5-9.6 Calculating Cycle Index, Enumerating General Graphs and Digraphs
Wed	9-Dec	22.	§10.1 Latin Squares, start Block Designs
Mon	14-Dec	23.	§10.2 Block Designs
Mon	21-Dec		<b>FINAL EXAM on Lectures 18-23 (§§6.4-6.5, chs9,10)</b>

TEXT: J. L. Gross, *Combinatorial Methods with Computer Applications*, 2008.

COURSENOTES: to be posted on class website, starting first week of classes