Math 3103: Combinatorics, Spring 2024

Date	Section[a]	Topic	Recommended Homework[b]
Jan 17	1.1	Set theory, basic counting	—
Jan 19	1.2	Permutations	1–27, 31–37
Jan 22	1.3	Combinations	1–33
Jan 24	1.4	Combinations with repetition	1–17
Jan 26, 29	8.1	Inclusion and exclusion	1–27
Jan 31	8.2, 8.3	Generalizations, derangements	1–7, (8.3) 1–11
Feb 2	8.4	Rook polynomials	
Feb 5	8.5	Forbidden positions	1–11
Feb 7	9.1	Generating functions	1–5
Feb 9, 12	9.2	Examples, formulas and calculations	1–15, 29, 33
Feb 14	9.3, 9.5	Partitions of integers, summation	(9.3) 1, 3, 5; (9.5) 1, 3, 5, 7
Feb 16	—	Review of Chapters 1, 8, 9	
Feb 19	—	Test on Chapters 1, 8, 9	
Feb 21	10.1	Recurrence relations, first order	1, 3, 5
Feb 23, 26	10.2	Second order relations	1, 3, 9–15, 23–31
Feb 28, Mar 1	10.3	Nonhomogeneous recurrence relations	1–13
Mar 4	10.4	Generating function method	1, 3
Mar 6	14.1	Rings: Definition and examples	1, 3, 5, 9bcd, 13, 15
Mar 8	14.2	Properties and structure	3–7, 13–21
Mar 11, 13	14.3	Integers modulo n	1–5, 9–15, 19, 21
Mar 15	14.4	Homomorphism and isomorphism	1–15
Mar 18–22	—	Spring break, no classes	
Mar 25	—	Review of Chapters 10 & 14	
Mar 27	—	Test on Chapters 10 & 14	
Mar 29	16.1	Groups: definition, examples	1–17
Apr 1	16.1	Groups: properties and subgroups	1–17
Apr 3	16.2	Homomorphisms and cyclic groups	1–15
Apr 5	16.3	Cosets and Lagrange's theorem	1–11
Apr 8	16.4	Public key cryptography	
Apr 10	16.5, 16.6	Coding theory	(16.5) 1, 3
Apr 12	16.7	Parity and generator matrices	1–9
Apr 15	16.8, 16.9	Group codes, Hamming matrices	1–7
Apr 17	16.10	Counting equivalence classes	1, 2, 3, 5–13
Apr 19	16.11	The cycle index	1–7
Apr 22	16.12	Pattern inventory	1–9
Apr 24	—	Review of Chapter 16	
Apr 26	—	Test on Chapter 16	
Apr 29	—	Review for final	
May 1	—	Review for final	
May 8	—	**Final Exam, 3:00–5:00**	

[a] Some sections may be omitted.

[b] Only odd-numbered problems unless otherwise noted.

Other Information

Instructor: Daniel H. Luecking **Office:** SCEN 354

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Office Hours: 11am–12noon and 3:00-4:00pm MWF

Textbook: *Discrete and Combinatorial Mathematics*, R. Grimaldi, 5th ed., Chapters 1, 8–10, 14, 16.

Web page: https://luecking.hosted.uark.edu/classes/

Exams: There will be three regular exams worth 100 points each. Exams will occur on the dates in the above schedule. There will be a comprehensive final exam worth 200 points.

Quizzes: There will be a quiz every few sections, each worth 10 points. Most quizzes will be take-home. If so, they must be turned in at the beginning of class on the day they are due, before you take your seat. I plan to have 12–14 quizzes.

Make-ups: No make-up exams and no make-up quizzes. If you have a *reasonable conflict* that prevents your taking an exam, you will be excused, and I will give you a grade on that exam equal to the average of all other scores, except the final (but including the quizzes). Conflicts which are known in advance must be reported in advance in order to be excused. Reasonable conflicts include (but are not limited to) *required* university activities, jury duty, national guard duty, illness or other emergencies, family duties and funerals. Missed exams without an excuse are recorded as 0 points.

All missed quizzes are recorded as 0 points. In compensation, only the 10 best quizzes are counted. Missed deadlines on take-home quizzes **may** be extended, but only if you have a reasonable conflict (see previous paragraph) and only until the beginning of the next class session.

Attendance: I take attendance occasionally, and I take note of a missed quiz, homework not turned in, or a graded item that is not picked up. Attendance will be taken into account when borderline grades are considered.

Grading: All of your solutions must show enough of the work that I can tell you understand what you are doing in each step; the answer alone will not get you full credit. When I do example problems in class, I will say what parts of my solutions must be present in yours.

Your 10 highest quiz scores will be added for a possible 100 points. Your two highest test scores will be added for another possible 200 points. The final exam is worth another 200 possible points.

Your grade is then determine from this grand total of quizzes, tests and the final, according to this scale: 450–500 = A, 400–449 = B, 350–399 = C, 300–349 = D.

Policy on Class Cancellation: In the event of bad weather, check with the University: if it is open, class will be held.

Statement on Academic Honesty: Submitting the work of another as your own is a serious violation of the University's policy on academic integrity, and will result in disciplinary proceedings when detected. *This includes any take-home assignments* unless I say otherwise. Do *not* accept help and do *not* offer help to anyone on them. If you are uncertain what constitutes a violation, talk to me *before* you do it.

Quoting University policy: *Each University of Arkansas student is required to be familiar with and abide by the University's 'Academic Integrity Policy' which may be found at*
http://honesty.uark.edu/policy/index.php
Students with questions about how these policies apply to a particular course or assignment should immediately contact their instructor.

Miscellaneous: You are not permitted to use any electronic device (unless mandated by a recognized disability) during any test or in-class quiz. In compensation, I almost never require you to simplify numerical answers or algebraic expressions.

On in-class quizzes you may use only pencils or pens and blank scratch paper.

On exams (including the final), in addition to pencil and paper, you may use your textbook and class notes *handwritten* on paper. A good strategy is to write down the main ideas you have trouble remembering on a single sheet of paper.