Combinatorics
Loyola University Chicago – Math 318.001 – Spring 2015
Course Syllabus & Ground Rules

Course Details
CLASS MEETINGS: Dumbach Hall, Room 229; MWF 10:25–11:15 a.m.
LAB: Dumbach, Rm 124, Thu. 9:00 a.m.–10:30 a.m.
OFFICE HOURS: BVM Hall, Rm 507, Tues. 1:00–2:30 p.m.; Changes will be posted on my webpage.

FINAL EXAM:
• when: Monday, April 27, 9:00–11:00 a.m.
• format: cumulative, closed-book, closed-notes, approved calculators allowed.
• rescheduling: requests granted for extenuating circumstances;\(^1\) must be made through Dean’s office.


Instructor Coordinates
Dr. Aaron Lauve
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773.508.3727 www.math.luc.edu/~lauve

Contact
Communication via Piazza is strongly encouraged. Emails to me should include 318 in the subject line. I will make every effort to reply within 48 hours.

Course Web Page(s)
There are several. Section-specific material and announcements will be posted to one of:
• piazza.com (a discussion forum; will be used extensively)
• cloud.sagemath.com (a site for computation and composition)
• webpages.math.luc.edu/~lauve/318.html (mainly for archiving posts from elsewhere)
• sakai.luc.edu/portal/site/MATH318_001_2438_1152 (mainly for grades and accessing Piazza)

Important Dates
In-term exam dates are tentative. Scheduled dates will be announced at least a week in advance.
Exams: March 11, April 13
No Class: 1/9, 3/2–3/6, 4/3, 4/6

The last date to drop with a record of “W” is March 23.

Course Summary
SYLLABUS. Chapters 1–10 of the text, with additional topics chosen from 11–20 as times allows. Topics: Permutations, binomial theorem, compositions, partitions, Stirling numbers, Catalan numbers, graphs, trees, Eulerian walks, Hamiltonian cycles, electrical networks, graph colorings, chromatic polynomials, combinatorial algorithms, optimization, among others. Techniques: Pigeon-hole principle, mathematical induction, inclusion-exclusion principle, recurrence relations, generating functions, matrix-tree theorem, Polya theory, Ramsey theory, pattern avoidance, probabilistic methods, partial orders, combinatorial algorithms, among others.

Prerequisites. Math 162.

\(^1\)E.g., University Policy suggests that students need not take four exams on any given day.
Technology

A TI-84+ or equivalent graphing calculator is optional for this course. Use of any calculator more advanced than this will not be allowed during exams.

We will use Sage and/or Mathematica throughout the semester. Sage is available for free, but is a bit of a pain to install under Windows...best to stick with the cloud version (cloud.sagemath.com). Get Mathematica for free here: myits.luc.edu/mathematica.

Course Components

EXAMS (3×20%). There will be two in-term exams and a final exam. The final exam will be cumulative.

HOMEWORK (10% + 20%). Homework will come in two flavors: “warm-ups” and “problems.” They should be turned in at the start of class, separately, and stapled if appropriate.

• Warm-ups (10%): Generally, a few of these will be due each class period. These exercises already have solutions printed in the text. Each of your solutions of this type will have two portions: (1) a self-grade of $\checkmark^-, \checkmark, \checkmark^+$, with $\checkmark^+$ given for mostly perfect work; (2) a short sentence of the form: “I got it myself,” “I made some progress, but gave up and looked at the solution,” “I looked at the solution and still don’t get it,” etc. (N.B.: This is an ideal chance for you to ask specific questions about material from the course, for me to address either in class, on Piazza, or during office hours.) To compute your final grade, the warm-up scores will be recorded as follows: absent (0%), $\checkmark^-$ (70%), $\checkmark$ (85%), $\checkmark^+$ (100%). Your top 10 scores will be kept.

• Problems (20%): A few of these will comprise more traditional “homework assignments,” due nearly every week. Assignments should be submitted stapled and on single-sided paper. Each assignment will be graded out of ten points. Each solution here must be written carefully, using complete sentences with correct English and mathematical grammar and punctuation. (If a number or one-word answer is asked for, briefly illustrate the ideas/computations behind your answer.) I will generally grade three of the problems carefully, giving each a score between 0 and 3. The final point: I reserve the right to subtract one point for sloppy or illegible work or not following directions (reread preceding sentences).

CLASS PARTICIPATION. Each student is expected to contribute in a meaningful way every week, through: good questions during class or on Piazza; good answers to those questions; volunteering to present a problem on Monday or Wednesday; authoring a “blog post” for blogs.luc.edu/mathstats/; “sharing” an article or news tidbit with facebook.com/lucmathstats; etc. When pondering your contributions each week, I’ll use the $\checkmark^-, \checkmark, \checkmark^+$ rubric above. Your best 10 scores will be kept for the final course grade.

Course Grade

Some curving away from the standard scale (91/A – 81/B – 71/C) may be necessary, but is not expected.

Academic Integrity

The Academic Standards and Regulations web page

www.luc.edu/academics/catalog/undergrad/reg.shtml

outlines the definition and ramifications of cheating at Loyola University (the “Academic Integrity” link) as well as the recourses available to you should you be accused of cheating (the “Academic Grievance Procedure” link). By attending this course, you agree to uphold the high standards of Loyola. If you are found cheating on an exam, you will receive a zero (0) for the exam and the incident will be reported to your academic dean and recorded in your permanent file.
Getting Help
You are expected to read and comprehend much beyond what is covered in lecture. Use your book well: learn the definitions and theorems; read and understand the proofs; read the examples' solutions.

Please, SEEK HELP if you are falling behind. Form study groups, work lots of problems, come to office hours, schedule another time to meet, find a tutor or online resources (e.g., ocw.mit.edu/), get inspired (www.youtube.com/user/vihart), etc.

Escape Routes
At any time, even after the last date for W-dropping the course, students who are experiencing medical or personal difficulties should not hesitate to consult their advisors or the Student Development Office or their dean. Don’t allow yourself to be overwhelmed by such problems; Loyola has resource persons who may be able to help you (www.luc.edu/wellness  www.luc.edu/bct)

Course Etiquette
Please set your cell phones to “silent” upon entering class; phone noises are a distraction to everyone. Likewise, talking with your neighbor while I am lecturing or leading a discussion is unacceptable behavior. Reading newspapers, surfing the web, or texting your friends is impolite and is a distraction to your instructor; please find a better use for your time.

Finally, and most importantly, respect for others is stressed above all else; please allow me the first chance to answer your fellow students’ questions. I expect everybody to participate in class discussions, but that begins by fostering an environment where we do not hesitate to ask our questions.

Disability Services
The Americans with Disabilities Act (ADA) is a federal statute that provides comprehensive civil rights protection for persons with disabilities. It requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring accommodation, please contact the SSWD office: in the Sullivan Center, suite 117, phone 773.508.3700, fax 773.508.3810, or online at www.luc.edu/sswd/.

Master’s Students
There are master’s students among you. They will be charged with giving presentations on additional combinatorial topics (either applications or material in later chapters of the text) Pay attention(!), because they will also be assigning exercises that may appear on homework and exams.

Odds and Ends
MAKE-UP QUIZZES/EXAMS. Make-up quizzes and exams will only be given for real emergencies, documented illnesses, or university-sponsored events. Students must notify me of their absence prior to the next regularly scheduled class (and before the examination if possible). If a student fails to appear for a make-up at the mutually arranged time, no further opportunities will be extended. Failure to contact me as stated above or inability to sufficiently document the extenuating circumstances of students’ absence will result in a grade of zero on the examination.

SAGE/LATeX ON THE CLOUD. You are responsible for creating an account on cloud.sagemath.com, after which time I will invite you to join our class “project.” (Please do this as soon as possible, and please use your Loyola email to register; this can always be changed later.)

LOYOLA EMAIL. On the occasion that I need to contact students outside of class, this is the only sensible way to proceed. If you would rather not use your @luc.edu email account, ... tough!
• You should receive a “WELCOME” email from me on the Sunday before the second week of class.
• If you do not receive this message, please let me know as soon as possible.

ACCESSING PIAZZA. Look for the “Piazza” button on the left panel under your MATH 318 course in Sakai, or head to piazza.com/luc/spring2015/math318001sp15/home directly. I expect that we will all be spending A LOT of time here: asking questions, answering questions, browsing through posted sample exams, pointing to sage/latex code on the cloud you’re needing help with, etc.

Samples of successful Piazza forums are available for browsing (piazza.com/class/gw9jakyzv6s16).²

Piazza Apps for smart phones or tablets are available (Apple and Android). I will enroll you in the Piazza forum. Let me know if you cannot get access it.

MORE Math. The department maintains a BLOG (blogs.luc.edu/mathstats) and a FACEBOOK page (www.facebook.com/lucmathstats) that will contain interesting math/stats related tidbits throughout the semester. Feel free to join the conversation. (Indeed, if there is a topic that you’d like to see discussed, send an email to webadmin@math.luc.edu and we’ll try to get a post up about it.)

²It will complain, “Action not allowed for unknown users,” but you can get around it. Just click “OK.”