

MATH 301 - Introduction to Combinatorial Theory

Summer 2024 Syllabus

Instructor: Jake McCann (Jacob.McCann@colostate.edu)

Important dates - term is June 10–August 2:

June 17: Last day to add or drop the course

June 19: Wednesday holiday - university offices closed - no classes

July 4: Thursday holiday - university offices closed - no classes

July 23: Last day to withdraw from the course, earning a W on your transcript

July 28: Last day to apply for Repeat Repair (see <https://registrar.colostate.edu/repeat-delete/>)

Course structure:

This course is asynchronous, meaning we're not going to meet at any specific time to discuss the content. You will learn the content by reading the book and watching the videos on your own time. There will still be specific due dates for all the homework assignments and assessments.

Course content:

Counting principles, sets, counting combinations, Pascal's triangle, the binomial theorem, proof techniques, recurrence, generating functions, graphs, trees, graph optimization.

Workload: This is a 3-credit course. At CSU, that translates to about 6-9 hours of work per week during the fall and spring terms. However, this is a summer course, so we have half the time to cover the same amount of material. As such, you should expect to work about 12-18 hours per week on this course. **Do not take this course if you are not prepared to work up to 18 hours per week.**

Prerequisite: MATH 161: Calculus for Physical Scientists 2. Truthfully, we'll only use a bit of calculus throughout the course. Most of the content will be introduced from scratch.

Materials: For quizzes and tests, you will need a computer, a working webcam and microphone, and a stable internet connection. For the rest of the course, you need a way to upload your homework assignments as PDFs, access to the textbook (see below), and access to SageMathCell.

Textbook: Counting Rocks! An Introduction to Combinatorics by Henry Adams, Kelly Emmrich, Maria Gillespie, Shannon Golden, and Rachel Pries. The link to the textbook is below and on the home page of our Canvas shell.

<https://www.mathematicalgemstones.com/maria/OER/CountingRocks.pdf>.

Videos: The videos we'll be using are from the following playlist:

<https://www.youtube.com/playlist?list=PL5J6K3znOvOmzBUoxlk-W0N4j7L1Y9yfW>.

They're also linked in the textbook itself, in the appropriate sections. The videos all have human-edited captions, and you can turn these on by clicking the "CC" button on the toolbar of the video on YouTube.

Communication: Email is the best way to reach me, and I aim to respond within 1 business day. My email is listed at the top of the syllabus. I will communicate important messages via announcements on Canvas. You should make sure that your settings on Canvas are set so that you receive push notifications or emails whenever I post an announcement. If you don't know how to do that, follow the directions here:

<https://community.canvaslms.com/t5/Student-Guide/How-do-I-manage-my-Canvas-notification-settings-as-a-student/ta-p/434>

Most of the communication you have with me will be through comments on your homework assignments, so you should get in the habit of reading over them after grades are posted.

Office hours: 10-11 Monday, Tuesday, Thursday; but also available for appointment

Course website: We will use <https://canvas.colostate.edu/> for all course materials and grades. This is a great place to stay organized and know what is due and when.

Grades: Your grade in the class will be calculated based on the following weights:

- Homework (45%)
- Quizzes (15%)
- Exams (40%)

Letter grades will be assigned according to a scale no stricter than the following:

[97, 100] A+	[77, 80) C+
[93, 97) A	[70, 77) C
[87, 90) B+	[60, 70) D
[83, 87) B	[0, 60) F

The GPA associated to each grade is standard according to CSU's grading scale.

Homework assignments: The only effective way to learn mathematics is to think about lots of different kinds of problems, and most of your time in this course will be spent working on such problems. You'll submit your assignments on Canvas as a PDF, and there are instructions on the assignment page for how to do that if you haven't done it before.

Your answers on homework assignments should be accompanied by brief explanations. If you're only writing math symbols, then you're not explaining things—make grammatically correct sentences by adding in just a few English words.

Deadlines: Due dates are there to give you the structure to help you keep up with the material throughout the term. In general, late work is not accepted. If you have circumstances that will make it difficult to meet a deadline, please email me in advance. The outcome is typically better if you communicate an issue before something is due.

Assessments: Starting in week 2, there will be a quiz or exam every week. The quizzes will cover about 1 week of content, and exams will cover about 2.5-3 weeks of content. The final is not cumulative.

Assessment time and place: You have until the due date to take the quizzes and exams, but once you start, you have 1.5 hours to finish quizzes and 3 hours to finish exams. However, I expect quizzes to take 30-60 minutes and exams to take 1-2 hours. The extra time is to ease any anxiety you may have with timed tests.

To ensure that everyone has the same chance to do well, we will be using LockDown Browser/Monitor for all assessments. This software prevents digital cheating during online tests. Students cannot print, copy, or go to another website—everything is locked down until the exam is submitted for grading.

If you haven't used LockDown Browser before, here are instructions for getting started:

1. [Respondus Lockdown Browser Resources](#) (Includes computer requirements and quick start guide).
2. Download and Install [Respondus LockDown Browser](#)
3. Short Video Introduction: [Respondus LockDown Browser](#) for Students
4. Steps to taking an exam with [LockDown Browser](#) and Monitor.
5. Respondus [Support + Resources](#)
6. Contact the [Student Disability Center](#) for accommodation questions
7. Respondus Lockdown Browser (with Monitor) [Student Help Guide](#)

University Policies and Standards

Accommodation for disabilities: If you are a student who will need accommodations in this class due to a disability or health condition, I will need an accommodation letter from the Student Disability Center (SDC) before they are implemented. Please contact the SDC at <https://disabilitycenter.colostate.edu> as soon as possible to initiate the accommodation process.

Classroom behavior and respect for diversity: Students and faculty each have responsibility for maintaining an appropriate learning environment. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, color, culture, religion, creed, politics, veteran's status, sexual orientation, gender, gender identity and gender expression, age, disability, and nationalities.

Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alternate name or pronoun. Please advise me of

this early in the semester so that I may make appropriate changes to my records. For more information, see the policies on classroom behavior and the student code at <https://catalog.colostate.edu/general-catalog/policies/students-responsibilities/> and <https://resolutioncenter.colostate.edu/student-conduct-code/>.

Religious holidays and observances: CSU has a legal obligation to accommodate students' absences due to religious observances. For such an accommodation, it is the student's responsibility to complete the Religious Accommodation Request Form at the beginning of each semester and submit the request via the Office of the Vice President for Student Affairs website. The Dean of Students will communicate with the instructor regarding the student's absence and the student is instructed to discuss how best to ensure an accommodation related to class conflicts. For religious observances that cannot reasonably be anticipated at the beginning of the semester, students must follow the procedure above as soon as possible after the course conflict is identified. If a student knows that a particular course or section of the course will have multiple conflicts with his or her religious obligations, the student is advised to locate another course section or defer taking the course to a different semester. In the event of a conflict in regard to this policy, individuals may appeal using established CSU procedures. Instructors are advised to provide reasonable accommodations to ensure compliance with CSU's obligations. See more details regarding academic policies at <https://catalog.colostate.edu/general-catalog/academic-standards/academic-policies>.

Discrimination and harassment: CSU is committed to providing an environment that respects the dignity and worth of every member of its community. CSU strives to create and maintain a work and study environment that is fair, inclusive, and responsible so that each member of the CSU community is treated with dignity and respect and is rewarded for relevant considerations such as ability and performance. CSU has adopted a comprehensive policy to define the types of conduct that are prohibited and to prevent harm arising from discrimination, harassment, sexual harassment, sexual misconduct, domestic violence, dating violence, stalking, and retaliation. Conduct that is discriminatory or harmful under the policy inhibits the achievement of the stated goals. All students, faculty, staff, and other persons having business with CSU are expected to know and follow this policy. Details regarding what is involved in bringing a complaint and the procedures for informal and formal resolution are available from the Office of Support and Safety Assessment for student-to-student behavior and the Office of Equal Opportunity for matters involving non-students such as faculty, staff, affiliates, or visitors and matters involving a student and non-student person. See more details at <https://catalog.colostate.edu/general-catalog/policies/discrimination-harassment/>.

Academic integrity: This course will adhere to the CSU Academic Integrity Policy as found in the Colorado State University General Catalog and the Student Conduct Code. At a minimum, violations will result in a grading penalty in this course and a report to the Office of Conflict Resolution and Student Conduct Services. See more details at <https://catalog.colostate.edu/general-catalog/policies/>
<https://tilt.colostate.edu/Integrity/Pledge>.