

California State University Sacramento - Spring 2023
Math 101 - Combinatorics

Section and Class Number: Section 1 and Class Number #34171, 3 units

Time and Location: Mon, Wed, Fri from 1:00 PM to 1:50 PM in Alpine Hall 156

Instructor and Email: Craig Timmons (him, he, his); craig.timmons@csus.edu

Office Hours and Location: Monday 8:45 AM to 9:45 AM and 2:00 PM to 3:00 PM,
Wednesday 8:45 AM to 9:45 AM; Shasta 256

The Classroom Community: Students in this class bring together a rich set of backgrounds, experiences, and perspectives. This class follows the values of the Hornet Honor Code which can be found here: https://www.csus.edu/student-affairs/_internal/_documents/hornet-honor-code.pdf

Technology Requirements: You will need to be able to use Canvas.

Textbook: *Principles and Techniques in Combinatorics*, Chen Chuan-Chong and Koh Khee-Meng, World Scientific Publishing Company.

Prerequisites: Math 31

Course Description: Introduction to the art of counting. The focus will be on actually listing the objects being counted in small cases and using the knowledge gained in working with small cases to build toward general principles. Sum and product principles, models of counting, permutations and combinations, equivalence relations and partitions, inclusion-exclusion principle, recurrence relations, and generating functions.

Student Learning Objectives: Some of the course learning objectives are listed below.

- Utilize elementary arguments to count permutations and combinations of finite sets.
- Understand binomial coefficients which includes formulas involving binomial coefficients and using binomial coefficients in counting arguments.
- Use the Binomial Theorem and the Multinomial Theorem.
- Know the Inclusion-Exclusion Principle.
- Be able to use double counting arguments to establish combinatorial identities.
- Know the Pigeonhole Principle and be able to use it in counting arguments.
- Solve basic recurrence relations.

Remark: The above list highlights some of the more important topics of the course, but does not list every topic that will be covered.

Grading: You will be graded on the following four components.

Quizzes - Quizzes count for 15% of your grade.

Homework - Homework counts for 22% of your grade.

Exams - Each exam is worth 15% of your grade. There are three exams.

Final Exam - The final exam is 18% of your grade.

The instructor reserves the right to put a curve on any quiz, exam, or the final exam. The curve will only benefit the student. Do not rely on a curve to raise your grade in the course.

Grading Scale:

100-93	92-90	89-87	86-83	82-80	79-77	76-73	72-70	69-60	59-0
A	A-	B+	B	B-	C+	C	C-	D	F

Exam Dates: Exam 1 - Feb 17, Exam 2 - Mar 17, Exam 3 - Apr 21

Academic Honesty: This course will follow Sac State's Academic Honesty Policy and Procedures which may be found here:

<https://www.csus.edu/umannual/student/stu-100.htm>

A student caught cheating may be reported to the Office of Student Conduct and disciplinary action may be taken. If you are unsure of what is considered cheating please contact me and read the Academic Honesty Policy and Procedures.

Attendance: While attendance is not required, on days where there is a quiz given during class time, notify me ahead of time if you will be missing class so that we can make other arrangements. If an unexpected emergency comes, please notify me as soon as possible so that it can be determined whether or not a make-up assignment(s) is appropriate.

Sickness: If you are sick, please do not attend your in-person classes and let your instructors know. If you are having symptoms of Covid-19 (fever, cough, sore throat, muscle aches, loss of smell or taste, nausea, diarrhea, or headache) or have been in contact with someone who has tested positive for Covid-19, contact Student Health and Counseling Services (SHCS)

<https://www.csus.edu/student-life/health-counseling/>

at 916-278-6461 to obtain guidance and/or medical care.

In the event a student becomes ill or are placed under quarantine as a result of the Covid-19 pandemic, the instructor and student will put together an individualized plan for the student to complete assignments. This may include accepting late assignments with no penalty, and/or alternative assignments to be completed by the student. However, once the instructor and student have created a plan for the student, it is important to follow that plan in order to maintain the integrity of the course and to be fair to both the student and instructor.

It is critical that you communicate with me in a timely manner if these circumstances occur. You will not be penalized for illness, but it is your responsibility to communicate with me via email.

Your mental and physical health is of utmost importance. There is **not** an expectation that you will contact me the moment a diagnosis is given. The expectation is that an email

is sent to me when you are healthy enough to communicate via email, but not necessarily ready to begin completing assignments.

Sac State Mobile App: Information on Sac State's mobile app can be found here:

<https://www.csus.edu/information-resources-technology/web-mobile/university-web-mobile-services.html#sac-state-mobile-app>

This is particularly important if you need to go to campus so that you can receive real-time information on the status of the campus.

Availability of Student Services:

- Services to Students with Disabilities (SSWD) - Sacramento State is committed to ensuring an accessible learning environment where course or instructional content are usable by all students and faculty. If you believe that you require disability-related academic adjustments for this class, please immediately contact Services for Students with Disabilities (SSWD) to discuss eligibility. A current accommodation letter from SSWD is required before any modifications, above and beyond what is otherwise available for all other students in this class will be provided.

<https://www.csus.edu/student-affairs/centers-programs/services-students-disabilities/>

- Crisis Assistance and Resource Education Support (CARES) - If you are experiencing challenges with food, housing, financial or other unique circumstances that are impacting your education, help is just a phone call or email away. The CARES office provides case management support for any enrolled student.

<https://www.csus.edu/student-affairs/crisis-assistance-resource-education-support/>

- Student Health and Counseling Services (SHCS) - Your physical and mental health are important to your success as a college student. Student Health and Counseling Services (SHCS) in The WELL offers medical, counseling, and wellness services to help you get and stay healthy during your time at Sac State. SHCS offers: Primary Care medical services, including sexual and reproductive healthcare, transgender care, and immunizations; urgent care for acute illness, injuries, and urgent counseling needs; pharmacy for prescriptions and over-the-counter products; mental health counseling, including individual sessions, group counseling, support groups, mindfulness training, and peer counseling; athletic training for sports injury rehabilitation; wellness services, including nutrition counseling, peerled health education and wellness workshops, and free safer sex supplies; violence and sexual assault support services. Most services are covered by the Health Services fee and available at no additional cost.

<https://www.csus.edu/student-life/health-counseling/>

- Additional Resources - To learn more about the many resources Sac State has to offer, I recommend visiting this website:

<https://www.csus.edu/student-affairs/retention-academic-success/>

This excellent website has numerous links to student oriented programs.

Notes: You may contact me at any time in regards to questions about the syllabus.

In the event that the instructor is not available during the semester for whatever reason, students will be contacted and advised as to how the course will proceed. This may include a change in instructor and the modality.