MAT 316 Combinatorial Mathematics (1303)

Section 1 WeFr 10:50-12:05
Sullivan Building 306A
Salem State University

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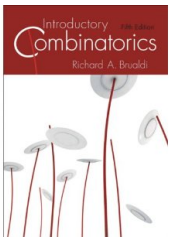
Office Hours: Mo 9:00-11:00, WeFr 9:15-10:45 or by appointment

Required text: Introductory Combinatorics, 5^{th} edition by Richard A. Brualdi. Pearson/Prentice Hall, 2009. ISBN No. 0-13-6020402



Dr. Travers Webpage

Overview : **3 Credit(s)** This course is a survey of combinatorial methods. Topics may include graphs, trees, networks, permutations and combinations, partitions, and enumeration theory. Three lecture hours per week.
Prerequisite: MAT 234.

We will discuss counting problems, graph theory, generating functions, the principle of inclusion-exclusion, recurrence relations, colorings, block designs, etc. We are not going to hold ourselves to a strict time frame. We will cover material at whatever pace we need to in order to understand. If we can move faster and cover more material, that is fine. If we need an extra class or two to understand a difficult concept then we will do so. Our main goal is to understand different ideas in combinatorics and how to prove these ideas.

Grading: There will be one in class exam and a final exam during the regular exam time period. The first exam is tentatively scheduled for Friday, March 10^{th}. The final exam is on Thursday, May 11^{th} at 8:00. Each exam will be worth 25% towards your final grade. There will be a project that will be worth 15% of your grade and the remaining 35% will be your homework grade.

Project: There will be one project assigned later in the semester. Details for the assignment will be distributed separately once we get far enough into the material as this project will consist of researching an area of combinatorics that we are not covering in class or researching an area we are covering in greater detail. In order for you to choose topics of interest, we have to have some exposure to different areas of combinatorics so that you have an idea of different avenues you can pursue.

Homework: Homework will be assigned by chapter (or a couple chapters if we are only cover small portions of the chapters). The assignment will be given when we start the material that the problems cover and they will be due one week after we finish covering all of the material to which the problems pertain. In general, there will not be a lot of problems per assignment and so I expect all of them to be completed. You can work on the problems freely with others from class (unless specifically instructed otherwise) but each person will be responsible for writing up the assignment. The clarity of the solution is as important as finding the correct solution, so I expect the answers to be clearly and in proper English. Assignments will consist of book problems primarily, but there may be supplemental problems as well.

Attendance Policy : All students are expected to be familiar with the academic regulations, including those regarding Academic Integrity, for Salem State University as published in the college catalog. In addition, each student is responsible for completing all course requirements and for keeping up with all that goes on in the course (whether or not the student is present). If you are going to miss a class, I expect an email or a call to my office **before** class begins. If you contact me ahead of time (other than unexpected situations that can be verified) then the absence will be excused. If you do not contact me ahead of time then the absence will be unexcused. If you have an unexcused absence on the day of an exam, you will receive a zero for that grade. All unverified "excused" absences after the second one will be considered unexcused. For each unexcused absence, your final grade will be docked in the following manner:

No. of Absences	Total Points Lost
1	1
2	$1+2=3$
3	$1+2+3=6$

and so forth

Note: For exams, arrangements must be made at least 24 hours in advance in order for an absence to be excused.

University Policy Statement: Salem State University is committed to providing equal access to the educational experience for all students in compliance with Section 504 of The Rehabilitation Act and The Americans with Disabilities Act and to providing all reasonable academic accommodations, aids and adjustments. Any student who has a documented disability requiring an accommodation, aid or adjustment should speak with the instructor immediately. Students with Disabilities who have not previously done so should provide documentation to and schedule an appointment with the Office for Students with Disabilities and obtain appropriate services.

In the event of a university declared critical emergency, Salem State University reserves the right to alter this course plan. Students should refer to www.salemstate.edu for further information and updates. The course attendance policy stays in effect until there is a university declared critical emergency. In the event of an emergency, please refer to the alternative educational plans for this course located at http://btravers.weebly.com. Students should review the plans and gather all required materials before an emergency is declared.

Global Goals

This course is intended to provide you with :

- experience using new counting techniques
- an advancement in your facility in learning abstract mathematics
- an advancement in your ability to understand and construct sound mathematical proofs
- an exposure to the basic tenets of experimental block design
- the fundamental definitions and principles of graph theory and how they relate to problems in discrete mathematics

Instructional Objectives

By the end of the course, you should be able to :

- apply simple combinatorial techniques to problems[1]
- find recurrence relations for some sequences[2]
- apply generating-function methods to some combinatorial questions, including (in some cases) the problem of finding a formula for a sequence when given a recurrence relation[2]
- apply the Principle of Inclusion-Exclusion to a variety of problems[1]
- create graphs to model real life situations[2]
- apply the ideas of coloring graphs to solve problems[2]
- use the ideas of block design to create designs[2]

Miscellaneous

- I don't want the class to feel like a lecture. I prefer a class that acts more like a discussion. You will get more out of the class if you participate and if you stop me when there is something that you do not understand.
- Believe it or not, it is actually helpful to read the textbook. If you read the material, it will reinforce the topics covered in class. It is more beneficial, in my experience, to read the section before we cover it so that you know where you have questions ahead of time.
- Please turn off the ringers on all cell phones and pagers before coming to class.

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[1] assessed through homework and midterm
[2] assessed through homework and final

Effective Date: January 10, 2017. Syllabus subject to change based on the needs of the class, but students will be notified in writing of any changes.

Academic Integrity: Salem State University assumes that all students come to the University with serious educational intent and expects them to be mature, responsible individuals who will exhibit high standards of honesty and personal conduct in their academic life. All members of the Salem State University academic community have a responsibility to ensure that scholastic honesty and academic integrity are safeguarded and maintained. Cheating and plagiarism are unfair, demoralizing, and demeaning to all of us. Cheating, plagiarism, and collusion in dishonest activities are serious acts that erode the University's educational role and cheapen and diminish the learning experience not only for the perpetrators, but also for the entire community. It is expected that Salem State University students will understand and subscribe to the ideal of academic integrity and that they will be willing to bear individual responsibility for their work. Materials (written or otherwise) submitted to fulfill academic requirements must represent a students own efforts.

Academic Dishonesty Policy: The fundamental purpose of this policy is to emphasize that any act of academic dishonesty attempted by any Salem State University student is unacceptable and will not be tolerated. Charges of academic dishonesty are reviewed through a process that allows for student learning and impartial review. Performing, aiding or inciting any of the actions listed below, in courses or other situations involving academic credit, constitutes an offense subject to disciplinary action.

Possession of Final Examinations and Papers/Projects: Students have the right to inspect their own completed final examination papers in a course within one semester following the end of the course. However, the course instructor shall have the right to retain permanent possession of the original examination papers and each student's submitted answers.
Students have the right to the return of the original of any written paper/project upon request, with the provision that a copy be provided to the instructor by the student if the instructor so requires. Under such circumstances, the instructor shall return to the student the written paper/project within one semester following the end of the course. Such request must be made by the student no later than the end of the following semester.

Appeals and Contesting of Grades: A student may contest/appeal a grade no later than four months after its official posting on Navigator/Polaris to the faculty who issued the grade in writing.