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Combinatorics Syllabus

Tugce Ozdemir

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Combinatorics Syllabus

Instructor

Tugce Ozdemir

Lectures : Mo We 9:30-10:45 AM EST

Lec. Room : NAC 4/130

Office Hours : Mo 10:45-11:45 AM EST

Textbook

1. "Combinatorics Through Guided Discovery" by Kenneth P. Bogart. This is a free open textbook and can be [read online](#) or viewed as [pdf](#).

2. "Applied Combinatorics", 2017 Edition by Mitchel T. Keller (Author), William T. Trotter (Author) [Open Source Link](#).

Lecture materials

Syllabus and assignments will be available on Google Classroom. You need to use your **CCNY email** to access **Google Classroom** and **Zoom** for online meetings and you will receive the Zoom links via email. Our first lecture will be on January 25th at 9:30 am at NAC 4/130.

Prerequisites

CSC 21700, 22000, EE31100

Course Description

Elective course, 3 cr., 3hr lecture.

The goal of this course is to teach you how to find ideas and strategies on your own instead of teaching you how to use techniques that someone else has already taught you. The exercises and contents you'll encounter during lectures are intended to help you figure out and validate the fundamental concepts of 'Combinatorics and Graph Theory' which in the end, results in greater knowledge and deeper learning. Enumeration, principle of inclusion-exclusion, recurrence relations, zero-one matrices, partitions, generating functions, graph coloring, Pólya's Theorem are among the key topics covered in this course.

Course Objectives

Students will have understanding and able to apply following concepts, when necessary, in computer science:

1. Combinatorics
2. Recurrence relations
3. Partitions
4. Generating Functions
5. Graph Theory

Grading

Points

<i>Question Sets (4)</i>	50
<i>Interim Exam</i>	25
<i>Final Exam</i>	25
Total	100
<i>Class Activity, Participation, Pop-up Quizzes</i>	Extra 10
Total	110

Homework

You will have 2 types of assignments:

1. You will have readings you need to complete before coming to the class which will not be graded but help you to understand the topic better and get extra credit from participation and pop-up quizzes.

2. You will receive 4 “**question sets**” (50% of your grade) after you learn the topic during class. To receive a credit, you need to submit your assignment by due time on the Google classroom. Question sets will be announced on Google Classroom and you will receive instructions along with each assignment. Late assignments 1 to 3 days would have a 10% penalty and will not be accepted after that. If you prefer handwriting, you need to use scanning app. Either you prefer handwriting or LaTeX while submitting your assignment, upload only **one (1)** PDF file for each assignment on Google Classroom. Unscanned images will NOT be accepted and will NOT be reviewed as a homework.

If you prefer using Latex for assignments, you will get **extra 10 points** for each question set assignment. [Here](#) is the link for “[Overleaf, Online Latex Editor](#)” tutorials.

Extra Credit

Extra credit is an opportunity for the student to demonstrate their knowledge or demonstrate their ability to use this knowledge to solve problems. The extra credit will be evaluated according to the nature of the study and the total point (max. 10) earned from the extra credit will be added directly to the final grade. Every extra credit assignment may have different weight. Also, not every participation will be counted as an extra credit. Extra credit can be earned with class participation, and pop-up quizzes. Quizzes can be held at any time during lecture and consist of questions related the current lecture’s topic, the video showed during lecture or assigned before the lecture, or any content regarding assigned homework that due before the current lecture.

CUNY Academic Integrity Policy

Cheating, plagiarism, obtaining unfair advantage or any kind of Academic dishonesty will not be tolerated and will be reported. You can find the CUNY Policy on Academic Integrity in this [link](#). Any form of plagiarism on assignments or exams may lead to failure of the class.

Attendance

Attendance will be taken first 2 weeks of the semester for verification of enrollment.

Interim and Final Exam

In-person exams usually include short and long answer questions, and rarely include multiple choice depending on the content. There will be between 6-10 questions in the exams.

NOTE: There will be NO make-up or substitute exams excluding emergency.

Lecture

During the lecture, you will be learned new concepts, theories based on the course schedule. You may have pop-up quizzes from content you have seen before and/or during the lecture. You will also solve problems related to the content you have seen while reviewing the material. The questions consist of the exercises from required book and/or from additional resources.

Lecture notes

Lecture notes will be available on Google Classroom after each lecture.

Office hours

Registration is recommended for the office hours. In order to register, you need to make an appointment by email explaining the reason you are attending to the office hours.

Email

Please include the expression “CSc45000 Spring23” in the subject line of the email and send email from authorized CCNY email address. Include your full name and **EMPLID** in the body of email. Although usually you will receive a response in a few hours, allow forty-eight (48) to seventy-two (72) hours before following up to inquire about a response, excluding urgency.

Tutoring – Mathematics

The Science Division offer different ways to help students’ learning. You can check tutoring options for [CCNY Office of Student Success](#) and [The City Tutors](#) from these [link](#).

Health And Wellness

Student can access to confidential counseling services, free health screenings, vaccines, health insurance enrollment through [Health and Wellness Services](#) which consist of Student Health, AccessAbility Center, Services, Counseling Center, Emergency Grants Program and Gender Resources.

Disability Services

The [AccessAbility Center/Student Disability Services \(AAC/SDS\)](#) provides equality in terms of accessing to all CCNY services, and activities by implementing and coordinating academic adjustments and support services for students with disabilities. Students with disabilities can require accommodation and services by visiting the office in NAC 1/218 or contact AAC/SDS via email disabilityservices@ccny.cuny.edu or TTY/TTD: 212.650.8441 or phone 212.650.5913.

If you are a student and registered with AccessAbility, you are entitled to special accommodation, you need to require a letter from AccessAbility to present to the Professor that states their accommodation. In case of any particular accommodation is required for the exam, “Exam Administration Request Form” from AccessAbility should be presented by students, **at least one week prior to the exam date** to have their accommodations.

Course Schedule (**Tentative**) and Important dates:

In addition to the syllabus, the schedule below is provided for you to see the general picture of the semester as an example; the order and date of the topics, assignments are likely to change. So, please follow the announcements. It is the student's responsibility to be aware of changes. Also, for important dates you can check the Academic Calendar [here](#).

1. Basic Counting Principles (Week 1-2)
2. Mathematical Induction (Week 3-4)
3. Recurrence Relation (Week 5) (Question Set 1 will be assigned)
4. Distribution (Week 6)
5. Partition and Stirling Numbers (Week 7) (Question Set 2 will be assigned)
6. Generating Functions (Week 8-9)
Interim Exam (Mar 15)
7. Graphs and Trees (Week 10)
8. Graph Coloring (Week 11)
9. Ramsey theory and more on Graph Theory (Week 12) (Question Set 3 will be assigned)
10. Pólya's Theorem (Week 13)
11. Zero-One Matrices (Week 14) (Question Set 4 will be assigned)
12. Special Topics (Week 15-16)
Final Exam (May 22)

CCNY Spring 2023 Final Exam Schedule can be found [here](#).