Course Syllabus

The course provides the background in combinatorics, probability theory and graph theory required in design and analysis of algorithms, in system analysis, and in other areas of computer science.

Basic information

• Course Number: 01:198:206 Sections 01, 02, 03, and 07
• Instructor: Konstantinos Michmizos
• Email: michmizos@cs.rutgers.edu
• Course Type: Undergraduate
• Credits: 4
• Learning Management System (LMS): https://rutgers.instructure.com/courses/104702

- Meeting Time: Mon & Thu 12:00 - 1:20 PM
- Meeting Place: webex link available upon logging on canvas

Textbooks:

1) Mathematics for Computer Science
Lehman, Leighton, and Meyer, 2012
https://people.csail.mit.edu/meyer/mcs.pdf

2) K. Rosen, Discrete Mathematics and Its Applications, any recent edition.
3) J. K. Blitzstein and J. Hwang, Introduction to Probability, any edition
4) S. Ross, A First Course in Probability, any edition

Textbooks are not required. You don't need to buy them in order to do well in the course.

In this course, we will study combinatorics and discrete probability.

- Counting: binomial coefficients, permutations, combinations, partitions
- Recurrence relations and generating functions
- Discrete probability:
  - Events and random variables
  - Conditional probability, independence
  - Expectation, variance, standard deviation
  - Binomial, poisson and geometric distributions; law of large numbers
- Some topics from graph theory: paths, components, connectivity, Euler paths, Hamiltonian paths, planar graphs, trees

Grading

Grades will be calculated out of 100 points:

Item	Points
Homework	300
Quizzes	700

There will be around 4 homework assignments (1 per month).

There will be around 12 quizzes (1 per week).

Grade disputes must be raised within one week of grades being returned.

Late assignments are not accepted.

Schedule

Reading refers to the textbook: **"Mathematics for Computer Science" (https://rutgers.instructure.com/courses/65821/files/10783329/download?wrap=1)** **(https://rutgers.instructure.com/courses/65821/files/10783329/download?download_frd=1)** **(https://rutgers.instructure.com/courses/65821/files/10783329/download?wrap=1)** by Eric Lehman, F. Thomson Leighton, Albert R. Meyer (**CC BY-SA 3.0 (https://creativecommons.org/licenses/by-sa/3.0)**)

Week	Topic	Reading
1	Counting	LLM Ch 15
2	Counting	LLM Ch 15
3	Counting	LLM Ch 15
4	Generating functions	LLM Ch 16
5	Probability spaces	LLM Ch 17
6	Conditional probability	LLM Ch 18
7	Random variables	LLM Ch 19
8	Random variables	LLM Ch 19
9	Deviation	LLM Ch 20
10	Random walks	LLM Ch 21
11	Recurrences	LLM Ch 22
12	Directed graphs	LLM Ch 10
13	Simple graphs	LLM Ch 12
14	Planar graphs	LLM Ch 13

Course Summary:

Date	Details	Due
Sat Feb 6, 2021	Quiz 1	due by 1pm
Sat Feb 20, 2021	Quiz 2	due by 12pm
Mon Mar 8, 2021	Quiz 3	due by 12:40pm
Mon Apr 5, 2021	Quiz 4	due by 12:40pm
Thu Apr 8, 2021	Quiz 3 (1 student)	due by 4:25pm
Fri Apr 9, 2021	Quiz 4 (1 student)	due by 6:30pm
Thu Apr 15, 2021	Quiz 5	due by 12:40pm
	Quiz 5 (1 student)	due by 9:30pm
	Quiz 5 (1 student)	due by 10:45pm
Sun Apr 25, 2021	Assignment 1	due by 9:33am
Mon May 3, 2021	Quiz 6	due by 1:30pm
	Quiz 6 (1 student)	due by 9:30pm
Mon May 10, 2021	Trial	due by 10pm
	Assignment 2	
	Assignment 3	
	final_score	
	hw_final	

Date	Details	Due
	Quiz_final (%)	