Course Information

Course staff	**Office Hours**	**Room**
Professor: Sofya Raskhodnikova	Tu 1-2pm, Th 4-5pm	MCS 112
Teaching Fellow: Gavin Brown	M 3:15-4:15pm, W 2:30-3:30pm	EMA 302
Graders: Konstantinos Sotiropoulos, Xin Lu, and Laixian Wan		

Webpage: `http://cs-people.bu.edu/sofya/cs537/`

Questions and class discussion on Piazza: We will use Piazza for class discussion and course announcements. Please post all course-related questions on Piazza, rather than emailing them to us. **Top participants will get bonus points at the end of the course**. Our class page is at: `piazza.com/bu/spring2020/cs537`

Prerequisites: CS 131 (Combinatoric Structures) and CS 330 (Introduction to the Analysis of Algorithms) and a course on probability. You need to be comfortable with mathematical proofs. Most assignments in this course require proving some statement and some creativity in finding the proof will be necessary.

Lectures: TuTh 11am-12:15pm.

Discussions: The TF will run weekly discussions (interactive problem solving sessions) to help with the material.

Textbook: Michael Mitzenmacher and Eli Upfal. *Probability and Computing, 2nd edition,* 2017.

Supplementary textbook: Rajeev Motwani and Prabhakar Raghavan. *Randomized Algorithms*, 1995.

Syllabus: This course covers the design and analysis of randomized algorithms and, more generally, applications of randomness in computing. Randomness is used in designing efficient algorithms and has numerous applications in learning, cryptography, distributed systems, networking, data mining, data privacy, complexity theory and other areas of computer science. You will learn fundamental tools from probability and see many applications of randomness in computing.

The following topics and their applications will be covered: events and probability, discrete random variables and expectation, moments and deviations, Chernoff and Hoeffding bounds, balls and bins, the probabilistic method, Markov Chains and random walks, and advanced techniques.

Homework: There will be an assignment due every Friday at **noon**, to be dropped in the course HW box on the first floor of MCS (to be set up by the CS Main office). Assignments will be posted on the course web page, usually one week in advance. No late homework will be

accepted. To accommodate extenuating circumstances, your lowest homework grade will be dropped.

You are strongly encouraged to type your solutions in LaTeX. Sample LaTeXhomework files are provided on the course web page.

You should be as clear and concise as possible in your write-up of solutions. Understandability of your answer is as desirable as correctness, because communication of technical material is an important skill. A simple, direct analysis is worth more points than a convoluted one, both because it is simpler and less prone to error and because it is easier to read and understand. Points might be subtracted for illegible handwriting and for solutions that are too long.

Optional problems: Some homework assignments will include optional problems, marked by *. Later, if you ask me for a recommendation or express an interest in working on a research project with me, I will definitely check how well you did on the optional problems.

Collaboration and Honesty Policy: Collaboration on homework problems is permitted. *No collaboration whatsoever is permitted on optional problems and exams.* You must read and sign Collaboration and Honesty Policy. Please keep one copy of the handout for your records.

Violations of this policy will be dealt with according to University regulations.

Exams and Grading: The grade will be calculated as follows:

Homework	weekly	30%
Midterm	Thursday, Mar 19 in class	25% (only 21% for PhD students)
Final exam	Wednesday, May 6, 12pm-2pm	40% (only 34% for PhD students)
Class participation	lectures, discussions, piazza	5%

PhD students will be asked to help with grading. This extra work will account for 10% of their grade.