

CS442 Probabilistic Algorithms, Fall 2019

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- **Office Hours:** Thursday 2-3 (and by arrangement)
- **Course Webpage:** <http://www.cs.rutgers.edu/~steiger/442.html>
- **OBJECTIVES:** To see how notions and techniques from discrete probability can play interesting and important roles in the design and analysis of algorithms and systems in Computer Science. Specific applications taken from load balancing in distributed systems, randomized routing on arrays, randomized algorithms for graph problems and problems in computational geometry, fingerprinting, universal hash functions, zero knowledge proofs, the probabilistic method, primality testing, random number generation, more....
- **Prerequisites:** CS206 (or equiv.) and CS344 (or equiv)
- **Expected Work:** regular written homework and 2 tests. Recitations will go over lecture material and do practice problems similar to those assigned as homework.
- **References:** No text seems to cover all the intended material, and at the right level. Some course notes will be distributed. The following texts will be useful references for various parts of the course and will be on reserve via the SEC reading room.
 - “Randomized Algorithms”, R. Motwani and P. Raghavan, Cambridge, 1995 (Overlaps large fraction of the course material and has much more for later study).
 - “Probability and Computing: Randomized Algorithms and Probabilistic Analysis”, M. Mitzenmacher and E. Upfal, Cambridge, 2005; a second edition came out in 2017 (if you wanted to own one of the listed references, I might suggest THIS one).
 - “The Probabilistic Method”, N. Alon and J. Spencer, Wiley, third edition, 2007; State-of-the-art on the subject; loaded with applications, examples, methods.
 - “The Probabilistic Method (Lecture Notes)”, J. Matoušek and Jan Vondrak. These excellent notes may be more accessible and more convenient to use than the Alon-Spencer text, above. Just access [<http://kam.mff.cuni.cz/matousek/lectnotes.html>].
 - ”An Introduction to Probability Theory and Its Applications, Vol 1, 3rd Edition”, W. Feller, John Wiley, 1968 (wonderful, classic intro to probability with many interesting examples and applications).
 - “Graphical Evolution” J. Palmer, Wiley, 1985 (a text on random graphs).
 - “Algorithmic Graph Theory”, A. Gibbons, Cambridge, 1985.

NO RECITATION FIRST WEEK