

# CS444 Probabilistic Algorithms, Spring 2008

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- **Office Hours:** T 3-4; Th 12:30-1:30
- **Course Web Site:** <http://www.cs.rutgers.edu/~steiger/444.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, random number generation.
- **Prerequisites:** CS344 (or equiv: this implies CS206 or equivalent))
- **Expected Work:** regular written homework and 2 tests. A recitation (optional) will be used as help for homework and lecture material.
- **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.
  - “Randomized Algorithms”, R. Motwani and P. Raghavan, Cambridge, 1995 (Overlaps large fraction of the course and has much more for later study).
  - “Probability and Computing”, M. Mitzenmacher and E. Upfal, Cambridge, 2005.
  - “The Probabilistic Method”, N. Alon and J. Spencer, Wiley, 1992 (third edition, 2007; State-of-the-art on the subject; loaded with applications, examples, methods).
  - “The Probabilistic Method (Lecture Notes)”, J. Matoušek. These excellent notes (about 70 pages) 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 [still] 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**