Syllabus: CS 6104
Randomized Algorithms
Fall, 2015

1 General Course Information

CRN	88926
Meeting Time	3:30 PM–4:45 PM; Tuesdays and Thursdays
Classroom	McBryde 224

Instructor: Lenwood S. Heath

- **Office:** 2160J Torgersen Hall
- **Office Hours:** 9:00–11:00 Tuesdays and Thursdays
- **Email:** `heath@vt.edu`

Web Site: `http://courses.cs.vt.edu/cs6104/Fall2015/index.php`

Scholar: `https://scholar.vt.edu/portal`

Piazza: `http://piazza.com/vt/fall2015/cs6104`

Required Textbook: Probability and Computing. Michael Mitzenmacher and Eli Upfal. Cambridge University Press, 2005. ISBN: 0-521-83540-2.

2 Course Description

Randomized algorithms are an advanced topic in the theory of algorithms where probabilistic analysis and the use of randomization in the execution of algorithms play an important role. In this course, we will study discrete probability as it applies to randomized algorithms as well as particular applications of randomized algorithms.

3 Prerequisites

An undergraduate or graduate course in algorithms is required. Background in discrete probability and combinatorics is highly desirable.

4 Grading Policy

Grading for the course is on a 600-point scale, with the points distributed as follows:

Homework assignments: 6 at 100 points each	600

A typical homework assignment consists of 3 to 6 problems, posted on the course web site approximately one week before the due date.

All homework must be prepared with LaTeX[1] or other word processing system and submitted as a PDF to Scholar by 5:00 PM on the due date[2]. **No late homework will be accepted.**

5 Readings

For most classes, there is a reading assignment (see Section 8) to be completed by class time. Each assignment consists of sections or chapters in the textbook.

6 Ethics

The Honor Code applies. All work submitted must be the student's own work. Students may solicit help only from the instructor or the GTA.

7 Announcement

If any student needs special accommodations because of a disability, please contact the instructor during the first week of classes.

[1] See LaTeX resources on the course web site.

[2] See Calendar on the course web site.

8 Course Schedule

Dates	Reading Assignment	Topics
August		
8/24–8/28	Chapter 1	Events and probability
8/31–9/4	Chapters 1 and 2	Discrete random variables and expectation; Bernoulli and binomial random variables
September		
9/7–9/11	Chapter 2	Geometric distribution; coupon collector's problem; quicksort
9/14–9/18	Chapter 3	Inequalities; computing the median
9/21–9/25	Chapter 4	Chernoff bounds
9/28–10/2	Chapter 4	Packet routing in sparse networks
October		
10/5–10/9	Chapter 5	Balls and bins
10/12-10/16	Chapter 5	Hashing; random graphs
10/16	Fall Break	
10/19–10/23	Chapter 6	The probabilistic method
10/26–10/30	Chapter 6	The probabilistic method
November		
11/2–11/6	Chapter 7	Markov chains; random walks
11/9–11/13	Chapter 7	Markov chains; random walks
11/16–11/20	Chapter 10	The Monte Carlo method
11/23–11/27	Thanksgiving Break	
11/30–12/4	Chapter 10	The Monte Carlo method
December		
12/8	**Last Day of Class**	Wrap up and questions

End of Syllabus