

# Theory of Probability

## Stat 116

### Fall 2008

**Place:** Braun Lecture Hall, Mudd Chemistry Building

**Time:** Monday through Friday, 10:00am–10:50am

**Instructor:** Kevin Ross, [kjross@stanford.edu](mailto:kjross@stanford.edu), Sequoia Hall room 113

Office hours: Monday 1:45pm–2:45pm, Friday 2:30pm–3:30pm

Instructor's office hours will usually be held in Sequoia Hall room 105 (library).

#### Teaching Assistants

Rudy Angeles [rangeles@stanford.edu](mailto:rangeles@stanford.edu) Sequoia 206

Yi Fang Chen [ychen01@stanford.edu](mailto:ychen01@stanford.edu) Sequoia 216

Baiyu Zhou [zhouby98@stanford.edu](mailto:zhouby98@stanford.edu) Sequoia 232

More details will follow regarding TA office hours and sections.

**Course website:** <http://coursework.stanford.edu>

Please check the website regularly for announcements and other course materials (e.g. lecture slides, homework assignments and solutions, practice exams). If you are enrolled in the course, you should have access to the website; send an email to HelpSU if you have problems. If you are auditing the course send an email to the Instructor to get access to the website.

#### Prerequisites

Calculus (e.g. MATH 52) and some linear algebra. In particular, you will need to be comfortable with limits, infinite series, differentiation, and integration. If you do not know calculus reasonably well, do not take Stat 116; you will have a hard time following the course material, especially in the second half of the quarter. See the calculus quiz on the website to test your knowledge of the prerequisite material.

#### Required Text

Ross, Sheldon. *A First Look at Probability Theory*, 7th edition.

Read each section of the text **prior to the corresponding lecture**. See schedule below for list of course topics and tentative schedule.

#### Other References

There are many excellent texts covering probability (and/or stochastic processes) at various levels of mathematical sophistication. We list here just a few, which are comparable to the Ross text. These books are on reserve in the Math & CS Library (Building 380, 4th floor).

Grinstead & Snell, *Introduction to Probability*; available online for free

Grimmett & Stirzaker, *Probability and Random Processes*

Pitman, *Probability*

Bertsekas, *Introduction to Probability*

## Grading & Exam Schedule

Homework	25%	Roughly one assignment per week
Midterm	25%	Thursday, October 23, 10:00am–10:50am (in class)
Final	50%	Friday, December 12, 8:30–11:30am

NO MAKEUP EXAMS will be given except for serious illness, religious holidays, or family emergencies. Do not take the course if you have a conflict with the scheduled exam times. Students who miss the final will receive an automatic failure in the course. In any case, if you anticipate difficulty in taking the examination at the scheduled time, you should contact the instructor as soon as possible before the examination.

## Homework

Homework problems will be posted on the course webpage. Homework is due AT THE START OF CLASS on the due date, usually on Friday. NO LATE HOMEWORK WILL BE ACCEPTED. There will be 8 graded homework assignments. The lowest homework grade will be dropped to accommodate for emergencies, late enrollment, etc.

Collaboration is allowed in solving the problems, but each student should hand in his or her own independently written solutions. Include in your paper the names of anyone consulted for the assignment. Show all work supporting your answers. Correct answers without supporting work will not receive credit. You are strongly encouraged to see the instructor or TA's during office hours if you have questions about the homework assignments (or about the course material in general.)

**Approximate lecture schedule** (Read corresponding sections of Ross text before class)

Week beginning (Mon)	Text sections	Topics
Sept 22	1.1–1.5, 2.1–2.7	Probability spaces, combinatorics
Sept 29	3.1–3.5	Conditional probability and independence
Oct 6	4.1–4.9	Discrete random variables
Oct 13	5.1–5.7	Continuous random variables
Oct 20	6.1–6.5, 6.7, 7.4	Jointly distributed random variables
Oct 27	7.8*	Distributions related to a normal sample
Nov 3	7.5–7.7	Conditioning, moment generating functions
Nov 10	8.1–8.4*	Limit theorems
Nov 17	8.1–8.4*	Limit theorems, additional topics
Nov 24	—	Thanksgiving break
Dec 1		Additional topics and review

\* See optional texts (e.g. Grimmett & Stirzaker) for more detailed treatment than Ross text.

Additional topics (Markov chains, random walks, simulation) will be covered as time allows.