STAT 430: Probability

Department of Statistics, The Wharton School, University of Pennsylvania, Fall 2018

Time:	TTh 3:00pm-4:20pm/4:30pm-5:50pm	**Place:**	Huntsman Hall 365

Objectives: This course is an introduction to probability theory, for a diverse audience of undergraduate and graduate students. It assumes no prior knowledge of probability, only a knowledge of multivariable calculus and some mathematical maturity. The course serves as a stepping stone to many areas that rely crucially on probabilistic ideas.

Topics include: Discrete and continuous sample spaces and probability; random variables, distributions, independence; expectation and moment generating functions, limit theorems (Law of Large Numbers, Central Limit Theorem). See Table 1.

Prerequisites: Multivariate calculus: MATH 114 or MATH 115 or equivalent.

Textbook: Dimitri Bertsekas, and John Tsitsiklis, *Introduction to Probability*, 2nd ed. Athena Scientific, 2008. Errata and problem solutions: `athenasc.com/probbook.html`.

The textbook is required. Copies of the textbook are on reserve at the Lippincott Library.

Instructor:

- Edgar Dobriban, dobriban@wharton.upenn.edu, Office: 465 JMHH
  Office Hours: Thursday 2:00pm-2:50pm, 423 JMHH

Teaching Assistants:

- Yichen Wang, wangyc@wharton.upenn.edu,
  Review Session: Wednesday 5:30-7:00pm, F38 JMHH
- Sanjay Subramanian, subs@wharton.upenn.edu,
  Review Session: Thursday 6:00-7:30pm in room F92 JMHH
- Muyang (Michael) Zhou, muzh@wharton.upenn.edu,
  Review Session: Monday 4:30-6:00pm, F92 JMHH
- Han Yan, hyan99@seas.upenn.edu,
  Office Hours: Tuesday 6:00-7:30pm, G90 JMHH
- The TAs will hold weekly office hours and run weekly review sessions they will discuss the homework, and answer your course related questions. Review sessions are optional, but students find them very helpful.
- The final office hour is Dec 12. There are no TA office hours scheduled during the first week, Fall Break (including the day before Fall Break 10/3) and during Thanksgiving break (including the evening before Thanksgiving Break (11/21)).

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Table 1: Tentative schedule. This schedule is subject to change, including the topics, order of topics, and time per topic.

Topic	Sub-topics	Readings	Time
Introduction	Logistics, Examples of Probability		1 lec
Sample Spaces and Proba.	Probability Spaces, Conditional Probability,	Ch. 1.1-1.6	4-5 lec
	Independence, Counting		
Discrete Random Variables	Discrete RVs: PMF, Expectation, Joint vars,	Ch. 2.1-2.7	3-4 lec
	Conditioning, Independence		
General RVs	Continuous RVs: PDF, CDF, Expectation,	Ch. 3.1-3.6	3-4 lec
	Normal RVs, Joint RVs, Conditioning		
Further Topics on RVs	Transforms, Correlation,	Ch. 4.1-4.5	3-4 lec
	Conditional Expectation, Sums of RV		
Limit Theorems	Markov Ineq, Weak LLN, CLT, Strong LLN	Ch. 5.1-5.5	5-6 lec
Review lec	Material covered so far		3 lec

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Course Page:

- Canvas, for announcements, grades, materials: canvas.upenn.edu/courses/1421408
- Gradescope, for exams. www.gradescope.com/courses/22124. The access code will be provided on Canvas. Please sign up so that you can see your graded exams.

Homework: You are expected to always be reviewing your notes from the previous lectures and thinking about the examples that were covered in class. Additional homework problems will be assigned but not collected. Solutions will be available online. The purpose of the homework is to help you learn the material. Since this is a math class, it is important that you work through problems to test your understanding.

Exams: There will be two midterm exams and one final exam. Exams will be closed book, i.e., no books or electronic devices are allowed. Practice exams will be provided close to the exam date.

Midterm #1 ..... Tuesday, September 25, in-class
Midterm #2 ..... Thursday, November 1, in-class
Final Exam ..... Thursday, December 13th, 6pm-8pm

Grading Policy: Midterm 1 (28.3%), Midterm 2 (28.3%), Final (28.3%), Class participation (15%).

Class participation is very broad; I want you to be engaged in the class. For instance: I will ask questions during class; I will also ask for volunteers to solve problems at the board (I will assign homework problems from one class to the next). Attendance, and getting to know you, also counts.

Feedback: The teaching staff is interested to hear from you about your experience in, and suggestions for, the class.

Class Policy:

- Class structure: interactive, 5 minute break mid-class.
- Exams: Academic honesty is a hallmark of your Penn education. Cheating will result in a failing grade. Rescheduling is only possible due to serious medical problems, or religious holidays.

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