IEOR 172: Probability and Risk Analysis for Engineers – Course Syllabus

ADMINISTRATIVE INFORMATION

Instructor: Rhonda Righter **e-mail:** RRighter@IEOR.Berkeley.edu
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Office Hours: Tu/Th at 12:40 and 3:40, with priority to IEOR 172 students at 12:40 and to IEOR 166 students at 3:40, and by appointment **Office:** 4187 Etcheverry

GSI: Lillian Dong **e-mail:** lilliandong@berkeley.edu
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Reader: Rameen Saeed **e-mail:** rameensaeed@berkeley.edu
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Office Hours: M/W 1:30-2:30 (M: 4176c, W: 4176b) and by appointment **Office:** 4176B Etcheverry

Text: *A First Course in Probability* 8th Ed, 2009 S.M. Ross
Earlier or later editions ok, but you're responsible for doing the right homework problems.
Reference: Grinstead and Snell, *Introduction to Probability* https://math.dartmouth.edu/~prob/prob/prob.pdf

Prerequisites: MATH 1A-1B or 16A-16B; No credit given for IEOR 172 after STAT 134 or 140.

Class Time and Room: TuTh 11-12:30 Moffitt 101

Discussions: F 4-5 PM, 247 Cory or F 5-6 PM, 3108 Etcheverry

UC Berkeley Honor Code: As a member of the UC Berkeley community, I act with honesty, integrity, and respect for others.

In fairness to students who put in an honest effort, cheaters will be harshly treated. Any evidence of cheating on an exam will result in a score of zero (0) on that exam. Cheating on the final exam results in an "F" for the course. Cheating includes but is not limited to bringing extra notes or electronic materials into an exam, copying off another person's exam, allowing someone to copy off your exam, and having someone take an exam for you. Incidents of cheating will be reported to the Center for Student Conduct, which may administer additional punishment.

Student Accommodations: Students with disabilities who need accommodations in order to have equal access to this course will be accommodated. If you have not done so already, please contact DSP and apply for services. If you are already eligible for services, please be sure to request your accommodation letters for this class. You are welcome to visit me in office hours or to schedule an individual appointment with me via email to review your accommodations.

GRADING

Problem Sets	15 points
Midterms	30 points each
Final exam	50 points
Class participation	5 points

PROBLEM SETS

Some of the problems, on the weekly problem sets, are quite challenging. I encourage you to work in groups of three to four people, but everyone should turn in individual papers. Since doing problems is the best way to prepare for exams, be sure that you clearly understand any parts that you may have gotten help with. ***LATE PROBLEM SETS WILL NOT BE ACCEPTED.*** The lowest problem set grade will be dropped. Problem sets are turned in on gradescope.

EXAMS

There will be one midterm and a final exam. In exceptional circumstances, exams may be taken early but not late. The final will be cumulative and comprehensive. Exams will be closed book, but you may bring one formula sheet (8 ½ by 11, both sides, handwritten) for the midterm, and two for the final. The midterm may be in a different room than the regular classroom. No calculators are allowed for the exams.

Midterm:	Thursday, October 10	
Final Exam:	Wednesday, December 18	8:00-11:00

COURSE DESCRIPTION AND OUTLINE

This is an introductory probability course for students in engineering, data science, or ORMS. It focuses mostly on random variables and their applications. An important goal is to strengthen intuition about randomness and variability in the real world. Application examples may include reliability, risk analysis, inventory and logistics, computer communications, service systems, and grid computing. We'll follow the book (8th ed) fairly closely:

Introduction and Combinatorics	Chapter 1
Skip the proofs of the binomial theorem, example 5d, and section 1.6	
Probability	Chapter 2 (skip 2.6)
Conditional Probability and Independence	Chapter 3
Discrete Random Variables	Chapter 4
Continuous Random Variables	Chapter 5 (skip 5.6.2-5.6.4)
Random Vectors	Chapter 6 (skip 6.3.2, 6.3.5, 6.6-6.8)
Properties of Expectation	Chapter 7 (skip 7.2.1-2, 7.3, 7.8-9)
Limit Theorems	Chapter 8 (skip 8.6)
Poisson Process	Chapter 9, section 1

ADVICE FROM FORMER IEOR 172 STUDENTS

This course is fast-paced, so study, practice, and study! This is no joke!!

If you have never studied probability this course can turn out to be a big challenge, especially because it takes a whole semester for you to start thinking in probability terms.

If you study a lot in the beginning of the semester, and understand the basics well, the rest of the class is not that difficult.

Attend lecture!! Definitely go to lecture.

Use lectures as primary material, and use the book more as a backup resource for formulas and examples.

Start early on homework, do extra problems for exams, save your cheat sheets!

Attend class and take good notes because they're very helpful. And go to office hours!

Simply enjoy probability entering your daily life; the world will make more sense after IEOR 172.