

MATH 375LM (25988) **Introduction to Probability**

Fall, 2019      Tuesday, Thursday 10:00 –11:40am      NAC 4/115

Book: *Introduction to Probability*, by Joseph K. Blitzstein and Jessica Hwang. Officially we are using the new 2<sup>nd</sup> edition. However, the 1<sup>st</sup> edition will do as well.

Grading: There will be twenty minute quizzes every two weeks or so. The quiz average will count as 30% of the grade. There will be a single mid-term exam which will count 30% and a final exam which will count 40%. You should be warned that there are no makeups. Instead, the remaining work will simply be counted more heavily.

Please attend regularly and be on time.

Office Hours: Tuesday 12-1:50pm, Other times by appointment.

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SYLLABUS AND HOMEWORK: ([1<sup>st</sup> ed number]2<sup>nd</sup> ed number)

Chapter 1 (Probability and Counting) : Sections 1.1-1.6;

HW: 1-6, 8s, 14, 15s, 16s, [18s]19s, [21]23, [22s]24s, [29s]31s, [31s]33s, [41]43, [42]44, [43]45, [55]57.

Chapter 2 (Conditional Probability): Sections 2.1-2.7;

HW: 2s, 3-7, 13, 21, 30s, 31s, 34, [38s]39s, [47]53.

Chapter 3 (Discrete Random Variables): Sections 3.1-3.3, 3.5-3.8;

HW: 1-4, 7-10, 12, 13, 15, 16, 21s, 22, 28s, 33, 39.

Chapter 4 (Expectation): Sections 4.1-4.8;

HW: 1, 3, 6, 14-16, [17s]18s, [23]24, [25]26, [26s]27s, [27]30, [28]31, [29s]32s, [30s]34s, [35]39, [37]41, [39]43, [65s]70s.

Chapter 5 (Continuous Random Variables): Sections 5.1-5.7;

HW: 3, 4, 5, 11s, [22]20, [26]24, [31]29, [32s]30s, [33s]31s, [38s]36s, [40]37, [45]43, [46]44.

Chapter 6 (Moment Generating Functions): Sections 6.4-6.6;

HW: 13s, 14s, 15, 19, 24.

Chapter 7 (Joint Distributions): Sections 7.1-7.3, 7.5;

HW: 1, 2, 4, 7, 9, 10, 16, 17, 24s, 40, [49]50.

Chapter 8 (Gamma, Change of Variables): Sections 8.4, 8.1, 8.2.

Chapter 9 (Conditional Expectation): Sections 9.1-9.3, 9.5;

HW: 4, 6, [7s]8s, [8]9, [23s]24s, [25]26, [28]29, [32]33, [33s]35s.

Chapter 10 (Bounds and Central Limit Theorem): Sections 10.2, 10.3;

HW: [17s]21s, [18s]22s, [24]28.

The solutions of the problems with the "s" attached are posted on the Harvard Stat110 site:  
stat110.net

### . COURSE LEARNING OUTCOMES

After taking this course, the student should be able to:	Contributes to Departmental Learning Outcome(s):
1. use basic combinatorics to obtain probabilities	a. c. e. f.
2. understand and apply probability mass functions and density functions	a. b. e.
3. understand and apply the concept of expectation	a. c. e.
4. understand and apply the concept of conditional expectation.	a.c. e.
5. understand and apply moment generating functions	b. e. f. in simple cases
6. be familiar with law of large numbers and central limit theorems in basic cases.	e. f. in simple cases

### COURSE ASSESSMENT TOOLS

1. in class quizzes
2. mid-term exam
3. final exam

### DEPARTMENTAL LEARNING OUTCOMES

***The mathematics department, in its varied courses, aims to teach students to***

- a. perform numeric and symbolic computations*
- b. construct and apply symbolic and graphical representations of functions*
- c. model real-life problems mathematically*
- d. use technology appropriately to analyze mathematical problems*
- e. state (e1) and apply (e2) mathematical definitions and theorems*
- f. prove fundamental theorems*
- g. construct and present (generally in writing, but, occasionally, orally) a rigorous mathematical argument.*