

A 21-325 Probability, Spring 2020

This syllabus is subject to change.

Course: A 21-325 Probability, Spring 2020

Class info: MWF. 9:30 - 10:20am. Wean Hall 5403

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Course website: math.cmu.edu/~seyedkah/probspring2020

Course description The purpose of this course is to introduce the fundamentals of probability theory. The goal is to introduce the fundamental concepts such as events, probability spaces, random variables, expectation, independence, conditioning, discrete and continuous random variables and distributions, and distribution functions. Then we introduce various limit theorems and their applications such as central limit theorem and versions of laws of large numbers. Finally we discuss some important random processes, random walks and Markov chains and some of their applications(if time permits).

Class format The lectures will be presented on black board. Attendance is not mandatory but highly encouraged since most of the motivating material will not be found in the primary resource.

Prerequisites The students must be comfortable with calculus, and understanding and writing rigorous proofs.

Learning objectives

- Understanding basic probabilistic techniques and be able to apply them when building suitable probabilistic models for applications
- Understanding various important probabilistic concepts such as independence and conditioning
- Understand and be able to use various limit theorems such as laws of large numbers and central limit theorem.

Resources I will use a variety of books and lecture notes for this course. The first item is used as the primary resource, however, many extra motivating applications and examples will be given in lectures.

1. Probability. An introduction, Geoffrey Grimmet and Dominic Welsh. *Available on CMU's online library.*
2. An Introduction to Probability Theory and Its Applications, William Feller
3. Probability and Random Processes, Ramon van Handel
4. Probability Theory with Applications, David Pollard

Homework There will be a new homework almost every week. Homework assignments can be solved individually, or in groups of 2 or 3 (you can form a different group for every assignment). However, every individual should write their own solution several hours after group discussions, and list their group members. It's highly encouraged to type your solutions in $\text{L}^{\text{A}}\text{T}^{\text{E}}\text{X}$, however, clear and legible handwritten solutions are also accepted. *You should upload your homework to Gradescope before its due date.* Late homework submissions are not allowed.

Online platforms

- **Piazza:** We use Piazza platform as a discussion environment. Students are welcome to ask/answer questions.
The class link is: piazza.com/cmu/spring2020/mcs21325/home
If you're not already signed up, you can use the following sign-up link: piazza.com/cmu/spring2020/mcs21325
- **Gradescope** Grade scope is used to grade homeworks and midterms and final exam.

Assessment There will be homework most weeks, two midterms, and a final.

Your raw grade will be computed as follows.

1. 35% Homework (lowest homework grade will be dropped.)
2. 20% Midterm with higher grade
3. 15% Midterm with lower grade
4. 30% Final

Your final grade will be computed as follows.

A	A-	B+	B	C+	C	D
92	89	84	80	75	70	60

Important dates

January 13	M	First day of classes
January 20	M	Martin Luther King Jr. Day; No Classes
January 27	M	Course Add Deadline
January 27	M	Course Drop Deadline to Receive Tuition Adjustment
February 24	M	Course Drop Deadline
March 2	M	9:30-10:20am Midterm I
March 6	F	Mid-Semester Break; No Classes
March 9	M	Mid-Semester Grades Due by 4 pm
March 9-13	M-F	Spring Break; No Classes
March 30	M	Course Withdrawal Grade Deadline
April 13	M	9:30-10:20am Midterm II
April 16	Th	No Classes
April 17-18	F, Sa	Spring Carnival; No Classes
May 1	F	Last Day of Classes

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