

MATH 3100: PROBABILITY

FALL 2014

LAST UPDATE: SEPTEMBER 3, 2014

Class: Monday, Wednesday, Friday: 11:00 am — 11:50 am, Ruffner Hall G006

Instructor: Leonid Petrov

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Office hours: Monday, Wednesday: 09:00 am — 10:30 am

or by appointment (I encourage you to make as many appointments as you need if you have a scheduling conflict with my official hours. The preferred way to make them is by email.)

Description: The MATH 3100 course introduces fundamental concepts, ideas, and techniques of probability theory:

- Basic properties of probability spaces
- Elementary combinatorics
- Discrete random variables: distributions, means, standard deviations
- Continuous random variables in one and multiple dimensions
- Independence, conditional probability and conditional expectation
- Law of Large Numbers
- Central Limit Theorems
- Poisson processes
- Markov chains
- Characteristic and generating functions

Prerequisite: Students should have at least one semester of calculus.

Textbook: “Probability” by Jim Pitman

Students are strongly encouraged to read the text. It includes many examples and extra exercises which augment the concepts discussed in the course.

The best way to learn the subject it is to do the homework problems every week. Please ask me questions about things you do not understand, either in class or in my office. DON'T wait until you feel completely lost!

Grading:

Homeworks will be assigned each week, but not collected. There will be several in-class quizzes (one in 2-3 weeks), a midterm and a final exam. Quizzes are 20-25 in-class exams based on assigned problems from homework. They will be announced in advance in class.

Grade distribution:

- 10% class participation
- 30% quizzes
- 25% midterm
- 35% final

Starred exercises:

There will be a number of optional “starred exercises” (up to 5) given in the lectures. Solution of each of them (turned in written form within two weeks of having appeared in lecture) will give 2% towards class participation grade. (You can also earn class participation grade in usual ways, too: class presence, active involvement by asking and answering questions in class, emailing good questions, filling up evaluations at the end of the course.)

Solution to starred exercises must be completely correct: there will be no partial credit. You are encouraged to work on exercises together, but you must write up solutions independently. In particular, you should not consult others during the process of writing down your solution.

Write-ups of starred exercises must be completely correct with complete detail. If you use a random variable or event not given in the statement of the problem, you must first define that random variable or event. If you have to say something that is not a mathematical expression, say it in complete English sentences. Most successful write-ups will take some time to get on the page.

Work that is illegible, or missing key details, will not receive credit. Remember that each of these exercises can add 2% to your grade – do them right! If you have questions about these exercises, feel free to ask.

Approximate course schedule:

week 1. 8/27, 8/29 — §§1.1, 1.3
week 2. 9/1, 9/3, 9/5 — §§1.4, 1.5, 1.6, 2.1
week 3. 9/8, 9/10, 9/12 — §§2.2, 2.4, 2.5
week 4. 9/15, 9/17, 9/19 — §§3.1, 3.2
week 5. 9/22, 9/24, 9/26 — §§3.3, 3.4
week 6. 9/29, 10/1, 10/3 — §3.5
week 7. 10/6, 10/8, 10/10 — §4.1
week 8. 10/15, 10/17 — §4.2
week 9. 10/20, 10/22, 10/24 — §4.4
week 10. 10/27, 10/29, 10/31 — §4.5
week 11. 11/3, 11/5, 11/7 — §§5.1, 5.2
week 12. 11/10, 11/12, 11/14 — §§5.3, 6.1
week 13. 11/17, 11/19, 11/21 — §§6.2, 6.3
week 14. 11/24 — §6.4
week 15. 12/1, 12/3, 12/5 — §6.5

No classes: 10/13, 11/26, 11/28

Last class: 12/5

Add/drop information: <http://www.virginia.edu/registrar/reginsthowfall2014.html>

Midterm exam: tentatively scheduled for **10/17**

Final exam: 12/12, 9:00am, Ruffner Hall G006

Do not make travel plans that conflict with either midterm or final exam!

Additional course support: The Math Department Tutoring Center is available for helping students in this course: see <http://pi.math.virginia.edu/~dmg4c/mthtutor.html> for more information and schedule. In addition, the Math Study Lounge is open most days for help.