STOR 435.2 (Math 535.2): Introduction to Probability Fall, 2016

Course goals and key learning objectives: The main goal of this course is to provide students with the fundamentals of probability theory that are necessary for more advanced courses in STOR, MATH, CS and other disciplines, and that can be used by students as a foundation for future research or other work in Statistics, Actuarial Science, Machine Learning, Analytics, Applied Mathematics and other areas.

Target audience: Students in Mathematical Decision Sciences, Mathematics, Computer Science, Physical Sciences and other majors and minors.

Place and Time: Hanes 120, Tuesday & Thursday, 12:30-1:45PM.

Instructor: Vladas Pipiras, Professor in the Department of Statistics and Operations Research; office: Hanes 305; e-mail: pipiras@email.unc.edu; phone: 843-2430.

Instructor office hours: Monday 8:00-9:30AM, Wednesday 9:30-11:00AM. If contacting me by e-mail, please start the Subject line with "Stor 435:", e.g. Subject: Stor 435: Homework 2.

Instructional assistant: Haipeng Gao, Xi Yang, and Chen Xing; offices: Hanes B4, B7, and B52 (Hanes basement); e-mails: gaoh@live.unc.edu, xiyang@live.unc.edu, and chenxing@live.unc.edu. **Instructional assistant office hours:** schedule posted on Sakai.

Course requirements: Your performance in the class will be assessed based on homework, quizzes and exams. Here are some tips to succeed in the course: ask questions and participate in class discussions; take advantage of the office hours; review lecture slides and textbook material after each class; set aside enough time to work on homework; prepare well for quizzes and exams; work on self-test problems and exercises in the textbook.

Homework: Unless announced otherwise, homework will be assigned every class. The homework assigned on Thursday will be due the Tuesday after, and that assigned on Tuesday will be due Thursday. You can bring your homework to class or leave it in my mailbox by 12:15PM of the due day. Any questions regarding homework grading should be discussed first with the instructional assistant (assigned to grade according to the schedule posted on Sakai). Each homework assignment will carry an equal weight.

I am aware that there are solution manuals freely available online to many problems from the various editions of the textbook, as well as answers to selected problems in the textbook itself. I will therefore often modify the textbook exercises assigned for homework.

Exams: There will be two in-class Midterm Exams and a Final Exam. The Final Exam is scheduled on December 9, Friday, at 12:00PM. Midterm I will take place on October 4, Tuesday and Midterm II will take place on November 8, Tuesday.

Quizzes: After finishing each chapter of the textbook, I will give a short 10 min quiz in the following class. There will be 8 quizzes in total (see the tentative schedule at the end of the syllabus) and they will carry equal weight. They will focus on the conceptual understanding of the notions introduced in the chapter (as opposed to problem solving as in homework and exams).

Grades: Homework 25%; Midterm Exams 20% each; Final Exam 25%; Quizzes 10%. All grades will be posted on Sakai. The (adjusted) score on the Final exam will replace the lowest midterm score in the final grade calculation, if the lowest midterm score turns out to be smaller than the (adjusted) Final exam score. If your total is above 90 you are assured an A- or an A. If you get above 80 you are assured of a B-, B, or B+ etc. I reserve the right to curve grades using more generous cutoffs depending on the overall performance of the class.

Course policies: Late homework will not be accepted (with the exception discussed below) and missed homework will receive a score of zero. But the lowest homework score (possibly zero) will be dropped in the calculations of the final grade. If you leave your homework in my mailbox after 12:15PM on the due day, I will ask the grader to divide the received score by half. If it happens again, then the homework will not be graded and will receive a score of zero. Likewise, there will be no make-up quizzes but the lowest quiz score (possibly zero) will be dropped. There will also be no make-up exams (with the usual exceptions of the dean's permission for the Final, a doctor's note for the midterms, etc).

Course website: The course website is at http://sakai.unc.edu. Homework assignments, announcements, grades and other information will be posted there. Skeleton lecture slides will also be posted on Sakai by 3PM on the day before each class. These slides can be printed or opened on a tablet to make notes in class.

Textbook: *A First Course in Probability* by S. Ross, 9th edition. This is a required textbook. We will cover most of Chapters 1-8 of the textbook. If you have earlier editions, you should be fine. The contents vary little between the 9th and earlier editions. Note, however, that the assigned homework problems will be based on those from the new edition and there is some difference in the collection of problems among the various editions. It will be your responsibility to make sure that you are dealing with the right problems.

Prerequisites: The official prerequisite for the course is Math 233. I will therefore suppose that you are familiar with calculus, including the calculus of several variables. See also the tentative schedule at the end of the syllabus for when calculus will start being used.

Honor Code: All students must be familiar with and abide by the Honor Code, which covers issues such as plagiarism, falsification, unauthorized assistance, cheating, and other grievous acts of academic dishonesty. Violations of the Honor Code will not be taken lightly.

Syllabus changes: I reserve the right to make changes to the syllabus, due dates and test dates, when unforeseen circumstances occur. These changes will be announced as early as possible so that students can adjust their schedules. (See also the "last modified" date at the bottom of the page.)

Tentative schedule:

Aug 25 (Th): Lecture 1 (combinatorics I), Hw 1
Aug 30 (Tu): Lecture 2 (combinatorics II), Hw 2, Hw 1 due
Sep 1 (Th): Lecture 3 (axioms of probability I), **Quiz 1**, Hw 3, Hw 2 due
Sep 6 (Tu): Lecture 4 (axioms of probability II), Hw 4, Hw 3 due
Sep 8 (Th): Lecture 5 (axioms of probability III), Hw 5, Hw 4 due
Sep 13 (Tu): Lecture 6 (cond. probability/independence I), **Quiz 2**, Hw 6, Hw 5 due
Sep 15 (Th): Lecture 7 (cond. probability/independence II), Hw 7, Hw 6 due
Sep 20 (Tu): Lecture 8 (cond. probability/independence III), Hw 8, Hw 7 due
Sep 22 (Th): Lecture 9 (random variables I), **Quiz 3**, Hw 9, Hw 8 due
Sep 27 (Tu): Lecture 10 (random variables II), Hw 10, Hw 9 due
Sep 29 (Th): Lecture 11 (random variables III), Hw 11, Hw 10 due
Oct 4 (Tu): **Midterm 1** (based on Lectures 1-8, Hws 1-8)
Oct 6 (Th): Lecture 12 (random variables IV), Hw 12, Hw 11 due
Oct 11 (Tu): Lecture 13 (cont. random variables I)*, **Quiz 4**, Hw 13, Hw 12 due
Oct 13 (Th): Lecture 14 (cont. random variables II), Hw 14, Hw 13 due
Oct 18 (Tu): *No class, office hours*
Oct 20 (Th): *Fall Break*
Oct 25 (Tu): Lecture 15 (cont. random variables III), Hw 15, Hw 14 due
Oct 27 (Th): Lecture 16 (jointly distributed variables I)**, **Quiz 5**, Hw 16, Hw 15 due
Nov 1 (Tu): Lecture 17 (jointly distributed variables II), Hw 17, Hw 16 due
Nov 3 (Th): Lecture 18 (jointly distributed variables III), Hw 18, Hw 17 due
Nov 8 (Tu): **Midterm 2** (based on lectures 9-15, Hws 9-15)
Nov 10 (Th): Lecture 19 (properties of expectation I), **Quiz 6**, Hw 19, Hw 18 due
Nov 15 (Tu): Lecture 20 (properties of expectation II), Hw 20, Hw 19 due
Nov 17 (Th): Lecture 21 (properties of expectation III), Hw 21, Hw 20 due
Nov 22 (Tu): Lecture 22 (properties of expectation IV), Hw 22, Hw 21 due
Nov 24 (Th): *Thanksgiving*
Nov 29 (Tu): Lecture 23 (limit theorems I), **Quiz 7**, Hw 23, Hw 22 due
Dec 1 (Th): Lecture 24 (limit theorems II), Hw 24, Hw 23 due
Dec 6 (Tu): Review, **Quiz 8**, Hw 24 due

Dec 9 (Fr, 12PM): **Final** (cumulative)

* Single variable calculus starts being used
** Multivariable calculus starts being used

Syllabus last modified: August 22, 2016