## Probability MA 485/585-1C Fall 2011

Class meets on Mon/Wed/Fri at 10:00am until 10:50am in Room 315 BEC

Instructor: Dr. Nikolai Chernov
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Office hours: MWF 11:00-11:45am, and by appointment; walk-ins are welcome
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There is **no required textbook** for this course. Students should print **class notes** from the instructor's web page (see the back of this flyer).

Grading policy: (One of two schedules that yields a better grade for you)

Homework	10~%	or $0\%$
Midterm Test I (Sep 26)	30~%	30~%
Midterm Test II (Oct 31)	30~%	30~%
Final Exam (Dec 14, 8:00-10:30)	30~%	40~%

**Homework:** The list of homework exercises and due dates will be posted on the instructor's web page. You need to submit your homework on the due date in class (or put it in the plastic bin on the wall near the instructor's office). No late homework. Corrected and graded HW will be returned at the next class meeting. Homework is **not mandatory**. If you turn the HW regularly and the schedule #1 above gives you a better grade, it will be automatically applied. Otherwise, your HW scores (if any) will be dropped and the schedule #2 will be applied. It is advised that you do homework as often as possible, for your practice, even if you cannot do it regularly for credit. Exercises marked as Bonus and Graduate can be attempted for extra credit.

**Tests:** All tests in this course are open-notes. You may use a calculator, and most likely you will need one, so bring one with you. You may also use a laptop or an iPad.

To 585 students: You are taking this course at a graduate level! You will need to do all homework exercises marked as Graduate (some of them require reading Chapter 18 from the class notes, which is marked for graduate students). Unlike regular homework assignments, the graduate exercises are **mandatory** for 585 students. They will make 15% of your course grade, the rest will be rescaled to 85%. The graduate homework problems can be turned in any time before (or on) the final exam. <u>Important</u>: after your graduate work is graded and returned to you, you can correct your solutions and resubmit your work for a better credit (there is no limit or penalty for resubmissions, but there is a deadline: the final exam). If, in the end, you do correctly 25 out of 28 graduate exercises, you will get full credit for this part of the course. If you do more, you'll get extra credit.

## Syllabus and tentative schedule

Chapters of the class notes	Dates
1. Combinatorics	Aug 17, 19, 22
2. Probability space	Aug 22, 24, 26
3. Conditional probability and independence	Aug 29, 31, Sep 2
4. Discrete random variables	Sep 7, 9, 12
5. Continuous random variables	Sep 14, 16, 19
6. Exponential random variables	Sep 21, 23
<b>Test - 1</b> (covers topics $1-5$ )	Sep $26$
7. Functions of random variables	Sep $28, 30$
8. Normal random variables	Sep $30$ , Oct $3$ , $5$
9. Joint distributions	$Oct \ 7, \ 10, \ 12$
10. Mean value	Oct 17, 19
11. Variance	Oct 21, 24
12. Moment generating function	Oct 26, 28
<b>Test - 2</b> (covers topics $6-11$ )	Oct 31
13. Covariance and correlation	Nov $2, 4, 7$
14. Law of Large Numbers	Nov 7, 9
15. Central Limit Theorem	Nov 11, 14, 16
16. Random walks	Nov 18, 21, 28, 30
17. Poisson process	Dec 2, $5$
Final Exam	Dec $14$

Final Exam covers topics 12–17 and some selected topics from the 1-11 range (to be announced later in class).

Regular class attendance is very important and strongly encouraged. The instructor will follow the class notes, so if you have to miss a class, study the notes thoroughly.

Class notes are available on the instructor's web page:

http://www.math.uab.edu/~chernov/teaching/teach.html You should print them and use them. Also, homework assignments, due dates, past tests (some with answers), helpful calculators, and more are posted on this web page.

If you would like to use a book, in addition to the class notes, you can buy one, check one from a library, or borrow one from the instructor. Here are suggested books:

S. Ross, A First Course in Probability, Prentice Hall

S. Ghahramani, *Fundamentals of Probability, with Stochastic Processes*, Prentice Hall The former is simpler and more elementary, the latter is more sophisticated.