DEPARTMENT OF MATHEMATICS, NORTHEASTERN UNIVERSITY

MATH 4581: STATISTICS AND STOCHASTIC PROCESSES

SPRING 2013

Class: Monday, Wednesday, Thursday; 1:35 pm — 2:40 pm; **210 Shillman Hall**
Instructor: Leonid Petrov
Office: 433 Lake Hall; phone 617-373-3893
email: l.petrov@neu.edu (preferred), lenia.petrov@gmail.com
Course webpage: on Blackboard

Office hours: Wednesday, Thursday: 09:30 am — 11:00 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.)

Textbooks: 1. "Introduction to Probability", C. M. Grinstead and J. L. Snell. Available free of charge at `http://www.dartmouth.edu/~chance/teaching_aids/books_articles/probability_book/book.html`
2. "An Introduction to Mathematical Statistics and its Applications", R. Larsen and M. Marx, fifth edition. (published by Prentice Hall).
It is absolutely not required that you purchase this second book.

Homeworks and quizzes: There will be several in-class quizzes and tests.

Homework problems will be assigned each week.

Snow days: If classes are cancelled due to snow, or for other official reasons, any scheduled test/quiz will occur on the next class meeting.

LEARNING:

- The best way to learn this material is to do the homework problems every week. Please ask me questions about things you don't understand, either in class or at my office. DON'T wait until you feel completely lost!
- This is a Calculus-based course, and assumes a working knowledge of single-variable calculus as well as some acquaintance with multi-variable calculus (including multiple integration). The knowledge of matrices is also helpful in some parts of the course.

Grading: The course numerical grade will be determined by the formula

$$\mathbf{Max}\big(0.4 \times \text{final} + 0.6 \times \text{semester work}; \quad 0.5 \times \text{final} + 0.5 \times \text{semester work}\big)$$

Letter grade is determined from the numerical grade as follows:

$$
\begin{array}{lll}
& A > 92, & 92 \geq A- > 89, \\
89 \geq B+ > 86, & 86 \geq B > 82, & 82 \geq B- > 79, \\
79 \geq C+ > 76, & 76 \geq C > 72, & 72 \geq C- > 69, \\
69 \geq D+ > 66, & 66 \geq D > 62, & 62 \geq D- > 59, \\
& F \leq 59. &
\end{array}
$$

Numerical grades may be curved before letter grades are assigned.

IMPORTANT:

CALCULATORS: Allowed throughout classes, quizzes and exams. You should ask the instructor for a permission to use a calculator in your smartphone during quizzes and exams.

COMPUTERS, CELL–PHONES: These must be turned off during the class. Exception is made for reading the PDF of the textbook.

CHANGES IN THE SYLLABUS: It is your responsibility to be aware of any changes the instructor may make to the syllabus as they are announced in class, or as posted on the course webpage. Students are responsible for all information given when they are absent.

ISSUES: If you have a concern about the course or the instructor that is not or cannot be resolved by speaking with the instructor, the next step is to contact Professor Tom Sherman (Undergraduate Director), 455LA, x2785, t.sherman@neu.edu.

ACADEMIC HONESTY: The Northeastern University's Rules of Academic Honesty and Integrity apply to this course. Cheating in this class includes (but is not limited to): looking at the papers of others during a quiz or test, talking to other students during a quiz or test, using a mobile electronic device to acquire information during a test. All incidents of cheating will be reported to OSCCR (the Office of Student Conduct and Conflict Resolution).

For more information please see `http://www.northeastern.edu/osccr/academichonesty.html`

INCOMPLETE GRADE: The grade I (Incomplete) will be given only if you have a good attendance record, have missed the Final for a good reason, and otherwise you are doing passing work. Incomplete grade is given at discretion of instructor.

CHANGE OF GRADES: It is University policy that no grade, including an incomplete, can be changed after one year. Exceptions must be authorized by the Academic Standing Committee.

TRACE EVALUATION: It is expected that every student will complete the TRACE evaluation as part of the course.

FINAL EXAM TRAVEL PLANS: It will not be possible to change the time and date of the final exam. So, all students without legitimate conflicts (approved by the instructor) will take the final exam at the scheduled date and time. Go to `http://www.registrar.neu.edu/finexsched.html` to see the dates of your final exam. **Do not make travel plans that conflict with the final exam**.

IMPORTANT DATES:
- The last day to drop a course without a W grade is Monday January 28.
- The last day to file a Final Exam Conflict Form is January 29.
- The last day to drop a course with a W grade is Tuesday April 2.

<u>Course description:</u>

Continues topics introduced in MATH 3081. The first part of the course covers classical procedures of statistics. The second part provides an introduction to stochastic processes with emphasis on Markov chains, random walks, and Brownian motion, with applications to modeling and finance. Prereq. MATH 3081.

<u>List of Topics:</u>

a. Review: Probability. Random variables. Classical statistical problems.
b. ANOVA.
c. Regression Models. Linear Regression.
d. Stochastic processes.
e. Queues. Poisson processes.
f. Markov processes.
g. Brownian motion.
h. Stocks. Black-Sholes.