Course Syllabus-Fall, 2013
Introduction to Stochastic Processes
STAT-GB.3321/STAT-UB.0021
Tuesday: 6:00-9:00 pm

Instructor:                        Professor Halina Frydman
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Office hours:                    Tuesday: 4:30-5:30 pm and by appointment

Grader:
E-mail:

Course Outline:
This is an introductory course in stochastic processes. The course covers basic
time of discrete and continuous Markov chains, martingales and Brownian motion with
its generalizations. The discussion of Markov chains includes statistical aspects of these
processes. If time permits, the idea of stochastic integration is introduced and rules of
stochastic calculus are developed. The topics are covered in the following order:

1  Discrete time Markov chains
2  Continuous time Markov chains
3  Discrete time martingales
4  Brownian motion and its generalizations
5  Elements of stochastic calculus
Prerequisites
The prerequisites for the course are Calculus I and a course in probability theory.

Texts

Lecture Notes

Topics and Readings:

- Discrete time Markov chains
  Ross: 4.1-4.6
  Lecture Notes: Chapter 1
- Continuous time Markov chains
  Ross: 5.3.1-5.3.4
  Ross: 6.1-6.5 and 6.8
  Lecture notes: Chapter 2
- Discrete time martingales
  Lawler: 5.1-5.3
  Lecture Notes: Chapter 3
- Brownian Motion and its generalizations
  Ross: 10.1-10.3
  Lecture Notes: Chapter 4
- Elements of stochastic calculus with finance applications
  Lawler: 9.1-9.3
  Lecture Notes: chapter 5

The following additional texts are useful references to topics covered in the course. In particular the third and the fifth topics of the course will use the material from Lawler. The remaining references sources of many interesting examples of Markov processes studied in the course.

**Grading**

There will be an in-class midterm, final exam and weekly homework assignments.

- Homework (weekly) 30%
- Midterm (November 6) 35%
- Final Exam (December 18) 35%

**Classroom norms**

Laptops, cell phones, smart phones and other electronic devices must be turned off prior to the start of each class meeting.

Class Attendance is mandatory. Absences may be excused only in the cases of documented illness, family emergency, religious observance or civic duty. If you will miss the class for religious observance or civic duty you must inform your instructor no later than the first week of class.

Students are expected to arrive to class on time and stay to the end of the class period.

**Academic Integrity**

Integrity is critical to the learning process and to all we do here at NYU Stern. All undergraduate students are expected to follow the Stern Code of Conduct [http://www.stern.nyu.edu/uc/codeofconduct](http://www.stern.nyu.edu/uc/codeofconduct), which includes a commitment to:

- Exercise integrity in all aspects of one’s academic work including, but not limited to, the preparation and completion of exams, papers and all other requirements or means that provides an unfair advantage.
- Clearly acknowledge the work and effort of others when submitting work as one’s own. Ideas, data, direct quotations, paraphrasing, creative expression, or any other incorporation of the work of others must be clearly referenced.
- Refrain from behaving in ways that knowingly support, assist or in any way attempt to enable another person to engage in any violation of the Code of Conduct. You have an obligation to report any observed violation.

**Students with Disabilities**

Students whose class performance may be affected due to a disability should notify the professor immediately so that arrangements can be made in consultation with the Henry and Lucy Moses Center for Students with Disabilities [http://www.nyu.edu/csd/](http://www.nyu.edu/csd/) to accommodate their needs.