MATH-60070 and MATH-70070 Financial Mathematics
Spring 2006. Professor Oana Mocioalca
Clasroom and time: MSB 158, 5-7:30PM
Office: MSB 308, Tentative Office Hours: T: 4:15-5PM, W: 2-3:15 and 4:15-6PM, or by appointment
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Textbooks:
• (Main textbook) "Arbitrage theory in continuous time", Tomas Bjork, Oxford U.P., 1998
• (Secondary textbook) "Introduction to mathematical finance : discrete time models" Stanley R. Pliska, Blackwell Publisher, 1997.

Suggested additional reading:
• Financial calculus : an introduction to derivative pricing, Martin Baxter, Andrew Rennie., 1996
• The mathematics of financial derivatives. A student introduction. P. Wilmott, S. Howinson, J. Dewynne. Cambridge U.P. 1995. *For people who want to see the effect of transaction costs*
• Options, futures and other derivative securities, John Hull, Pretince-Hall, 1992
• Introduction to Stochastic Calculus Applied to Finance. D. Lamberton, B. Lapeyre. Chapman Hall/CRC Press, 1996. *For people who want more math than we will be doing*
• Implementing derivative models. L. Clewlow, Ch. Strickland. John Wiley and Sons, Ltd., 1998, *For people who want more numerical applications*

Prerequisites and suggested preparation:
• A graduate introduction to probability theory (no measure theory needed): MATH 4/50011 or something equivalent.
• Calculus of several variables
• Differential equations

Grading scheme
• Monthly quizzes (5 of them), averaged: 40%
• Homework assignments, averaged: 15%
• Class project 15%
• Final exam 30%

Quizzes
Every 3 weeks or so, a 45-minute in-class quiz will test your grasp on the

material covered in class from the last quiz. Some quizzes might me more comprehensive. You will not be allowed to use textbooks, notes, or any other aid during the quizzes. See the note bellow about plagiarism[1], which will not be tolerated.

Class project:

You will be required to turn in one class project/paper. Project topics will be taken from the textbook's later chapters and associated exercises, from suggested readings and their associated exercises or from other sources (with the instructor's accord) and will be due in the last 3 weeks of class.

Homework:

Homework problems will be assigned and collected and graded approximately bimonthly (the weeks there is no quiz). While it is acceptable to work in groups on homework, each student must turn in a separate assignment; identical solutions are NOT acceptable. Your homework must reflect YOUR understanding of the material.

Final Exam

Final exam will be comprehensive. Signs of collaboration or plagiarism[1] will be dealt with harshly.

Outline of the course
- Review of the stochastic integral (Chap. 4)
- Stochastic differential equations (Chap. 5)
- Arbitrage pricing (Chap. 6 and 7)
- Black-Scholes hedging (completeness, Delta-hedging, and incompleteness), (Chap. 8-15)
- Continuous time models for Foreign Exchange
- Discrete models (binomial) (secondary textbook)

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[1]Plagiarism is the act of presenting someone else's work as your own. This includes finding the answer of a given problem in a book, in someone else's assignment, and copying it. Plagiarism in a mathematical assignment is very easy to detect as a correct solution to a mathematical problem is almost never unique.