Fall 2004: IEOR E4706 Financial Engineering: Discrete-Time Asset Pricing
Columbia University

Syllabus and Course Logistics

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Course Website: www.columbia.edu/∼mh2078/FE04.html

Class Time: Tuesdays: 4.10pm to 6.40pm

Location: Mudd 535

Prerequisites

1. SIEO W4606: Stochastic Processes for Financial Engineering
2. IEOR E4007: Optimization Models and Methods for Financial Engineering

Textbooks There are no required textbooks for the class as course notes will be provided. *Investment Science* by David Luenberger is a recommended text that might provide useful background reading. However, the course itself will be at a considerably more advanced level than Luenberger's text. Other relevant references include

1. *Introduction to Mathematical Finance* (Blackwell Publishers) by Stanley R. Pliska.
2. *Introduction to the Economics and Mathematics of Financial Markets* (MIT Press) by Jakša Cvitanić and Fernando Zapatero.
3. Steve Shreve's *Lectures on Stochastic Calculus and Finance*.

Assignments
There will be 6 to 8 assignments, due in class one week after they have been assigned. Late assignments will NOT be accepted! Students are welcome to work together on the assignments but each student MUST write up his or her own solution.

Exams
A midterm exam will be held on October 26^{th} and the final examination will PROBABLY be held in finals week. Any student who is unable to take an exam must have a very good reason for doing so, e.g., a medical emergency. Such students will take

a makeup exam that will be MORE difficult than the regular exam.

Exam regrades may be requested by:

1. Explaining in a written statement why you think you should obtain more marks.
2. Submitting this statement and the exam to either the TA or course instructor no later than one week after the exam was returned to the class. (This means that if you failed to collect your exam within a week of it being returned to the class, then you cannot request a regrade!)

It should be kept in mind that when a regrade is requested the entire exam will be regraded and it is possible that your overall mark could go down as well as up. We will also photocopy a subset of the exams before returning them to the class. This is intended to deter the very few people (hopefully there are no such peoople in this class!) who might be tempted to rewrite parts of their exams before requesting a regrade.

Grading
An *approximate* overall grading scheme is: Assignments 10%, Midterm 35%, Final 55%.

Syllabus and Tentative Course Schedule

- Lecture 1: Course overview; Deterministic cash-flows
- Lecture 2: Deterministic cash-flows
- Lecture 3: Forwards and swaps
- Lecture 4: Futures markets and their mechanics
- Lecture 5: Martingale Pricing
- Lecture 6: Martingale Pricing
- Lecture 7: Martingale Pricing
- Lecture 8: Applications: (i) The Binomial Model (ii) Forwards and Futures
- Lecture 9: American options; Introduction to real options
- Lecture 10: Dynamic Portfolio Optimization
- Lecture 11: Term Structure Models
- Lecture 12: Term Structure Models
- Lecture 13: To be decided