IEOR E4710 Term Structure Models: Spring 2010
Columbia University

Syllabus and Logistics

Instructor: Martin Haugh
332 S.W. Mudd Building
Department of Industrial Engineering and Operations Research
Email: martin.haugh@columbia.edu
URL: www.columbia.edu/∼mh2078/

Teaching Assistant: < @columbia.edu >

Course Website: All course material will be posted on CourseWorks

Class Time: To be confirmed.

Location: 303 S.W. Mudd

Prerequisites

1. IEOR E4707 Financial Engineering: Continuous-Time Models
2. IEOR E4703 Monte Carlo Simulation

Textbooks There are no required textbooks for the class. However, the course lectures and lecture notes will often draw from these recommended texts: sources.

1. *Interest Rate Models: An Introduction* (Princeton University Press) by Andrew J.G. Cairns. (A relatively inexpensive text that provides a nice introduction to interest rate modelling at the MS level.)
2. *Interest Rate Models: Theory and Practice* (Springer Finance) by Damiano Brigo and Fabio Mercurio. (One of the "bibles" on interest rate modeling, more of a PhD or reference text than a course text.)
3. *Monte Carlo Methods in Financial Engineering* (Springer) by Paul Glasserman. (While the focus is on Monte Carlo, there is a lot of very useful and well written material on term structure models here.)

Other good references include

- *Volatility and Correlation* (Wiley) by Riccardo Rebonato. (The interest rates component of this book covers market models extensively.)
- *Stochastic Calculus for Finance II: Continuous-Time Models* (Springer) by Steven E. Shreve. (An excellent text for finacial engineering in general.)

- *Fixed Income Securities* (Wiley Finance) by Lionel Martellini, Philippe Priaulet and Stephane Priaulet. (This is a particularly good text with a lot of excellent background and product material. The material is covered at an advanced MBA / MS level.)
- *Fixed Income Securities* (Wiley Finance) by Bruce Tuckman. (A nice text with good background and product material. It also includes a number of case studies and examples that demonstrate how much of the theory is used in practice. It does not cover the more advanced models such as HJM and market models.)
- *Investment Science* (Oxford University Press) by David G. Luenberger. (Much of the material on lattice models draws from this source.)

Assignments
There will be approximately 6 assignments that must be submitted on the due date. 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
There will be a midterm and a final examination. 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 people in this class!) who might be tempted to rewrite parts of their exams before requesting a regrade.

Grading
An *approximate*, but by no means definitive, grading scheme is: Assignments 10%, Midterm 35%, Final 55%.

1. Week 1: Lattice Models I
2. Week 2: Lattice Models II
3. Week 3: Review of Stochastic Calculus
4. Week 4: Single-Factor Models
5. Week 5: Single-Factor Models
6. Week 6: Multi-Factor Models
7. Week 7: Monte-Carlo Simulation
8. Week 8: Midterm Exam
9. Week 9: Heath-Jarrow-Morton Models
10. Week 10: Heath-Jarrow-Morton Models
11. Week 11: Market Models
12. Week 12: Market Models
13. Week 13: Market Models
14. Week 14: To be decided