The Universty of Texas at Austin
McCombs School of Business

Lorenzo Garlappi Spring 2008

# Syllabus — Financial Risk Management— FIN377.2

This syllabus describes the policies and the procedures for this course. Please read it.

## 1 General Information

**Meeting Place and Time:**
CBA 4.348, Tuesdays & Thursdays, 8am-9:30am (03085), 9:30am-11am (03090)

**Instructor:**

Lorenzo Garlappi
Email: `lorenzo.garlappi@mccombs.utexas.edu`
Office Hours: Tuesdays & Thursdays, 2pm-3pm
Office: CBA 6.228
Telephone: (512)471-5682
Fax: (512)471-5073

You are always free to stop by my office. If I am busy at the time, I might ask you to come back at a more suitable time.

**Teaching Assistants:**

Andrew Koch
Email: `andrew.koch@phd.mccombs.utexas.edu`
Office Hours: Wednesdays 10:00am-11:30am
Office: CBA 5.334G
Telephone: (512)471-1671

Denys Maslov
Email: `denys.maslov@phd.mccombs.utexas.edu`
Office Hours: Fridays, 3pm-4:30pm
Office: CBA 5.324D
Telephone: (512)471-1674

## 2 Course Objectives

Modern managers are risk managers. Having determined which risks a firm is exposed to, managers must choose which risks to keep, which to shed, and which to moderate. They can no longer afford simply to take the firm's financial landscape as it comes. This course equips you for

making such choices through understanding how to value and to employ derivative securities in a variety of contexts.

In order to provide a useful skill set, it is necessary to stress the fundamentals and to explore the topic at a somewhat technical level. By its nature, this course unavoidably uses mathematics and statistics. The payoff, however, is worth it. After a brief introduction to derivatives, the first section of this course will explore the fundamental principle underlying this material – pricing by no arbitrage. The second section of the course will explore forward and futures contracts including pricing and applications such as hedging with futures. The third section of this course will study derivative securities with option-like payoffs with an emphasis on no arbitrage pricing restrictions, the binomial option pricing model, the Black-Scholes model, hedging, and applications of option pricing. The final section of the course will give a brief introduction to numerical techniques for valuing derivative securities with an emphasis on risk management.

This course will be especially useful for students who are considering a career in investment analysis or portfolio management. Upon completion of the course, students should acquire a clear understanding of the underlying theory of pricing derivative securities and how it applies in practice.

**Is this Course Right for You?** This is an advanced undergraduate course and the course workload can be demanding; its aim is to build on your past finance knowledge and advance you toward the goal of beginning a career. In pursuit of this, you will be up against the best in the world and there are no shortcuts. Do <u>not</u> sign up just expecting a "hot topic" course with which to highlight your résumé.

# 3 Class Prerequisites

Finance FIN377.2 (this class) is an elective course, restricted for students who are currently enrolled in a major program in the College of Business Administration. The prerequisites for doing well in the course include solid analytical skills, the ability to work with spreadsheets, and a keen interest in financial markets.

# 4 Class Format

The class meetings will be a mix of lecture and group discussions. You should complete the assigned readings in advance of class and come prepared to contribute to class discussions. On top of the course material for the day, a typical lecture will most likely include discussing something from the financial press for a few minutes.

# 5 Course Material

Given this is an advanced undergraduate course, I will not be teaching directly from the textbook although one is required. For those of you considering graduate school, all your future courses will follow a similar model. View the required textbook given below as an alternate view of my class lectures. Given the complexity of the material covered in this course, this alternate view will aid you in better understanding the material. You should buy the book and do the assigned readings.

If at the end of the course, you did not find the required textbook useful, Mark Twain once nicely summarized the many uses of a book:

> *A big leather-bound volume makes an ideal razor strap. A thin book is useful to stick under a table with a broken caster to steady it. A large, flat atlas can be used to cover a window with a broken pane. And a thick, old-fashioned heavy book with a clasp is the finest thing in the world to throw at a noisy cat.*
>
> — Mark Twain, quoted in Greatly Exaggerated

**Required Reading:**

1. McDonald, Robert L., *Derivatives Markets*, Second Edition, Pearson Addison Wesley, 2006.
2. Articles and lecture notes as distributed on *Blackboard*.
3. Two case studies from Harvard Publishing to be purchased on:
   `www.harvardbusinessonline.com`
   These case studies will be assigned later in the class.

**Other References:**

1. Hull, John C., *Options, Futures, and Other Deriviatives*, Sixth Edition, Pearson Prentice Hall, 2006. *This used to be the required book for the course.*
2. Cox, John C. and Mark Rubinstein, *Options Markets,* Prentice-Hall, 1985. *An old book, but still a good one.*
3. Wilmott, Paul et al., *The Mathematics of Financial Derivatives A Student Introduction,* Cambridge University Press, 1995.
4. Wilmott, Paul, *On Quantitative Finance: Volumes I & II,* Wiley, 2000.

5. Neftci, Salih N., *Introduction to the Mathematics of Financial Derivatives,* Second Edition, Academic Press, 2000. *This is a more advanced text.*

6. Back, Kerry, *A Course in Derivative Securities : Introduction to Theory and Computation,* Springer, 2005. *This is the best of the more advanced texts.*

# 6 Course Requirements and Grading

The course has available 1000 total points as follows:

| | |
|---|---|
| Midterm Exam | 300 |
| Final Exam | 400 |
| Problem Sets | 100 |
| Two Group Cases | 200 |
| Total | 1000 |

1. **Examinations**

   All exams are closed book, but you may bring one $4'' \times 6''$ "crib" notecard and a calculator that can compute natural logarithms. The midterm exam is set for **March 6** in class. The Final Exam will be a **cumulative test**. If you choose to miss the midterm exam, the additional weight of $300$ points will be placed on your final exam.

2. **Cases**

   There will be two formal case studies in the course. These **must** be completed in a group from 3 to 5 people. For one of the cases, you will be required to make a brief presentation in class in addition to a written analysis.

3. **Problem Sets**

   Do the problem sets in groups of no more than 5 people (working alone is fine if you want but, given the nature of the class, there are tremendous synergies to be exploited by working with colleagues with different backgrounds). Each group turns in a single copy of its work with the names of all contributing members listed. Homework is due in class at the beginning of lecture when I collect it. Groups can change each assignment. The lowest problem set score is dropped; late homework is not accepted. I expect roughly 7 to 10 problem sets to be assigned throughout the semester.

4. **Class Participation**

   Positive contributions to class are encouraged. Even so, your classmates are unlikely to appreciate it if you simply ramble on and on, and they should feel free to let you know. Negative contributions (e.g., distracting behavior, chronic tardiness) cannot be abided. While I do not give official grades for class participation, consistent positive contributions will help you if you are on a grade border at the end of the semester.

5. **Final Course Grades**

   Please recognize that this is a difficult subject. I do not expect high numerical scores on the exams. Given this is an upper-level elective, course grades will be based on a distribution skewed toward an 'A.' If you work hard in the class, you have nothing to worry about.

6. **General Policies**

   - **Pass/Fail**

     If you take the course on a **pass/fail** basis, you must complete **all the projects and assignments** and take all the exams in order to pass the course.

   - **Attendance**

     Exams are fixed far in advance, and absentees will receive a grade of zero for work missed. Again, note that the midterm exam can be missed with additional weight then placed on the final exam with no penalty. The exam dates given elsewhere in this syllabus will not be changed. If you do not take an exam on the scheduled date and would like **make-up exam**, then you are responsible for providing satisfactory evidence to substantiate the reason for absence. Please be sure that you have ample satisfactory **written** evidence demonstrating the reason for your absence. According to University rule, you are allowed to take a make-up test if you have **more than 3 tests within 24 hours.** Please notify me of this conflict **two-weeks** before the test. Arrange your job interviews, and any necessary travel, on dates other than those on which we have exams.

     To get the most out of this class, please be courteous. This includes (but is not limited to) attending all scheduled classes and arriving on time. If you must arrive late or leave early, do it discreetly—late arrivals are very disruptive to the class. If you have trouble hearing me or other students because of distractions around you, quietly ask those responsible for the distraction to stop. Please let me know immediately if you have any problem that is preventing you from performing satisfactorily in this class.

   - **Appeals**

     Grading errors must be submitted, in writing, within one week of the graded material's availability to the course teaching assistant. Correcting errors is done per document and thus could raise or lower scores. All regrading requests must be fully explained in writing and must be signed. In addition, to the signed regrading request, the original paper must accompany the request for a regrade.

   - **Accommodation**

     The Americans with Disabilities Act is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact

the Office of the Dean of Students - Services for Students with Disabilities located on the fourth floor of the Student Services Building or call (512) 471-6259.

# 7 Academic Integrity

Students are expected to follow the University of Texas Honor Code:

> "The core values of The University of Texas at Austin are learning, discovery, freedom, leadership, individual opportunity, and responsibility. Each member of the University is expected to uphold these values through integrity, honesty, trust, fairness, and respect toward peers and community."

If you have questions about the University of Texas Honor Code please consult:

`http://www.utexas.edu/president/speeches/hc_042904.html`

*Examinations are to be the work of the individual student using only material explicitly permitted.* Concerning all other aspects of the course (including problem sets), I encourage you to speak freely with your classmates except on cases which should only be discussed with your group members.

# 8 Outline *(subject to change)*

The outline below presents a tentative roadmap for the course. We may deviate from it depending on interest and time. The readings listed below are solely from the McDonald textbook. During the semester, I may distribute additional reading articles by posting them on *Blackboard.*

1. Introduction to Derivative Securities & Payoff Diagrams
   - Reading - Chapters 1 & 2, Appendix 2A
2. No Arbitrage Pricing
3. Applications of No Arbitrage - Option Price Restrictions, Early Exercise of American Options, and Put-Call Parity
   - Reading - Chapter 9
4. Pricing Options - Binomial Option Pricing Model
   - Reading - Chapters 10
5. Integration and Synthesis

- Case 1 discussion.

6. Pricing Futures and Forward Contracts
   (a) Pricing of Forward Contracts
      - Reading - Chapters 5.1–5.3
   (b) Pricing of Futures Contracts
      - Reading - Chapters 5.4–5.7, Appendix 5B
   (c) Application of Futures Contracts
      - Reading - Chapters 4, 6, 7, & 8
7. Pricing Options - Advanced Binomial and Black-Scholes-Merton
   (a) Advanced Binomial
      - Reading - Chapter 11
   (b) Black-Scholes-Merton Option Pricing Model, Hedging, and Applications
      - Reading - Chapter 12 & 13
8. Numerical Methods for Derivative Security Valuation
   - Reading - Chapters 18 & 19
9. Integration and Synthesis
   - Case 2 discussion.
10. Optional Topics (time allowing)
   - Financial Engineering & Corporate Applications
     - Reading - Chapters 15 & 16
   - Risk Management & Derivative Disasters
     - Reading - Chapters 25 & 26
   - Energy and Weather Derivatives
   - Credit Derivatives