UNIVERSITY OF SOUTHERN CALIFORNIA
MARSHALL SCHOOL OF BUSINESS
SPRING 2009

FBE 535: Applied Finance in Fixed Income Securities

Class # 15417R, MW 2p.m. - 3:20 p.m. Room JKP210
Class # 15418R, W 6:30p.m. - 9:30 p.m. Room JKP202

1. Contact Information:

Instructor:	Antonios Sangvinatsos
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Course website:	on Blackboard (https://blackboard.usc.edu/)
Office Hours:	Monday 6:00 p.m. to 7:00 p.m.

2. Course Objectives:

This course describes the important fixed income securities and markets, and in turn develops tools for valuing these securities and managing their interest rate and credit risk. Historically, *fixed-income* refers to securities which promise fixed cash flows over their lives. Now, we generally view any fixed-income instrument as one in which its value depends on the level of interest rates and/or the health of the underlying assets. Thus, along with an analysis of fixed-rate bonds, we will also look at other securities, such as floaters, inverse floaters, bond options, caps/floors, callable bonds, interest rate swaps, credit default swaps and mortgage-backed securities.

The study of fixed income securities is highly quantitative in nature. Students should be comfortable with mathematics such as algebra, linear algebra and basic calculus, as well as statistical concepts such as probability distributions, mean, variance, covariance, and regression. A basic background in finance is required, such as the core course, *Foundations in Finance*. Although some previous coursework in options is helpful, it is not necessary to have taken an options course as the analysis of fixed-income derivatives will be self-contained. Students will need to use a calculator that can raise a number to an arbitrary power, and are expected to be familiar with a spreadsheet package like *Excel* (including, for example, its solver function). It is my experience that if students do not satisfy these criteria, then they tend to struggle in the class.

3. Prerequisites and Expectations:

- Finance: I will assume at least a good understanding of **basic notions in finance**: the time-value of money; return, risk and portfolio diversification; net present value etc. These are materials covered basic Corporate Finance, GSBA 521 (a prerequisite course). I will discuss some of these topics in class, but I expect you to review the material from GSBA 521 as necessary.

- Statistics/Math: Uncertainty is what makes the study of financial markets fascinating. If there were no uncertainty there would be very few job opportunities on Wall Street! Unfortunately, uncertainty also makes our task more difficult. The good news is that you will finally understand why you had to study statistics. No serious study of finance can be undertaken without a **basic knowledge of statistics**. In addition a good knowledge of **basic algebra and calculus** is needed.

- Computers/Software/Calculators: Many of the examples in lectures and problem sets require Microsoft **Excel** (or a similar product). You will need access to a computer and familiarity with Excel. I will assume that you know how to use spreadsheets to perform some basic analysis. Students are also expected to bring a **calculator** to every class section and to all examinations.

4. Course Material:

The main course material is a collection of presentation slides which will be used in each lecture. The slides for each class will be uploaded on Blackcoard by the time the class starts. Usually this will be the night before the day of class. In addition to the presentation slides, there will be biweekly homeworks that will also become available on Blackboard. Students should study the slides and the homeworks (and other material that will become available on BB) very thoroughly in order to be able to do well in the class. A secondary course material is a collection of readings, which provide additional discussion of the issues brought up during the lectures. These materials will be uploaded on Blackboard periodically during the semester.

Students are expected to have downloaded the notes prior to coming to the class so they can make notes directly onto their hardcopy, and thus can spend more time listening and participating in the lecture.

There is no required textbook for the class as there is no excellent textbook material for it. There is however a collection of 3 recommended (*but not required*) books:

1) The book closest to the presentation slides is the "**Fixed Income Securities"**, Wiley edition, by Tuckman. (There is no difference known to me between the hardcover and soft cover versions). I may also be referring to this book more than I do it for other books. This however does not mean I require this book.

2) A second very nice book that does a good job in presenting the material to students is the "**Fixed Income Securities: Valuation, Risk Management and Portfolio Strategies"**, Wiley Finance Series, by Lionel Martellini, Phillipe Priaulet, and Stephane Priaulet.

3) The third book I recommend is the "**Fixed Income Markets and Their Derivatives"**, South-Western Edition, by Sundaresan. According to my knowledge it is currently out of print but perhaps you can find it second hand, on a discount store online like half.com, or amazon.com. Sudaresan's book like Martellini et.al book reads more like a standard textbook but it is much more expensive.

For those of you who are planning a career in the fixed-income sector, any of the following four books may also be helpful:

Das, **Swap & Financial Derivatives**, 3rd edition, John Wiley, 2003.
Fabozzi, **The Handbook of Fixed Income Securities**, 6th edition, Irwin, 2000.
Bomfim, **Understanding Credit Derivatives and Related Instruments**, Academic Press, 2004.

These are all highly regarded books, which are very encompassing in their particular area. Again, these books should be available at any large bookstore. I do not recommend them here because the course is self contained and these books are very expensive (in the $100 plus range).

5. Grading Criteria, Exams and Course Policy:

Grades will be assigned based on the following weights according to 2 schemes. Your overall course score will be calculated using the maximum of the two schemes presented bellow. These are:

	Scheme 1	Scheme 2
Mid-Term Exam	35%	0%
Final Exam	40%	75%
Homework	10 %	10 %
Class Participation	15%	15%

- Important Dates:

Mid-Term Exam:	March 11, in class **
Final Exam:	Class 15417R – Monday, May 11, 2-4pm
	Class 15418R – Wednesday, May 6, 7-9pm
Q&A Session:	April 29

** If we have not finished the midterm's material a week before the scheduled midterm date, the midterm will be postponed for the first Wednesday after the spring break or in general for a week after we have covered the midterm material.

- Exam dates are in line with the university schedule. Rooms are to be determined.

- There is no alternate midterm date.

- Problem Sets: Because the material is analytical and new concepts build on old ones, it will be essential to do the problem sets in order to follow the lectures and succeed on the exams. To facilitate learning, I encourage students to work together on these problem sets. The homework will be graded in a two checks scale. A homework will get two checks if the student attacked all problems and made meaningful effort to address all issues. Will get zero checks if not all problems were attacked, or if the presentation is very sloppy, or if the presentation can hardly make sense. A homework will earn one check if it falls between the previous two cases. All homeworks will be handed in class. No homeworks will be accepted after the due date and especially after the upload of the solutions on Blackboard. All homework sets will be available on Blackboard before we start covering the material that is needed in order to be solved. So you'll have plenty of time to think about the questions. Similar questions will appear in the midterm and final.

These problem sets count for borderline cases, of which 20% of the class found themselves in, for example, past years.

Even though performance on those assignments will not contribute much to the final grade, failing to do them will cost in understanding the material and performing in the midterm and final.

- Exams: **Tests are closed book**. You may bring one piece of paper with handwritten notes (double-sided, 8.5''x11''). You will need a calculator that can raise numbers to arbitrary powers. Laptop computers and calculators with word processing features are not permitted. **There will be no make-up exams.** By enrolling in the course you are committing to take the tests on the scheduled dates.

- Regrades: Regrades must be requested within one week of the day the item was returned to the class. The student must submit a written and precise explanation of why he/she thinks the grade should be modified. The entire assignment will be regraded and the final mark may go up or down.

6. Office Hours:

If you have any questions about the material covered in class please do not hesitate to see me. The best way is to see me during my regular office hours. Dropping by outside of office hours and emailing questions is highly discouraged (except in emergencies).

If you have problems keeping up with the material, do not wait hoping that things will get better. They will probably get much worse. You are strongly encouraged to study and discuss the material with other classmates and to see me during the office hours. I also strongly encourage you to raise questions in class.

7. Other Policies:

- Academic Integrity: I will strictly enforce the university rules on academic integrity "… *The use of unauthorized material, communication with fellow students during an exam, attempting to benefit from the work of another student, and similar behavior that defeats the intent of an examination or other class work is unacceptable to the University. It is often difficult to distinguish between a culpable act and inadvertent behavior resulting from the nervous tensions accompanying examinations. Where a clear violation occurs, however, the instructor may disqualify the student's work as unacceptable and assign a failing mark on the paper*."

- Students With Disabilities: Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me as early in the semester as possible. DSP is located in STU 301 and is open 8:30 a.m. – 5:00 p.m., Monday through Friday. The phone number for DSP is (213) 740-0776.

- Tent Cards**:** Classroom participation and interaction is an integral part of the learning experience. To facilitate this, students are expected to bring a tent card to every class session and place it visibly.

8. List of topics: (Subject to change)

1. Course overview
2. Zeroes and coupon bonds
3. Yield to maturity
4. Forward rates

5. Duration
6. Convexity
7. Immunization

8. Floating rate notes and inverse floaters
9. Swaps

MIDTERM

10. No arbitrage pricing
11. Risk-neutral probabilities
12. Dynamic trading strategies
13. An interest rate model
14. Model calibration

15. Options
16. American options
17. Callable Bonds
18. Swaptions,

OPTIONAL

19. The mortgage market
20. Mortgage pools, passthroughs, IOs, and Pos
21. CMOs
22. [Caps, floors, and collars]

FINAL

9. Week-to-week breakdown: (Subject to change)

Week 1: Course overview and zeroes
Week 2: Coupon bonds and Yield to maturity
Week 3: Yield to maturity and Forward rates
Week 4: Forward rates and Duration
Week 5: Duration and Convexity
Week 6: Immunization
Week 7: Floating rate notes
Week 8: Swaps and No Arbitrage Pricing
Week 9: Risk Neutral Probabilities
Week 10: Dynamic Trading strategies
Week 11: Interest rate modeling
Week 12: Calibration and Options
Week 13: American Options
Week 14: Callable Bonds, Swaptions
Week 15: Revisions - Movie