## FNCE 235/725: Fixed Income Securities Fall Semester 2004

<u>Instructor</u>: Prof. Motohiro Yogo Tel.: (215) 898-3609 E-mail: yogo@wharton.upenn.edu Office: 2318 Steinberg Hall-Dietrich Hall Office Hours: Mon. & Wed. 4:30-5:30

Teaching Assistants:Jianfeng YuGrant Longjianfeng@wharton.upenn.edugrlong@wharton.upenn.edu

#### Course Description:

The course covers the valuation of a wide variety of fixed income securities and its derivatives including pure-discount government bonds, coupon bonds, callable bonds, forwards and options on fixed income securities, interest-rate swaps, floating-rate notes, home mortgages, and inflation-indexed bonds. The course also covers analytical tools used in bond portfolio management and interest risk management. These include the construction of yield curves, duration and convexity as measures for risk management, and term structure models.

Among relevant topics not covered in the course are the relation between macroeconomic variables and interest rates, taxes, and multi-factor models of the term structure. Default risk and corporate bonds are also not covered, but these topics are covered in FNCE 238/738 Funding Investments.

<u>Prerequisites</u>: Introductory finance and statistics. FNCE 235: FNCE 100-101 and STAT 101-102 FNCE 725: FNCE 601 and STAT 621

Lectures: Section 401: Mon. & Wed. 12:00-1:30, JMHH 260 Section 402: Mon. & Wed. 3:00-4:30, JMHH 260 Section 403: Tues. & Thurs. 12:00-1:30, JMHH G65

The lectures are based on lecture notes contained in the Course Pack. Please attend your assigned section and bring the relevant chapters of the Course Pack to class.

Weekly Help Sessions: Fri. 3:00-4:30

The help sessions will focus on the problem sets. Students have the opportunity to ask questions about assignments that have been turned in as well as problems that are due the following week. Before the midterms, the TA will review the relevant materials.

Materials:

1. Course Pack: The course pack contains lecture notes and is available for purchase at Wharton Reprographics.

2. Handouts: Handouts may be distributed during the course as necessary. At the end of the term, students will be billed for the total amount of the handouts on their bursar accounts.

3. webCafe: Announcements, problem sets, solutions, and other material will be posted on the course homepage at http://webcafe.wharton.upenn.edu/eRoom/fnce/725-fa04-1

4. Books on Reserve: For students who find it helpful to see the material presented in different ways, the following textbooks are placed on reserve at the Lippincott Library. Students are not directly responsible for the material in these books.

Hull, John C. *Options, Futures, and Other Derivatives*, fifth ed. Upper Saddle River, NJ: Pearson Education, Inc., 2003.

Sundaresan, Suresh M. *Fixed Income Markets and Their Derivatives*, second ed. Cincinnati, OH: South-Western, 2002.

Tuckman, Bruce. *Fixed Income Securities: Tools for Today's Markets*, second ed. Hoboken, NJ: John Wiley & Sons, Inc., 2002.

Requirements:

1. Problem Sets

Problem sets will be assigned on a weekly basis during the semester. The main purpose of the problem sets is to increase your understanding of the material and to help you prepare for the exams. The problem sets will be graded on a "check-plus", "check", "check-minus", or "no credit" basis. Late problem sets receive no credit. Solutions will be posted on the course homepage after the due date.

## 2. Two Midterm Exams

There are two midterm exams given in class. See under "Schedule" for the dates of the exams. You must take the exam during your assigned section, and makeups will not be given for missed exams.

## 3. Final Exam

The final exam will be given during the final exam period at the time assigned by the Registrar. The exam is comprehensive; students are responsible for all material covered in the course.

Grades:

The final grade for the course is based on the following formula.

Requirement	% of	Formula
	Final	
	Grade	
Problem	10	"Check-plus" = 10 points, "check" = 7 points, "check-minus"
Sets		= 3 points, and "no credit" $=$ 0 points.
Exams	90	The midterms are each worth "1 grade", and the final exam is
		worth "2 grades". The average of the best 3 out of the 4
		grades counts toward the final grade.

I expect the distribution of the final grade to be

% of Students	<b>FNCE 235</b>	<b>FNCE 725</b>
20%	А	DS
35%	В	HP
40-45%	С	Р
0-5%	D or F	NC

For FNCE 235 students, I will attach a + or - to some grades. The distribution will be adjusted appropriately if the group of students is exceptional.

# Drop Deadline:

FNCE 235: Any student that drops the course after **September 20** will receive a "W" on their transcript.

# Groups:

You may work in groups of up to 5 for the problem sets. (You may work alone if you wish.) A group may consist of students from different sections and both undergraduate and MBA students. Each group submits one copy of their solution for each assignment, and every member of the group receives the same grade. After the first assignment, group composition may not change without permission. The names of each group member must be clearly written at the top of the assignment in order for each member to receive credit.

<u>A Final Caveat</u>: Plans and policies outlined in this syllabus may be subject to change!

Schedule	2:			
Lecture	Date	Торіс		
1	9/8 & 9/9	Ch 1: Overview of Fixed Income Securities		
		Ch 2: The Grammar of Fixed Income Securities		
2	9/13 & 9/14	Ch 3: Data for a Recurring Illustration		
		Ch 4: Bond Valuation Using Synthetics		
3	9/15 & 9/16	Ch 5: Interpreting Bond Yields		
4	9/20 & 9/21	Ch 6: Bond Values and the Passage of Time		
5	9/22 & 9/23	Ch 7: Forward Contracts		
6	9/27 & 9/28	Ch 8: Dollar Delta 1: Risk Measurement		
7	9/29 & 9/30	Ch 9: Dollar Delta 2: Risk Management		
8	10/4 & 10/5	Ch 10: Dollar Gamma		
9	10/6 & 10/7	Ch 11: Delta, Gamma, and Theta		
10	10/11 & 10/12	Ch 12: Time-Adjusted Performance Profiles		
11	10/13 & 10/14	Ch 13: Vasicek 1: Properties of the Short-Term Rate		
12	10/18 & 10/19	Midterm Exam 1 (In Class)		
13	10/20 & 10/21	Ch 14: Vasicek 2: The Term Structure		
	10/25 & 10/26	Fall Break (No Class)		
14	10/27 & 10/28	Ch 15: Vasicek 3: More Term Structure		
15	11/1 & 11/2	Ch 16: Vasicek 4: The Greeks		
16	11/3 & 11/4	Ch 17: Valuation By Monte Carlo Methods		
17	11/8 & 11/9	Ch 18: Introduction to Bond Options		
18	11/10 & 11/11	Ch 19: European Bond Options		
19	11/15 & 11/16	Ch 20: American Bond Options		
		Ch 21: Deja Vu		
20	11/17 & 11/18	Midterm Exam 2 (In Class)		
21	11/22 & 11/23	Ch 22: Bonds with Embedded Options 1		
	11/24 & 11/25	Thanksgiving Break (No Class)		
22	11/29 & 11/30	Ch 23: Bonds with Embedded Options 2		
23	12/1 & 12/2	Ch 24: Floating Rate Notes		
24	12/6 & 12/7	Ch 25: Interest Rate Swaps		
		Ch 26: Options on Yields		
25	12/8 & 12/9	Ch 27: Floating Rate Notes with Embedded Options		
26	12/13 & 12/14	Ch 28: Home Mortgages		