

# **FNCE 235/725: Fixed Income Securities**

Fall 2009

Syllabus

Prof. Nikolai Roussanov

Email: [nroussan@wharton.upenn.edu](mailto:nroussan@wharton.upenn.edu)

Office: 2424 SH-DH

Office hours: W 4-5:30 pm

## **Teaching Assistants**

Kam-fai (Derek) Ho [[faikam@wharton.upenn.edu](mailto:faikam@wharton.upenn.edu)], head TA

Gaoxiang (Gary) Hu [[gaoxiang@wharton.upenn.edu](mailto:gaoxiang@wharton.upenn.edu)]

Jessica Tung [[jesstung@wharton.upenn.edu](mailto:jesstung@wharton.upenn.edu)]

Aaron Wedlund [[wedlund@wharton.upenn.edu](mailto:wedlund@wharton.upenn.edu)]

TA office hours are at the TA cubicles in the Finance Department (2300 SH-DH). The times will be posted on the course webCafe homepage.

## **Course Description**

The course covers the valuation of a wide variety of fixed income securities and derivatives including pure discount bonds, coupon bonds, forwards and options on fixed income securities, interest-rate swaps, floating-rate notes, and mortgages. The course focuses on analytic tools used in bond portfolio management and interest rate risk management. These tools include yield curve construction, duration and convexity, and formal 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 will also not be discussed, as these topics are covered in other courses.

## **Prerequisites**

Students must have taken introductory finance and statistics.

FNCE 235: FNCE 100-101 and STAT 101

FNCE 725: FNCE 601 and STAT 621

## **Lectures**

Section 401 Tu/Thu 9:00 -10:30

Section 402 Tu/ Thu 10:30 -12:00

Section 403 Tu/Thu 1:30 - 3:00

Location of lectures: JMHH G65

## **Materials**

1. The course pack contains lecture notes and is available online. The pack was created by Prof. Michael Gibbons during the many years he taught this course. We will follow it closely. See course schedule below for outline of the chapters we will cover. To assist students who have not yet decided to take the course, the first five chapters of the course pack will be posted on the course webCafe page.

As lectures will be following the notes in the course pack, you will need to bring the relevant chapters of the Course Pack to class. Additional handouts will be distributed during the course via webCafé as necessary.

There is a textbook for the course, available at the bookstore:

Pietro Veronesi, 2009. Fixed Income Securities: Valuation, Risk, and Risk Management

This is a brand new text, and its way of presenting the material differs somewhat from the way it is done in the course. Although students are not responsible directly for the material in this book that is not covered explicitly in class, it is very helpful in mastering the material and solving homework/exam problems, as well as a general reference on the subject.

3. Announcements, problem sets, solutions, and other material will be posted on the course **webCafé** homepage at

<https://webcafe.wharton.upenn.edu/eRoom/fnce/725-sp09-1>

Note that Wharton computing accounts are required in order to access **webCafé**. Enrolled non-Wharton students may obtain an account starting on the first day of the class at: <http://accounts.wharton.upenn.edu>

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

John C. Hull, 2005. Options, futures, and other derivative securities. Sixth edition.

Suresh Sundaresan, 2002. Fixed Income Markets and their derivatives. Second edition.

Bruce Tuckman, 2002. Fixed income securities: tools for today's markets. Second edition.

### **Special drop/add dates**

The Finance Department's Drop and Add Deadlines are different than the University's.

Finance DROP deadline is Monday, January 28<sup>th</sup>

Finance ADD deadline is Tuesday, January 29<sup>th</sup>

Should you decide to drop this course, you must do so through Penn In Touch by the Finance Department's drop deadline. If you drop the course after the department deadline you will receive a "W" on your transcript.

### **Requirements**

1. There are two exams given in class (see "Schedule" for the dates). The first exam is worth 30% of the final grade and the second is worth 35%. They are discussed in more detail later in the syllabus.
2. A final project is worth 35% of the final grade. It will be distributed during the final week of class. It is due on May 4 (the first day of the Final Exam period).
3. Problem sets will be assigned on a near-weekly basis. They are discussed in more detail later in the syllabus. A student whose final score is just below the margin between two letter grades may have their grade adjusted upward based on their work in problem sets and class participation. No student will have their grade adjusted downward based on problem sets and class participation.

### **Attendance and class participation**

1. Attendance at lectures is strongly encouraged even though optional. The background of each student in the course differs, and I provide a few sessions that may be viewed by some students as review material. For most lectures, the Course Pack contains a preface which should help you decide whether you know the material. If you do not need to attend a particular session, feel free to miss the lecture.
2. You must attend the lecture for the section for which you are registered. There are too many students in each section to allow students to move around.
3. During class I encourage you to ask questions, although I do not guarantee that I will answer them to your satisfaction at that time. Questions from you help me better judge how the class is absorbing the material.
4. I will also cold-call in lecture. This is not done with evil intent. Instead, it is another way for me to judge how the class is absorbing the material. No student's grade is ever penalized for saying something wrong in class.
5. To make it easier for me to get to know you, please sit in the same seat at each class session (this will take some time to work out, with drops and adds). Please bring a name plate to class.

### **Help and Review Sessions**

There will be weekly help sessions throughout the semester. The date and time are yet to be confirmed.

### **Problem Sets**

Many problem sets will be assigned during the semester. Late answers will not be accepted. You are to turn in your answers before class begins. For all of the problem sets you may work with other students in the class.

A team of people need only submit one copy of their solution for a particular problem set. Every member of the team will receive the same grade. Teams may be comprised of students from differing sections and differing programs (e.g., undergraduate and MBA). No team may have more than five students.

Solutions to each problem set will be available after your answers have been turned in. Your graded answers will be returned to a file cabinet in the Finance Department in Steinberg-Dietrich Hall. The problem sets will be

graded by giving a “check-plus,” “check,” “check-minus,” or “no credit.” Most of the questions on the problem sets will not be discussed in class. The help and review sessions will handle questions about the problem sets.

The main purpose of the problem sets is to increase your understanding of the material and help you prepare for the exam. Problems that have been used successfully in prior years may be used again this year. You can probably track down solutions to these problems instead of working on them. Students who take this approach will regret their choice during the exams.

### **Examinations**

There will be two in-class examinations during the semester. The (tentative) dates are listed on the course schedule. They will be closed-book. For the first exam, you may bring an 8 ½ x 11 piece of paper of notes. You may write on both sides. For the second exam, you may bring two such pieces of paper. The second exam concentrates on material taught since the first exam, but material presented earlier may also appear on this exam.

You may bring a calculator to the exam, but not a computer.

Following university rules, exams may be postponed because of “illness, a death in the family, or some other unusual event.” If such a circumstance arises, undergraduates must petition their dean’s office for a makeup exam.

MBA students must petition the MBA Program Office.

### **Final Project**

This will be described later in the semester.

### **Grades**

Expected distributions of the final grades are

<b>FNCE 235</b>	<b>% of students</b>	<b>FNCE 725</b>	<b>% of students</b>
A	25%	DS or A	25%
B	40%	HP or B	60%
C	30-35%	P or C	5-15%
D/F	0-5%	QC/NC or D/F	0-10%

Scores on final project and the two in-class exams will be standardized. Each student’s final score is the weighted sum of these three standardized values, where the weights are 30% (exam 1), 35% (exam 2), and 35% (final project).

**Course Schedule (preliminary and subject to change)**

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

