

UNIVERSITY OF PENNSYLVANIA  
The Wharton School

FNCE 235/725:  
**FIXED INCOME SECURITIES**

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## Course Description

This course covers fixed income securities (including fixed income derivatives) and provides an introduction to the markets in which they are traded, as well as to the tools that are used to value these securities and to assess and manage their risk.

Quantitative models play a key role in the valuation and risk management of fixed income derivatives. Although every effort will be made to introduce the various pricing models and techniques as intuitively as possible and the technical requirements are limited to basic calculus and statistics, the class is by its nature quantitative and will require a steady amount of work.

In addition, some computer proficiency will be required for the assignments, although familiarity with a spreadsheet program (such as *Microsoft Excel*) will suffice.

## Prerequisites

The prerequisites for this course are the introductory finance and statistics courses, i.e., FNCE 100/601 and STAT 101/621.

## Textbook and Readings

The course will be based primarily on lecture notes (copies of the slides used in class) and on the following required textbook:

- Pietro Veronesi, *Fixed Income Securities*, Wiley, 2010.

The lecture notes will be made available ahead of each class through *Canvas*.

## Requirements and Grading

Final grading will be based on four assignments, a final exam and class participation, with the following weights: 40% group assignments, 50% final exam and 10% class participation.

## Office Hours

By appointment.

## Course Outline

Below is a tentative outline of the course, illustrating the progression of topics and the corresponding readings.

### **1. Introduction to Fixed Income Securities**

Lecture notes and Textbook, Chapter 1

### **2. Bond Pricing and the Term Structure of Interest Rates**

Lecture notes and Textbook, Chapter 2 and Section 7.3

### **3. Interest Rate Immunization**

Lecture notes and Textbook, Chapters 3-4

### **4. Interest Rate Forwards**

Lecture notes and Textbook, Sections 5.1-5.3

### **5. Interest Rate Swaps**

Lecture notes and Textbook, Sections 5.4-5.5

### **6. Introduction to Options and Interest Rate Trees**

Lecture notes and Textbook, Section 6.2, Chapters 9-10 and Sections 11.2.1 and 11.2.3

### **7. The Ho-Lee and Simple Black-Derman-Toy Models**

Lecture notes and Textbook, Section 11.1

### **8. Interest Rate Caps and Floors**

Lecture notes and Textbook, Sections 11.2.2 and 20.1.1-20.1.3

### **9. The Black-Derman-Toy Model**

Lecture notes and Textbook, Sections 11.3 and 11.5

### **10. Interest Rate Swaptions and Callable Bonds**

Lecture notes and Textbook, Sections 11.2.4 and 12.1-12.2

### **11. Interest Rate Futures and Futures Options**

Lecture notes and Textbook, Sections 6.1 and 11.4

### **12. Monte Carlo Simulation**

Lecture notes and Textbook, Sections 13.1-13.5

### **13. Mortgages and Mortgage-Backed Securities**

Lecture notes and Textbook, Chapter 8 and Sections 12.3 and 13.6

### **14. Inflation-Indexed Bonds and Swaps**

Lecture notes and Textbook, Section 7.4

### **15. Corporate Bonds and Credit Default Swaps**

Lecture notes