

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 these securities. As a result, 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

The final grade will be based on home assignments (90%) and class participation (10%).

Office Hours

To be announced.

Course Outline

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

I. Introduction to Fixed Income Securities

Lecture notes and Textbook, Chapter 1

II. Government Bonds

Lecture notes and Textbook, Sections 2.1-2.8

III. The Term Structure of Interest Rates

Lecture notes and Textbook, Section 2.9

IV. Interest Rate Immunization: The Basic Framework

Lecture notes and Textbook, Chapter 3 and Section 4.1

V. Interest Rate Immunization: Factor Models

Lecture notes and Textbook, Sections 4.2-4.6

VI. Fixed Income Forwards and Repos

Lecture notes and Textbook, Sections 5.1-5.3

VII. Interest Rate Swaps

Lecture notes and Textbook, Sections 5.4-5.5

VIII. Binomial Interest Rate Models: Introduction

Lecture notes and Textbook, Section 6.2, Chapter 9 and Sections 10.1-10.4

IX. Binomial Interest Rate Models: Some Refinements

Lecture notes and Textbook, Sections 10.5, 11.2.1, 11.2.3 and 12.1

X. The Ho-Lee and Simple Black-Derman-Toy Models

Lecture notes and Textbook, Section 11.1

XI. Interest Rate Caps and Floors

Lecture notes and Textbook, Sections 11.2.2 and 20.1.1-20.1.3

XII. The Black-Derman-Toy Model

Lecture notes and Textbook, Sections 11.3, 11.5 and 20.1.4

XIII. Interest Rate Swaptions

Lecture notes and Textbook, Sections 11.2.4, 12.2 and 20.2

XIV. Fixed Income Futures

Lecture notes and Textbook, Sections 6.1, 6.5 and 11.4

XV. Fixed Income Futures Options

Lecture notes

XVI. Monte Carlo Simulation

Lecture notes and Textbook, Sections 13.1-13.5

XVII. Mortgage-Backed Securities

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

XVIII. Continuous-Time Interest Rate Models

Lecture notes and Textbook, Sections 14.1-14.3, 19.1-19.4 and 22.3.3

XIX. Corporate Bonds

Lecture notes

XX. Credit Derivatives

Lecture notes