Course Description

The objective of this course is to undertake a rigorous study of the theoretical foundations of modern financial economics. The course will cover the central themes of modern finance including individual investment decisions under uncertainty, stochastic dominance, mean-variance theory, capital market equilibrium and asset valuation, arbitrage pricing theory, option pricing and the potential application of these themes. Upon completion of this course, students should acquire a clear understanding of the major theoretical results concerning individuals’ consumption and portfolio decisions under uncertainty and their implications for the valuations of securities.

Prerequisites

The prerequisites for this course are graduate level microeconomics (Economics 681 or Economics 701), matrix algebra, and calculus. The microeconomics courses may be taken concurrently.

Course Material

- The lecture notes are mainly based on those of Prof. Jessica Wachter
- The website for this course can be accessed through Canvas:
  https://canvas.upenn.edu.
  On this website you can find lecture notes, sample problems, announcements.
- All readings are optional, but may be helpful. The textbook is

On the syllabus, readings from the textbook are prefaced by HL. This textbook is out of print. You can find the chapters on the course website.

- Following each topic, there is a list of recommended articles which can also be found on the website.

**Other reading**

Some excellent texts that cover material related to this course are:


For background reading, the following textbooks may be useful:


**Course Work and Grading**

All times below are Eastern Time.

There will be two midterms, a final, and a class presentation. The midterms are each worth 20% of the grade. The presentation is worth 10%, and the final 50%.

- Midterm 1: available 8 AM on 10/4, due 8 AM on 10/5
- Midterm 2: available 8 AM on 11/8, due 8 AM on 11/9
• Final: available 8 AM on 12/19, due 8 AM on 12/20

All exams are open book/notes. They are to be taken under adherence to the University’s honor code. Midterms are designed for a prepared student to complete them within 1 hour. The final is designed for a prepared student to complete within 2 hours.

Sample questions. For each topic, there will be sample questions and answers posted on Canvas. There will also be exams from previous years. Students are highly encouraged to work through these problems without looking at the answers as preparation for the quizzes and the final exam, and as the best way to learn the material.

Class presentation on 12/11. Each student will be asked to give a 10 minute presentation (with 5 additional minutes for questions, thus for a total of 15 minutes) on a problem from a problem set, or a previous exam question of their choosing. Students will be graded based on accuracy and clarity of these presentations (this is worth 10% of the total grade). Please seek approval of the question preparing it.

Teaching Assistant

The teaching assistant for this course is Chisom Onyishi. She can be reached by email at sovemba@wharton.upenn.edu.
Course Outline and Readings

Note: Dates are approximate.

I Decision Making under Uncertainty 9/11

- Outline
  - Expected utility representations
  - Risk aversion
  - Insurance premium
  - Portfolio choice
  - Useful utility functions
  - Stochastic dominance

- Readings:
  (a) Ingersoll book Chapter 1 (optional)
  (b) Back book Chapter 1 (optional)
  (c) HL Chapters 1, 2.1–2.10
  (f) Ross, S., 1981, Some stronger measures of risk aversion in the small and large with applications, Econometrica 49, 621-638.
  (g) HL Chapters 2.1–2.10
II Mean-Variance Portfolio Analysis 9/18

• Outline
  – Notation and definitions
  – Characterization of minimum variance portfolios
  – Properties of minimum variance portfolios
  – The case with a riskless asset

• Readings
  (a) Ingersoll book Chapters 3 and 4 (optional)
  (b) Back book Chapters 2 and 5 (optional)
  (c) HL Chapter 3

III The Capital Asset Pricing Model (CAPM) 9/25

• Outline
  – Back book Chapter 6 (optional)
  – Statement of the CAPM
  – First derivation of the CAPM
  – One and two-fund separation
  – Second derivation of the CAPM

• Readings
  (a) HL Chapters 4.1–4.17
IV Arbitrage Pricing Theory 10/2

• Outline
  – Linear factor model
  – An economy with one factor and no residual risk
  – An economy with multiple factors and no residual risk
  – An economy with multiple factors and residual risk

• Readings
  (a) Ingersoll book Chapter 7 (optional)
  (b) Back book Chapter 6 (optional)
  (c) HL Chapters 4.18–4.22

V State-Contingent Claims 10/9, 10/16

• Outline
  – Pareto-optimal allocations
  – Complete markets competitive equilibrium
  – Securities market equilibrium
  – Representative agent

• Readings
  (a) HL Chapter 5
VI State Prices and Arbitrage 10/23

• Outline
  – Definitions
  – Fundamental theorem of asset pricing
  – Complete markets
  – Option pricing in two periods

• Readings
  (a) HL Chapters 6.1–6.9

VII Multi-Period Securities Markets 10/30

• Outline
  – Description of the economy
  – Pareto optimal allocations and complete markets
  – Rational expectations equilibrium
  – Dynamic completeness
  – Securities market equilibrium

• Readings
  (a) Ingersoll book Chapter 10, 11 (optional)
  (b) Back book Chapter 8, 9 (optional)
  (c) HL Chapters 7.1–7.8, 7.11-7.15
VIII Characterizing Optimal Consumption and investment policies: Dynamic Programming

- Outline
  - Markov property
  - Value function
  - Euler equation
  - Example: logarithmic utility
  - Infinite horizon recursive formulation

- Readings
  (a) HL Chapters 7.9, 7.10, 7.16, 7.19, 7.20, 7.22
IX The Fundamental Theorem Revisited 11/13, 11/20

- Outline
  - Notation and definitions
  - Martingale property of prices and no-arbitrage
  - Market completeness
  - Characterizing optimal consumption and investment policies: Martingale method
  - Example: The binomial model

- Readings
  (a) HL Chapter 8
Representative Agent Asset Pricing 11/27, 12/4

• Outline
  – The iid lognormal model
  – The consumption CAPM
  – The yield curve
  – Equity strips
  – Rare events

• Readings
  (a) Barro, R., 2006, Rare disasters and asset markets in the twentieth century, Quarterly Journal of Economics 121, 823–866.
  (b) van Binsbergen, J., M. Brandt, and R. Koijen, On the timing and pricing of dividends, American Economic Review 102, 1596–1618.