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 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**

There will be three quizzes and a final exam. We will hold the quizzes for the first 80 minutes of class (following the quiz, we will break for ten minutes and then resume). The following list gives the quiz dates and topics covered:

- Quiz 1: On 9/21, covering Topics I, II, III
- Quiz 2: On 10/26, covering Topics IV, V
- Quiz 3: On 11/16, covering Topics VI, VII, VIII.
There will also be a final exam on the last day of class, 12/07. You will be allowed one sheet of paper with writing on the front and back for each of the quizzes. For the final, which is cumulative, you will be allowed four sheets with writing on the front and back. Final grades will be determined as follows: Quizzes (20% each, for a total of 60%), Final exam 40%. Also, students are expected to come to class and to actively participate in class discussion. Class participation will count for students on the margin between grades.

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 as the best way to learn the material.

Teaching Assistant

The teaching assistant for this course is Yicheng Zhu. He can be reached by email at yichengz@wharton.upenn.edu. His office hours are Thursdays from 5:00 to 6:00 in SH-DH 2437.
Course Outline and Readings

Note: Dates are approximate. There will be a quiz on classes marked by *. Please note that this class (following the University schedule) meets Wednesday afternoon before Thanksgiving.

I Decision Making under Uncertainty 8/31

• Outline
  – Expected utility representations
  – Risk aversion
  – Insurance premium
  – Portfolio choice
  – Important utility functions
  – Stochastic dominance

• Readings:
  (a) HL Chapters 1, 2.1–2.10
  (e) HL Chapters 2.1–2.10
II Mean-Variance Portfolio Analysis 9/7

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

- Readings
  (a) Chapter 3

III The Capital Asset Pricing Model (CAPM) 9/14

- Outline
  - 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 9/21*

- 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) HL Chapters 4.18–4.22

V State-Contingent Claims 9/28, 10/12

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

- Readings
  (a) HL Chapter 5
VI State Prices and Arbitrage 10/19

- 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 10/26*

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

- Readings
  (a) HL Chapters 7.1–7.8, 7.11-7.15
VIII Characterizing Optimal Consumption and investment policies: Dynamic Programming 11/2, 11/9

- Outline
  - Markov property
  - Recursive formulation of the dynamic problem
  - Euler equation
  - Example: logarithmic utility
  - Infinite horizon recursive formulation
  - Representative agent revisited

- Readings
  (a) HL Chapters 7.9, 7.10, 7.16, 7.19, 7.20, 7.22
  (b) Campbell, J., and L. Viceira, 1999, Consumption and portfolio decisions when expected returns are time-varying, Quarterly Journal of Economics 114, 433–495.
IX The Fundamental Theorem Revisited 11/16*

• Outline
  – Notation and definitions
  – Martingale property of prices and no-arbitrage
  – Market completeness
  – Individual optimization
  – Example: The binomial model

• Readings
  (a) HL Chapter 8

X Representative Agent Asset Pricing 11/21 (Wednesday), 11/30

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

• Readings

