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 two quizzes and a final exam:

- Quiz 1: 10/2, covering Topics I–V
- Quiz 2: On 10/30, covering Topics V–VII
- Final Exam: On 12/16 (12–2), cumulative, with a focus on topics not yet covered.

For each quiz, you may bring in one sheet of paper with writing on the front and back. Quizzes will be 80 minutes long. For the final, you may bring in three sheets of paper with writing on the front and back. Note that the final is held on the date and time determined by the Registrar. Final grades will be determined as follows:
Quizzes (25% each, for a total of 50%), Final exam 50%. 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 the final exam, and as the best way to learn the material.

**Teaching Assistant**

The teaching assistant for this course is Maria Gelrud. She can be reached by email at mgelrud@wharton.upenn.edu. Her office hours will be announced on canvas the first week of class.
Course Outline and Readings

Note: Dates are approximate. On 10/2 (the first quiz), there will be a lecture for the second half of class. There will be no class on 10/9 due to the Yom Kippur holiday. Following the University schedule, there will not be class the Wednesday before Thanksgiving.

I Decision Making under Uncertainty 8/28

• 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 9/4

• 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) 9/11

• 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 9/18

• 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 9/18, 9/25

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

• Readings
  (a) HL Chapter 5
VI State Prices and Arbitrage 10/2

• 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 10/16

• 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 10/23, 11/6

- 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

- 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

X Representative Agent Asset Pricing 11/20, 12/4

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

- Readings

