

# MIT SLOAN SCHOOL OF MANAGEMENT

Jiang Wang  
E52-456  
wangj@mit.edu

Finance Theory  
15.407  
Fall 2003

## 15.407 Course Syllabus Finance Theory (Current Draft: October 14, 2003)

### Course Description

The path-breaking advances in finance theory and practice over the past several decades have profoundly changed the financial world. These changes are further accelerated by the extensive globalization of financial markets and the rapid development in financial technologies in recent years. This course provides an introduction to modern finance theory and its applications within a unified framework. The topics of the course include: (1) unifying principles of finance; (2) financial markets and valuation of assets; (3) theory of interest rates; (4) portfolio theory; (5) asset pricing models; (6) introduction to corporate finance.

This course is targeted toward graduate students who are interested in finance and financial technologies. It covers similar topics as in 15.401, but more rigorously and in more depth. It also covers some basic topics in 15.402 on corporate finance. The course requires no prior course work in economics and finance.

### Course Materials

#### REQUIRED:

- Bodie, Kane and Marcus, *Investments* (5th edition), McGraw Hill. (BKM)
- Brealey and Myers, *Principles of Corporate Finance* (7th edition), McGraw Hill. (BM)
- 15.407 Readings, MIT Copy Technology Centers (E52-045), Fall 2002.
- Wang, *15.407 Lecture Notes (Fall 2003)*, <http://web.mit.edu/15.407>.

#### RECOMMENDED:

- Wall Street Journal.
- Morris, *The Wall Street Journal Guide to Understanding Money and Investing*.

### Course Prerequisites

The prerequisites for the course include working knowledge of calculus, probability, statistics, linear algebra and basic computer literacy (e.g., excel, matlab).

### Course Requirements

- Regular class sessions are on Tuesdays, 16:00–19:00, E51-151.

- Assignments include problem sets and projects.
  - Problem sets and projects should be done in groups of no more than four.
  - Each assignment must be handed in at the assigned time and location.
  - Late assignments are not accepted.
  - There is a recitation for each problem set.
- There is a midterm and a final exam. The exams are closed book, one 8.5"×11" sheet of notes (two-sided) is allowed for the midterm and two 8.5"×11" sheets of notes for the final. The final exam is comprehensive.
- The course grade is determined according to the following weighting:

20%	problem sets and and projects.
30%	midterm
50%	final exam

### **Office Hours**

- Monday 16:00 – 17:30.

### **Teaching Assistant**

- Kevin Chu ([kevin\\_chusloan.mit.edu](mailto:kevin_chusloan.mit.edu))

### **Administrative Assistant**

- Megan Gately, E52-450, 253-9745, [mgately@mit.edu](mailto:mgately@mit.edu).

# Course Outline

(Schedule of topics and assignments is subject to revision.)

## Part A.

### Introduction

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**September 9**

#### Introduction to Finance

Financial decisions of households and corporations. Unifying principles of finance. Approaches to valuation of financial and real assets. Roles of financial markets. Objectives of corporate financial managers.

Reading:

BKM Chapter 1, 2. BM Chapter 1, 2.

**September 16**

#### Present Value (PV)

Present value. Mechanics of PV calculations. Compound interest. Real vs. nominal cash flows.

Reading:

BM Chapter 3.

Assignment:

Problem Set 1 due Tuesday, September 23.

## Part B.

### Valuation

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**September 23**

#### Fixed-Income Securities

Fixed-income markets. Term structure of interest rates. Forward interest rates. Market conventions. Properties of bond prices. Interest rate risk. Measuring and hedging interest rate risk. Inflation risk. Credit risk.

Reading:

BKM Chapter 14, 15, 16. BM Chapter 3, 24, 25.

Assignment:

Problem Set 2 due Tuesday, September 30.  
Project 1 on Fixed-income portfolio management due Friday, October 17.

**September 30**

#### Common Stocks

Discounted Cash Flow Model (DCF). EPS. P/E ratio. PVGO. Discount Rates.

Reading:

BKM Chapter 18. BM Chapter 4.

Assignment:

Problem Set 3 due Tuesday, October 7.

**October 7**

#### Forwards and Futures

Forward and futures. Forward and futures prices. Hedging with forward and futures.

READING:

BKM Chapter 22, 23. BM Chapter 27.

ASSIGNMENT:

Problem Set 4 due Tuesday, October 21.

<b>October 14</b>	<b>Options</b> Options. Properties of options. Valuation of options, binomial model, risk-neutral pricing, Black-Scholes formula. Reading: BKM Chapter 20, 21. BM Chapter 20. Assignment: Problem Set 5 due Tuesday October 28.
<b>October 21</b>	<b>Historical Asset Returns</b> Reading: BKM Chapter 5.3-5.4. BM Chapter 7.1.
<b>October 28</b>	<b>Midterm Exam</b>
<b>Part C.</b>	<b>Time Value of Money and Price of Risk</b>
<b>October 28</b>	<b>Time Value of Money and Theories of Interest Rates</b> Intertemporal consumption/saving decisions. Theory of real interest rates. Hypotheses of term structure of interest rates. Reading: BKM Chapters 5.1, 15.3, 15.4. BM Chapter 24.1, 24.4. Assignment: Problem Set 6 due Friday, November 14.
<b>November 4</b>	<b>Risk</b> Asset returns. Measures of risk. Risk and horizon. Reading: BKM Chapter 6. BM Chapter 7.
<b>November 4</b>	<b>Portfolio Theory</b> Diversification. Systematic risk and non-systematic risk. Portfolio theory. Efficient risk-return trade-off. Dynamic considerations. Reading: BKM Chapter 7, 8. BM Chapter 7, 8.1. Assignment: Problem Set 7 due Tuesday, November 18.
<b>November 18</b>	<b>Capital Asset Pricing Model (CAPM) and Its Extensions</b> CAPM. Risk and return trade-off in CAPM. Applications of CAPM. Empirical evidence on CAPM. Extensions of CAPM. Reading: BKM Chapter 9. BM Chapter 8.2-8.3. Readings package: "Beta and return" (F. Black). Assignment: Project 2 on equity portfolio management due Tuesday, November 25.
<b>November 25</b> (17:30-20:30)	<b>Arbitrage Pricing Theory (APT)</b> Factor model of asset returns. APT. Implications of APT. Reading: BKM Chapter 10, 11. BM Chapter 8.4. Assignment: Problem Set 8 due Tuesday, December 2.

**Part D. Introduction to Corporate Finance**

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**November 25 Market Efficiency**

Efficient Market Hypothesis (EMH). Empirical tests of EMH. Implications of EMH.

Reading: BKM Chapter 12. BM Chapter 13. Readings package: “The theory of stock market efficiency: Accomplishments and limitations” (R. Ball).

**December 2 Capital Budgeting**

Capital budgeting criteria. Cash-flow calculations. Discount rates. Project Interaction. Real options.

Reading: BM Chapter 5, 6, 9, 22.

Assignment: Problem Set 9 due Friday, December 5.

**December 9 Financing**

Leverage. MM Theorems. Corporate taxes.

Reading: BM Chapter 17, 18.

**TBA Final Review Session**

**TBA Final Exam**