

# Massachusetts Institute of Technology Sloan School of Management

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E52-410; 253-7159

Finance Theory  
Spring 1998

## Course Syllabus for 15.415-A&B

### Course Description

This course covers modern capital market theory and its applications to corporate finance. The three main areas to be addressed are: (1) Valuation of financial claims; (2) Risk and return; and (3) Corporate finance decisions including capital budgeting, financing and hedging. 15.415 is a prerequisite for all finance electives and for the Financial Engineering and Financial Management Tracks.

### Textbooks and Reading Materials

#### REQUIRED:

- R. Brealey and S.C. Myers, *Principles of Corporate Finance* (5th ed.), McGraw Hill. (BM)
- Z. Bodie, A. Kane and A. Marcus, *Investments* (3rd ed.), Irwin. (BKM)
- R. Uppal and J. Wang, *15.415 Lecture Notes*, Sloan Graphic Arts.
- 15.415 Readings package, Sloan Graphic Arts.

#### RECOMMENDED:

- J. Hull, *Options, Futures, and Other Derivatives* (3rd ed.), Prentice Hall.
- *Wall Street Journal*.

### Office Hours

Tuesday 4–5 pm, and by appointment. Tel: 253-7159; Email: [uppal@mit.edu](mailto:uppal@mit.edu)

### Secretary

Michael Enos, E52-450, 253-6853

### Teaching Assistants

There are four teaching assistants for the course. The teaching assistants will be holding office hours every week and also recitations in weeks that an assignment is due. The schedule for office hours and recitations will be announced in class.

- Angel Diaz-Alegre: [adalegre@po7.mit.edu](mailto:adalegre@po7.mit.edu)
- Giu Hoang: [bhoang@mit.edu](mailto:bhoang@mit.edu)
- William Chuck Joyce: [chuckjen@gis.net](mailto:chuckjen@gis.net)
- Todd Mitton: [mitton@mit.edu](mailto:mitton@mit.edu)

## Course Requirements

- Regular class sessions are on Tuesday and Thursday in E51-345 from 10:00–12:00 and in E51-325 from 2:00–4:00.
- There are 10 assignments.
  - Each assignment consists of exercises and minicases/cases. The solutions for the exercises are included. You need to hand in only the solutions to the minicases/cases. Questions on the midterm and final exams will be based on these exercises and minicases/cases.
  - All assignments can be done in groups of three or less. (Students are free to change groups.)
  - Each assignment is due at the beginning of class on its due date.
  - Late assignments are not accepted.
  - There is a recitation/review session for each assignment. The schedule for these recitations will be announced in class. Attendance is not mandatory.
- 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 course grade is determined by a 15/35/50% weighting on assignments/midterm/final.

## Course Outline

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

### Part A.

### Introduction

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**February 3, 5**

#### Introduction to Finance

Corporate financial decisions. Valuation of investments. Role of financial markets. Objectives of financial management.

READING: BM Chapter 1, 2.

**February 10, 12**

#### Present Value

Present value. Perpetuities and annuities. Compound interest. After-tax discount rates. Impact of inflation. Internal rate of return (IRR).

READING: BM Chapter 3.

ASSIGNMENT: Problem Set 1 due on February 24.

**February 17**

**No class—Monday schedule**

### Part B.

### Valuation

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**February 19, 24, 26**

#### Fixed-Income Securities

Discount bonds and spot interest rates. Term structure of interest rates. Forward interest rates. Coupon bonds. Inflation. Foreign exchange. Fixed-income portfolio management. Credit risk. Corporate bonds. Mortgage-backed securities.

READING: BM Chapter 3, 23, 24. BKM Chapter 13, 14, 15. Readings package: “Understanding duration and volatility” (Bond Portfolio Analysis Group, Salomon Brothers).

ASSIGNMENT: Problem Set 2 due on March 3.

**March 3**

#### Common Stocks

Dividend Discount Model (DDM). EPS. P/E ratio. PVGO.

READING: BM Chapter 4. BKM Chapter 17, 18.

ASSIGNMENT: Problem Set 3 due on March 10.

**March 5, 10, 12**

**Options**

Properties of options. Applications of options. Valuation of options, binomial model, Black-Scholes formula. Complex options.

READING: BM Chapter 20, 22. BKM Chapter 19, 20. Readings package: “Of butterflies and condors” (Economist); “The British Petroleum stock offering: An application of option pricing” (C. Muscarella and M. Vetsuypens).

ASSIGNMENT: Problem Set 4 including Case “Sally Jameson: Valuing stock options in a compensation package” due on March 17.

**March 17**

**Forward and Futures**

Financial and commodity forwards and futures.

READING: BM Chapter 25. BKM Chapter 21, 22, 25.

ASSIGNMENT: Problem Set 5 due on March 31.

**March 19, 24, 26**

**No class—Spring Break**

**Part C.**

**Risk**

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**March 31**

**Risk and Return**

Definition of risk. Estimation of risk and return. Historic asset returns.

READING: BM Chapter 7.

**March 31**

**Review Session for midterm exam**

From 7:00 to 9:00 pm in 54-100

**April 2**

**Midterm Exam** (in-class exam)

**April 7**

**Portfolio Theory**

Diversification. Aggregate risk and idiosyncratic risk. Portfolio theory.

READING: BM Chapter 7, 8. BKM Chapter 5, 6, 7. Readings package: “Risk and return” (Economist).

ASSIGNMENT: Problem Set 6 including Case “Beta Management Company” due on April 14.

<b>April 9</b>	<p><b>Capital Asset Pricing Model (CAPM)</b></p> <p>CAPM. Estimating betas. Asset allocation. Performance evaluation.</p> <p>READING: BM Chapter 8, 9 and BKM Chapter 8, 9. Readings package: “Beta and return” (F. Black).</p> <p>ASSIGNMENT: Problem Set 7 due on April 23.</p>
<b>April 14</b>	<p><b>Multifactor CAPMs and Arbitrage Pricing Theory (APT)</b></p> <p>Empirical evidence on CAPM. Extensions to CAPM. APT.</p> <p>READING: BKM Chapter 10, 11. Readings package: “Cost of capital using APT: A case of nine New York utilities” (E. Elton, M. Gruber and J. Mei).</p>
<b>Part D.</b>	<b>Corporate Finance</b>
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<b>April 16</b>	<p><b>Efficiency of Capital Markets</b></p> <p>Notions of market efficiency. Empirical evidence on market efficiency. Implications of market efficiency.</p> <p>READING: BM Chapter 13, BKM Chapter 12. Readings package: “The theory of stock market efficiency: Accomplishments and limitations” (R. Ball).</p>
<b>April 21</b>	<b>No class—Patriot’s Day</b>
<b>April 23, 28, 30</b>	<p><b>Capital Budgeting</b></p> <p>NPV rule. Cash-flow calculations. Project interactions. Alternatives to NPV. Discount rates. Strategic options. Capital rationing.</p> <p>READING: BM Chapter 5, 6, 10, 11, 21. Readings package: “A new approach to evaluating natural resource investments” (M. Brennan and E. Schwartz); “The term structure of discount rates” (M. Brennan).</p> <p>ASSIGNMENT: Problem Set 8 including Case “Acid rain” due on May 5.</p>

**May 5**

**Financing Decisions**

Capital structure. Modigliani-Miller Theorems. Impact of taxes on financing. Costs of financial distress. Agency and information costs.

READING: BM Chapter 17, 18. Readings package: “Unlocking corporate finance” (Economist); “Still searching for optimal capital structure” (S. Myers); “Three pieces of the capital structure puzzle: The cases of Alco Standard, Comdisco, and Revco” (S. Patrick).

ASSIGNMENT: Problem Set 9 including Case “UST Inc.” due on May 12.

**May 7**

**Interaction of Investing and Financing**

Adjusted present value (APV). Weighted average cost of capital (WACC).

READING: BM Chapter 19.

ASSIGNMENT: Problem Set 10 (not to be handed in).

**May 12**

**Dividend Policy**

Modigliani-Miller Theorem on Dividends. Dividends versus capital gains. Impact of taxes.

READING: BM Chapter 16. Readings package: “The determinants of corporate leverage and dividend policies” (M. Barclay, C. Smith and R. Watts).

**May 14**

**Hedging Financial Risks**

Financial risks. Hedging strategies.

READING: BM Chapter 25. BKM Chapter 25. Readings package: “Derivatives and corporate risk management” (Journal of Applied Corporate Finance); “Derivatives regulation and financial management: Lessons from Gibson Greetings” (J. Overdahl and B. Schachter); “How financial engineering can advance corporate strategy” (P. Tufano).

**May 16**

**Review Session for final exam**

From 1:30 to 4:30 pm in 34-101.