

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
SLOAN SCHOOL OF MANAGEMENT

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Finance Theory
15.415 C&D
Spring 1999

15.415 Course Syllabus

Course Description

This course covers modern theories of investment, asset valuation, and corporate finance. The topics include: (1) valuation of financial securities; (2) portfolio theory and asset pricing models; and (3) corporate financial decisions including capital budgeting, financing and risk management. 15.415 is a prerequisite for finance electives and for the Financial Engineering and Financial Management Tracks.

Course Materials

REQUIRED:

- R. Brealey and S.C. Myers, *Principles of Corporate Finance* (5th edition), McGraw Hill. (BM)
- J. Wang, *15.415 Lecture Notes*, Sloan Graphic Arts.
- 15.415 Readings Package (for Section C&D), Sloan Graphic Arts.

RECOMMENDED:

- Z. Bodie, A. Kane and A. Marcus, *Investments* (4th edition), McGraw Hill. (BKM)
- Wall Street Journal.

Course Requirements

- Regular class sessions are on Tuesdays and Thursdays in E51-325 from 10:00–12:00 (for Section D) and 14:00-16:00 (for Section C), respectively.
- There are 10 assignments.
 - Assignments can be done in groups of three or less.
 - Each assignments 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.
- 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 by a 15/35/50% weighting on assignments/midterm/final.

Office Hours

Wednesday 15:00 – 16:00, and by appointment.

Teaching Assistants

- **Section C** (TTh 14:00-16:00):
 - John Cochran (jcochran@mit.edu)
 - Jennifer Huang (hcy@mit.edu)
- **Section D** (TTh 10:00-12:00):
 - Giorgio Fano (gfano@mit.edu)
 - Lin Xu (xlin@mit.edu).

Secretary

Robin Colleen Moore, E52-430, 253-9747 (rcmoore@mit.edu).

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

Part A. Introduction

February 2 Introduction

Corporate financial decisions. Valuation of investments and cost of capital. Role of financial markets. Objectives of financial managers.

READING: BM Chapter 1, 2.

February 4, 9 Present Value

Present value. Shortcuts in PV calculations. Compound interest. After-tax discount rates. Impact of inflation. Internal rate of return (IRR).

READING: BM Chapter 3.

ASSIGNMENT: Assignment 1 due on February 18.

Part B. Valuation

February 11, 18 Fixed-Income Securities

Term structure of interest rates. Forward interest rates. Bond prices. Interest rate risk. Inflation. Foreign exchange. Credit risk.

READING: BM Chapter 3, 23, 24. BKM Chapter 14, 15, 16.

ASSIGNMENT: Assignment 2 due on February 25.

February 23 Common Stocks

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

READING: BM Chapter 4. BKM Chapter 18, 19.

ASSIGNMENT: Assignment 3 due on March 4.

February 25 Forward and Futures

Financial and commodity forwards and futures. Hedging with forward and futures.

READING: BM Chapter 25. BKM Chapter 22, 23.

ASSIGNMENT: Assignment 4 due on March 4.

March 2, 4

Options

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

READING: BM Chapter 20, 22. BKM Chapter 20, 21. Readings package: “Of butterflies and condors” (Economist); “The British Petroleum stock offering: An application of option pricing” (C. Muscarella and M. Vetsuypens).

ASSIGNMENT: Assignment 5 (including Case “Sally Jameson: Valuing stock options in a compensation package”) due on March 11.

Part C.

Risk

March 9

Risk and Return

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

READING: BM Chapter 7. BKM Chapter 5.

March 11

Portfolio Theory

Diversification. Systematic risk and non-systematic risk. Portfolio theory. Frontier portfolios.

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

ASSIGNMENT: Assignment 6 (including Case “Beta Management Company”) due on April 6.

March 16

Midterm Exam

March 18, 23, 25

No class—Spring Break

March 30

Portfolio Theory (continued)

April 1

Capital Asset Pricing Model (CAPM)

CAPM. Estimating betas. Applications of CAPM. Empirical evidence on CAPM. Extensions to CAPM

READING: BM Chapter 8, 9 and BKM Chapter 9. Readings package: “Beta and return” (F. Black).

ASSIGNMENT: Assignment 7 due on April 13.

April 6

Arbitrage Pricing Theory (APT)

APT. Applications of APT.

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).

Part D.

Corporate Finance

April 8

Efficiency of Capital Markets

Notions of market efficiency. Empirical evidence on market efficiency. Implications of market efficiency for corporate finance.

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

April 13, 15

Capital Budgeting

NPV rule. Cash-flow calculations. Project interactions. Alternatives to NPV. Discount rates. Strategic options.

READING: BM Chapter 5, 6, 10, 11, 21.

ASSIGNMENT: Assignment 8 (including Case “Acid rain”) due on April 22.

April 20

No class—Patriot’s Day

April 22

Capital Budgeting (continued)

April 27, 29

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: Assignment 9 (including Case “UST Inc.”) due on April 29.

May 4

Interaction of Investing and Financing

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

READING: BM Chapter 19.

ASSIGNMENT: Assignment 10 (including Case “American Chemical”) due on May 6.

May 6

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 11

Hedging Financial Risks and Risk Management

Financial risks and hedging strategies. Corporate risk management.

READING: BM Chapter 25. BKM Chapter 27. Readings package: “How financial engineering can advance corporate strategy” (P. Tufano); “Derivatives and corporate risk management” (Journal of Applied Corporate Finance).

ASSIGNMENT: Case reading “Metallgesellschaft AG” and “Derivatives regulation and financial management: Lessons from Gibson Greetings” (J. Overdahl and B. Schachter).

May 13

Course Summary