

**SLOAN SCHOOL OF MANAGEMENT
MASSACHUSETTS INSTITUTE OF TECHNOLOGY**

Andrew W. Lo
E52-454

Summer 2007
3-9745

15.414 Financial Management

This course provides a rigorous introduction to the fundamentals of modern financial analysis and applications to business challenges in capital budgeting, project evaluation, corporate investment and financing decisions, and basic security analysis and investment management. The four major sections of the course are: (A) an introduction to the financial system, the six unifying principles of modern finance, and fundamental present-value relations; (B) valuation models for stocks, bonds, forwards, futures, and options; (C) methods for incorporating uncertainty into valuation models, including portfolio theory, mean-variance optimization, and the Capital Asset Pricing Model; and (D) applications to corporate financial decisions, including capital budgeting, project financing, and corporate risk management.

Course Materials

- R. Brealey, S. Myers, and F. Allen, *Principles of Corporate Finance*, 8th edition, Irwin/McGraw Hill.
 - ‘Brealey, Myers, and Allen’ is the world’s most popular finance text. It provides a thorough introduction to financial theory and practice.
- Class Notes
 - Class notes will be distributed in class and available on SloanSpace. They contain material not found in Brealey, Myers, and Allen, and provide alternate perspectives on the major themes of the course.
- Reading Packet
 - The reading packet, available from Copy Tech, contains cases and a few additional readings.

Course Requirements and Grading

Grades will be determined by class participation (15%) and your performance on the assignments (45%) and final exam (40%).

As noted in the course outline, there will be 4 written assignments, consisting of both problem sets and cases. The problem sets should be fairly straightforward. Cases are more difficult and will be discussed in class on the day they are due. **You should work together on the assignments in groups of four. Please bring the case write-ups and problem solutions to class.**

Recitations

Katy Kaminski (katykam@mit.edu), a Sloan PhD student, will hold recitations as indicated in the course outline. During recitations, Katy will review class material and present additional applications and problems. Katy will also be available outside of class for additional help. Students seeking intensive one-on-one help should talk with Professor Lo or Marsha Warren about additional resources that are available.

Administrative Assistant

Sarah Grosvenor, E52-450, (617) 253-9745, sgrosv@mit.edu.

Additional Readings (not required)

P. Bernstein, *Capital Ideas*, Free Press, 1993.

- Bernstein is one of the most well-respected and influential practitioners in the financial industry, and the founding editor of the *Journal of Portfolio Management*. This is a lively and beautifully written account of the most important ideas in academic finance, many of which were developed at MIT in the 1960's and 1970's.

Z. Bodie, A. Kane, and A. Marcus, *Investments*, 4th edition, Irwin/McGraw Hill, 1999.

- BKM focus exclusively on capital markets. They provide a more rigorous and thorough analysis of investments than Brealey, Myers, and Allen.

J. Hull, *Introduction to Futures and Options Markets*, 3rd edition, Prentice Hall, 1998.

- Hull provides a straightforward introduction to options, futures, and swaps (collectively called financial derivatives). The book discusses the valuation of these securities, the mechanics of trading, and the use of financial derivatives in managing risk.

Course Schedule

This is an approximate schedule for the course; some material may take longer or shorter to cover than the time allotted.

Week	Session	Date – A	Date – B	Topic	Assignment Due
1	1	Jul 24	Jul 24	Introduction	
	2	Jul 25	Jul 25	Present Value Relations 1	
	3	Jul 25	Jul 25	Present Value Relations 2	
	4	Jul 26	Jul 26	Fixed Income Securities	
	5	Jul 27	Jul 27	Equity Securities	
2	6	Jul 30	Jul 30	Trading Lab Session	Problem Set 1, Case
	7	Jul 31	Jul 31	Futures and Forward Contracts	
	8	Aug 2	Aug 2	Options	
	9	Aug 3	Aug 3	Introduction to Risk and Return	
3	10	Aug 6	Aug 6	Risk Analytics	Problem Set 2
	11	Aug 7	Aug 7	Portfolio Theory	
	12	Aug 9	Aug 9	The CAPM	
	13	Aug 10	Aug 10	The APT and Other Extensions	
4	14	Aug 13	Aug 13	Practical Considerations	Problem Set 3, Case
	15	Aug 14	Aug 14	Capital Budgeting 1	
	16	Aug 16	Aug 16	Capital Budgeting 2	
	17	Aug 17	Aug 17	Corporate Financing 1	
5	18	Aug 20	Aug 20	Corporate Financing 2	Problem Set 4, Case
	19	Aug 21	Aug 21	Corporate Risk Management	
	20	Aug 22	Aug 22	Market Efficiency	
		Aug 23	Aug 23	Final Examination	Examination

Recitations

Week	Session	Date – A	Date – B	Topic
1	1	Jul 27	Jul 27	Discounting and Present Value
2	2	Jul 31	Jul 31	Common Stock
	3	Aug 3	Aug 3	Options and Futures
3	4	Aug 7	Aug 7	Risk, Return, and Statistics
	5	Aug 10	Aug 10	Portfolio Theory and CAPM
4	6	Aug 16	Aug 16	Capital Budgeting
5	7	Aug 21	Aug 21	Review

Course Outline

Chapters listed below refer to the main course textbook, Brealey, Myers, and Allen; articles referenced using the authors' last names are provided in the Readings Packet.

PART A. INTRODUCTION

July 24	Introduction to Finance and Course Overview	Chapter 1–2
	<ul style="list-style-type: none">▪ Financial decisions of households and corporations▪ Objectives of corporate financial managers.▪ Approaches to valuing financial and real assets▪ The role of financial markets▪ Unifying principles of finance	
	Read Kahneman and Tversky (1982), Maloney and Mulherin (2003)	
July 25	Present Value Relations 1	Chapter 3
	<ul style="list-style-type: none">▪ Net Present Value (NPV)▪ Opportunity cost of capital▪ Discount rates and the time value of money	

PART B. VALUATION

July 25	Present Value Relations 2	
	<ul style="list-style-type: none">▪ Mechanics of NPV calculations▪ Compound interest▪ Annuity and perpetuity formulas▪ Real vs. nominal cash flows	
July 26	Fixed Income Securities	Chapters 23–25
	<ul style="list-style-type: none">▪ Fixed-income markets▪ Term structure of interest rates▪ Market conventions, properties of bond prices▪ Measuring and hedging interest rate risk▪ Inflation risk, credit risk	
July 27	Equity Securities	Chapter 4
	<ul style="list-style-type: none">▪ Discounted Cash Flow (DCF) model▪ EPS, P/E, discount rates	

July 30 Trading Lab Session CRL Handout
Assignment Due: Problem Set 1
Case: Acid rain: The Southern Company (A)

July 31 Forwards and Futures Contracts Chapter 27
▪ Definitions of forward and futures
▪ Arbitrage pricing relations
▪ Using forwards and futures to hedge

Aug 2 Options Chapter 20–21
▪ Basic properties of options
▪ Valuation of options
▪ Binomial and Black-Scholes pricing models

PART C. RISK AND RETURN

Aug 3 Introduction to Risk and Return Chapter 7, 24.1, 24.4
▪ Historical asset returns
▪ The time value of money

Aug 6 Risk Analytics Chapter 7
▪ Measures of risk
▪ Risk and investment horizon

Assignment Due: Problem Set 2

Aug 7 Portfolio Theory Chapter 7, 8.1
▪ Diversification, systematic and idiosyncratic risk
▪ Portfolio optimization
▪ Efficient risk/return trade-offs

Aug 9 The Capital Asset Pricing Model (CAPM) Chapter 8.2–8.3
▪ The CAPM and linear risk/return trade-offs
▪ Applications of the CAPM
▪ Empirical evidence and extensions of the CAPM

Read Jagannathan and McGrattan (1995)

Aug 10 The APT and Other Extensions Chapter 8.4

- Linear factor models of asset returns
- Arbitrage pricing and its implications
- Factor models for hedge funds

Aug 13 Practical Implications

Assignment Due: Problem Set 3
Case: Harvard Management Company Case (HMC)

PART D. CORPORATE FINANCE

Aug 14 Capital Budgeting 1 Chapter 5–6, 9, 22

- Capital budgeting criteria
- NPV rule, cashflow calculations, discount rates

Read Graham and Harvey (2001)

Aug 16 Capital Budgeting 2

- Project interactions
- Real options.

Aug 17 Corporate Financing 1 Chapter 14–15, 17–18

- Raising capital
- Source of funds
- Leverage, risk, and the M&M Theorems

Read Kim and Ritter (1999) and Smith (1986)

Aug 20 Corporate Financing 2 Chapter 18, 19.1–19.4

- Optimal capital structure
- Corporate taxes, after-tax WACC
- Financial distress.

Assignment Due: Problem Set 4
Case: Massey Ferguson, 1980

Read Myers (1984)

- Aug 21 Corporate Risk Management
- The 3 P's of Total Risk Management
 - Risk management and the M&M theorems
 - Risk management and corporate governance

Read Lo (1999)

- Aug 22 Market Efficiency Chapter 13
- Origins of the Efficient Markets Hypothesis
 - Implications and empirical tests of the EMH
 - Behavioral finance and neuroeconomics
 - The Adaptive Markets Hypothesis

Read Lo (2005, 2007)

Aug. 23 FINAL EXAM

Readings Packet

Cases

1. 'Acid rain: The Southern Company (A).' HBS case 9-792-060.
2. 'Harvard Management Company.' HBS case 9-201-129.
3. 'Massey-Ferguson, 1980.' HBS case 9-282-043.

Articles

1. Graham, J. and C. Harvey, 2001, "The Theory and Practice of Corporate Finance: Evidence from the Field", *Journal of Financial Economics* 60, 187–243.
2. Jagannathan, R. and E. McGrattan, 1995, "The CAPM Debate", *Federal Reserve Bank of Minneapolis Quarterly Review* 19, 2–17.
3. Kahneman, D. and A. Tversky, 1982, "The Psychology of Preferences", *Scientific American* 246, 160–173.
4. Kim, M. and J. Ritter, 1999, "Valuing IPOs", *Journal of Financial Economics* 53, 409-437.
5. Lo, A., 1999, "The Three P's of Total Risk Management", *Financial Analysts Journal* 55, 13–26.
6. Lo, A., 2005, "Reconciling Efficient Markets with Behavioral Finance: The Adaptive Markets Hypothesis", *Journal of Investment Consulting* 7, 21–44.
7. Lo, A., 2007, "Efficient Markets Hypothesis", to appear in *The New Palgrave: A Dictionary of Economics*, 2nd Edition. New York: Palgrave Macmillan.
8. Maloney, M. and H. Mulherin, 2003, "The Complexity of Price Discovery in an Efficient Market: The Stock Market Reaction to the Challenger Crash", *Journal of Corporate Finance* 9, 453–479.
9. Myers, S., 1984, "Finance Theory and Finance Practice", *Interfaces* 14, 126-137. Reprinted in *Midland Corporate Finance Journal* 5 (Spring 1987).
10. Smith, C., 1986, "Raising Capital: Theory and Evidence", *Midland Corporate Finance Journal* 4, 6–22.