

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

Hui Chen
Fall 2010

15.401
Sections A, B

15.401 Finance Theory I

This course provides a rigorous introduction to the fundamentals of modern financial analysis and applications to business challenges in valuation, risk analysis, corporate investment decisions, and basic security analysis and investment management. The four major sections of the course are: (A) an introduction to the financial challenges firms and households face and the principles of modern finance in tackling these challenges; (B) valuation of stocks, bonds, forwards, futures, and options; (C) risk analysis including portfolio theory, mean-variance optimization, and the Capital Asset Pricing Model; and (D) applications to corporate financial decisions, including capital budgeting decisions. 15.401 is a prerequisite for all finance electives.

Class Schedule

The class meets twice per week:

- Section 15.401A: MW 1:00-2:30pm, E51-345
- Section 15.401B: MW 2:30-4:00pm, E51-345

Recitations

TAs will hold recitations during which class material will be reviewed and additional applications and exercises presented.

- Section 15.401A: F 2:00-3:00pm, Room E62-276
- Section 15.401B: F 3:00-4:00pm, Room E62-276

Course Website

The course website is <http://stellar.mit.edu/S/course/15/fa10/15.401AB/index.html>. All teaching materials will be posted on this site. TA office hours, class announcements, as well as problem sets will be posted here. Solutions to problem sets will be posted no later than one week after the due date; they will not be distributed in paper form in class. The course calendar is also available on this website.

Teaching Assistants

The TAs are Felipe Severino (fseverin@MIT.EDU) and Yuyao Wang (yy_wang@mit.edu).

Office Hours

Hui Chen, Tuesdays 4:00-5:30 pm, E62-637, or by appointment (huichen@mit.edu).

TAs will also hold regular office hours. The time and location will be announced on Stellar.

Tutoring

Extra help is available through the Sloan Core Tutoring Program:

<https://sloanpoint.mit.edu/progs/mba/academic/tutoring>

Administrative Assistant

Alexandra West, E62–611, (617) 253–9747, awest@mit.edu

Course Requirements and Grading

Course requirements include class participation (which requires having read the text book prior to coming to class), 7 problem sets, 2 case write-ups, and the midterm and final exams. The following weighting scheme will be used to determine each student's course grade:

10%	Class Participation
20%	Problem Sets and Case Study Write-Up
25%	Midterm Exam
45%	Final Exam

The closed-book in-class midterm exam will be on November 1st, and the closed-book final exam will be given on the MIT-scheduled final exam date (TBA) — please reserve these dates and schedule your interviews and travel plans accordingly.

Course Materials

- **Textbook.** R. Brealey, S. Myers, and F. Allen, *Principles of Corporate Finance*, 9th or 10th edition, Irwin/McGraw Hill.
- **Class Notes and Recitation Notes.** Notes will be available on the course website. They contain material not found in Brealey, Myers, and Allen, and provide alternate perspectives on the major themes of the course.
- **Problem Sets and Case Assignments.** Problem sets and case assignments will be available on the course website.

Additional Readings (not required)

Z. Bodie, A. Kane, and A. Marcus, *Investments*, 8th edition, Irwin/McGraw Hill, 2009.

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

B. Malkiel, *A Random Walk Down Wall Street*, 2007.

- This best-selling introduction to investing is now in its 9th edition and is as popular as ever because of its entertaining style and sage advice. This is a great way to ease into financial markets, particularly for those who are not financially inclined.

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.

Staying Up to Date

You are encouraged to follow financial and macroeconomic news in the Financial Times, Wall Street Journal, or The Economist. If you encounter an interesting article that you would like to share with the class, send me an email and I will post it on the class web site.

Exams

The midterm and final exams will test your understanding of the key class concepts. They do not test your ability to memorize or to use your calculator. They rather probe your deeper understanding of the material. As a result, they may be more challenging than the exams you are used to. To prepare for these exams, you should review the slides together with your own class notes, the handouts, the required readings, the problem sets, the sample exams, and preferably the suggested readings. The final exam is cumulative. Students can request their graded final exams after the end of the semester.

You will be allowed one double-sided page of notes at the midterm exam and two double-sided pages of notes at the final exam. The sheets must be no larger than 8.5 X 11. There are no restrictions on the content of the formula sheets. If you must miss an exam, you will be required to make it up after the semester is over. No laptops or palm pilots are allowed on the exam.

Problem Sets

There will be 7 problem sets over the course of the semester. Most problems set will contain 1 Excel question, emphasizing a practical implementation of a concept. The problem sets are graded on a 10 point scale. *Late problem sets will not be accepted.* You are encouraged to work in groups on the problems, but you must hand in your own copy. You also need to acknowledge any help you received on the first page of your work. The exam questions will have the same format as the problem sets (without any Excel question obviously); but the problem sets will be slightly easier.

Sloan Values

You are responsible for upholding Sloan's code of conduct, which mandates zero tolerance for cheating and plagiarism. For more details on Sloan's academic policies, please read the document "Classroom Values in Practice" which is available on the course website.

Course and Recitation Schedule (subject to changes)

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

Session	Date	Topic	Assignment Due
1	09/08	Introduction	
2	09/13	Present Value 1	
3	09/15	Present Value 2	
	09/15	<i>Special Lecture: Bob Merton</i>	<i>Attendance recommended (4-6pm)</i>
	09/17	<i>Recitation: Present value</i>	
4	09/20	Fixed Income Securities 1	Problem Set 1: Present Value
5	09/22	Fixed Income Securities 2	
	09/24	<i>Recitation: Fixed Income</i>	<i>Evening schedule (TBA)</i>
6	09/27	Fixed Income Securities 3	
7	09/29	Common Stocks 1	Problem Set 2: Fixed Income
	10/01	<i>Recitation: Fixed Income, Part II</i>	
8	10/04	Common Stocks 2	Case 1
9	10/06	Forwards and Futures 1	
	10/08	<i>Recitation: Common Stocks</i>	
	10/11	Columbus Day – No class	
10	10/13	Forwards and Futures 2	
	10/15	<i>Recitation: Forwards</i>	Problem Set 3: Common Stocks
	10/18	SIP Week – No class	
	10/20	SIP Week -- No class	
	10/22	<i>SIP Week -- No Recitation</i>	
11	10/25	Options 1	Problem Set 4: Forwards and Futures
12	10/27	Options 2	
	10/29	<i>Recitation: Mid-Term</i>	
13	11/01	In-Class Mid-Term Exam	
14	11/03	Introduction to Risk and Return	
	11/05	<i>Recitation: Options</i>	
15	11/08	Portfolio Theory 1	Problem Set 5: Options
16	11/10	Portfolio Theory 2	
	11/12	<i>NYC Visit -- No Recitation</i>	

17	11/15	CAPM 1	
18	11/17	CAPM 2	
	11/19	<i>Recitation: Portfolio Theory</i>	
19	11/22	CAPM 3	Problem Set 6: Portfolio Theory
	11/24	Thanksgiving – No Class	
	11/26	<i>Recitation: CAPM</i>	
20	11/29	Capital Budgeting 1	Problem Set 7: CAPM
21	12/01	Capital Budgeting 2	
	12/03	<i>Recitation: Capital Budgeting</i>	
22	12/06	Market Efficiency	
23	12/08	Final Review	Case 2
	12/12	<i>Recitation: Final review</i>	<i>Schedule TBD</i>
	12/xx	Final Exam	

Course Outline

Chapters listed below refer to the main course textbook, Brealey, Myers, and Allen (10e). Note that the chapter numbers for the 9th edition are slightly different.

PART A. INTRODUCTION

9/8	Introduction to Finance and Course Overview	Chapter 1
	<ul style="list-style-type: none">▪ Financial decisions of households and corporations▪ Approaches to valuing financial and real assets▪ Opportunity of cost of capital▪ The role of financial markets▪ Unifying principles of finance	
9/13, 15	Present Value	Chapter 2
	<ul style="list-style-type: none">▪ Present Value (PV) and Net Present Value (NPV)▪ Discount rates and the time value of money▪ Compound interest▪ Annuity and perpetuity formulas▪ Real vs. nominal cash flows	

PART B. VALUATION

9/20, 22, 27	Fixed Income Securities	Chapters 3, 23, 24
	<ul style="list-style-type: none">▪ Fixed-income markets▪ Term structure of interest rates▪ Properties of bond prices and market conventions▪ Interest rate risk▪ Inflation risk, credit risk	
9/29, 10/4	Common Stocks	Chapter 4
	<ul style="list-style-type: none">▪ Discounted Cash Flow (DCF) model▪ EPS, P/E, PVGO	
10/6, 13	Forwards and Futures	Chapter 26
	<ul style="list-style-type: none">▪ Definitions of forwards and futures▪ Arbitrage pricing relations▪ Using forwards and futures to hedge risks	
10/25, 27	Options	Chapter 20, 21
	<ul style="list-style-type: none">▪ Definition of options▪ Basic properties of options	

- Binomial and Black-Scholes pricing models

11/1 Mid-Term Examination (in-class, closed-book)

PART C. RISK AND RETURN

11/3 Introduction to Risk and Return Chapter 7, 8

- Historical asset returns
- Risk/return trade-off

11/8, 10 Risk Analytics / Portfolio Theory Chapter 7, 8

- Measures of risk
- Diversification
- Systematic and idiosyncratic risks
- Portfolio optimization
- Efficient risk/return trade-offs

11/15, 17, 22 Capital Asset Pricing Model (CAPM) Chapter 7, 8

- The CAPM and linear risk/return trade-offs
- Applications of the CAPM
- Empirical evidence and extensions of the CAPM

PART D. CORPORATE FINANCE

11/29 Capital Budgeting 1 Chapter 5, 6, 9

- Capital budgeting criteria
- NPV rule, cash flow calculations, discount rates

12/1 Capital Budgeting 2 Chapter 22

- Project interactions
- Real options

12/6 Market Efficiency Chapter 13

- Origins of the Efficient Markets Hypothesis
- Implications and empirical tests of the EMH
- Recent developments

12/8 Final Review (tentative)

12/xx FINAL EXAM (closed-book)
