

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

Kogan and Wang
E62-636 and E62-614

15.415
Summer 2019

15.415 Finance Theory

This course provides a rigorous introduction to the fundamentals of modern finance and their applications to business challenges in valuation, investment and risk managements, and corporate financial decisions. The five 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) introduction to corporate finance and capital budgeting; (C) valuation of stocks, bonds, forwards and futures, options; (D) risk and return, including risk analysis, the Arbitrage Pricing Theory (APT), portfolio theory, and the Capital Asset Pricing Model (CAPM); and (E) corporate financial decisions, including capital structure, payout policy, interaction between investment and financing decisions, and risk management.

Course Materials

- **Required Textbook:** Brealey, Myers, and Allen, *Principles of Corporate Finance* (13e), Irwin/McGraw Hill. (BMA)
- **Recommended Textbook:** Bodie, Kane, and Marcus, *Investments* (11e), Irwin/McGraw Hill. (BKM)
- **Class Notes:** Class notes will be available on the course website. They provide alternative perspectives on the major themes of the course.
- **Assignments:** Problem sets and case write-ups will be available on the course website.
- **Course Packet:** The course packet, available from Copy Tech, contains cases and additional readings.

Course Requirements and Grading

Course requirements include regular attendance and participation in class, readings in the textbooks, problem sets, and case write-ups, and two exams. The following weighting scheme will be used to determine each student's course grade:

10%	Class participation
12%	Problem Sets
8%	Case Write-Ups
25%	Mid-term exam
45%	Final Exam

Recitations

TAs will hold regular recitations, to review class material and present additional applications and exercises.

Administrative Assistant

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Additional Readings (not required)

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

- This best-selling introduction to investing is now in its 9th edition and 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.

Wall Street Journal

- Often called the diary of financial markets, the *Journal* is still the leading business publication in the world and familiarity with its various columns, sections, and op-ed pieces is a must for any serious finance professional.

Course Outline

(This draft: July 22, 2019)

PART A

INTRODUCTION

7/24 (W)

Introduction to Finance

- Financial decisions of households and corporations
- Approaches to valuing financial and real assets
- The role and the overview of financial markets
- Financial frictions
- Unifying principles of finance

Reading: BMA Chapter 1; BKM Chapters 1, 2, 3, 4

7/25 (Th)

Market Prices and Present Value

- State-space model for time and risk
- Arbitrage/relative pricing
- Present Value (PV) and future value
- Inflation, nominal and real cash flows and discount rates
- Historic returns on asset classes: return and risk
- Annuity and perpetuity formulas
- Compound interest

Reading: BMA Chapter 2, 7; BKM Chapter 5
Problem Set 1

PART B

CORPORATE FINANCE I

7/26 (F)

Introduction to Corporate Finance

- Corporate financial decisions
- Opportunity cost of capital and NPV
- Financial objective of corporate managers

Reading: BMA Chapter 1

7/26 (F), 29 (M)

Capital Budgeting I

- NPV rules
- Cash flow calculations
- Alternatives to NPV
- Project interactions

Reading: BMA Chapters 5, 6, 9, 10, 11
Case: “Acid Rain”

PART C

RELATIVE VALUATION

7/30 (T)

Fixed Income Securities

- Fixed-income markets

- Term structure of interest rates
- Properties of bond prices and market conventions
- Interest rate risk, duration, and convexity
- Inflation risk

Reading: BMA Chapter 3; BKM Chapters 14, 15, 16
Problem Set 2

7/31 (W)

Common Stocks

- Discounted Cash Flow (DCF) model
- Gordon model, multi-stage growth model
- EPS, P/E, PVGO

Reading: BMA Chapter 4; BKM Chapter 18
Problem Set 3

8/1 (Th)

Forwards and Futures

- Introduction to forwards and futures
- Arbitrage pricing relations
- Forward interest rates
- Swaps

Reading: BMA Chapter 26; BKM Chapters 22, 23
Problem Set 4

8/2 (F), 8/6 (T)

Options

- Introduction to options
- Basic properties of options
- Binomial model of option pricing
- Risk neutral pricing
- Black-Scholes-Merton option pricing model

Reading: BMA Chapters 20, 21
Problem Set 5

8/5 (M)

Midterm Exam (in class, 3 hours, closed book, 1 page of notes)

PART D

RISK, RISK PREMIUM, AND MARKET EQUILIBRIUM

8/7 (W)

Risk

- Decisions under uncertainty and expected utility theory
- Risk aversion
- Diversification and portfolio analytics
- Systematic and idiosyncratic risk

Reading: BMA Chapter 7; BKM Chapters 6, 7

8/8 (Th)

Arbitrage Pricing Theory (APT)

- Factor models for risk

- APT
- Applications of APT

Reading: BKM Chapter 8, 10
Problem Set 6

8/12 (M)

Portfolio Theory

- Portfolio optimization
- Mean-variance efficient portfolios
- Capital Market Line and leverage

Reading: BMA Chapter 8; BKM Chapter 7
Problem Set 7

8/13 (T)

Capital Asset Pricing Model (CAPM)

- CAPM and linear risk/return trade-offs
- Applications of the CAPM
- Empirical tests of CAPM, size and book/market effects

Reading: BMA Chapter 8; BKM Chapter 9
Problem Set 8
Case: “AQR”

8/14 (W)

Market Efficiency

- Efficient Market Hypothesis (EMH)
- Implications of EMH
- Empirical evidence on EMH

Reading: BMA Chapter 13
Problem Set 9

PART E

CORPORATE FINANCE II

8/15 (Th)

Capital Budgeting II and Real Options

- Capital budgeting and discount rates
- Introduction to real options
- Identifying and valuing real options

Reading: BMA Chapter 22

8/16 (F)

Financing/Capital Structure I

- Financing decisions and capital structure
- Modigliani-Miller theorems
- WACC
- Business risk vs. financial risk
- Financing and corporate taxes

Reading: BMA Chapters 14, 15, 16, 17, 18
Case: “Ameritrade”

Problem Set 10

8/19 (M)

Corporate bonds

- Default risk, default risk premium
- Valuation of corporate bonds
- Other corporate securities

Reading: BMA Chapter 23, 24
Problem Set 11

8/20 (T)

Financing/Capital Structure II

- Cost of financial distress
- Information and agency costs
- Trade-off theory of capital structure
- Financing and personal taxes

Reading: BMA Chapters 14, 15, 16, 17, 18

8/21 (W)

Interaction between Investing and Financing

- Adjusted Present Value (APV)
- Weighted Average Cost of Capital (WACC)

Reading: BMA Chapter 19
Problem Set 12

8/22 (Th), 23 (F)

Payout Policy and Risk Management

- Modigliani-Miller Theorem on risk management
- Impact of frictions on risk management
- Hedging interest rate risk with derivatives
- Hedging commodity price risk with derivatives

Reading: BMA Chapters 26

8/23 (F)

Course Wrap-up and Summary

8/26 (M)

Final Exam (in class, 3 hours, closed book, 2 pages of notes)