

**FINA 221**  
**Investment Analysis and Portfolio Management**

Fall 2009

**Instructor Information**

Name: Prof. Nengjiu Ju  
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Office hours: WF (1:30-2:50pm) or by appointment

**Lectures**

L1A: WF (3:00-4:20pm); Room: 4502  
L1B: WF (4:30-5:50pm); Room: 4502

**Tutorials**

T1A: W (2:00-2:50pm); Room: 1505  
T1B: T (6:00-6:50pm); Room: 2303

**Demonstrator Information:**

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**COURSE DESCRIPTION**

This course is designed to provide a comprehensive introduction to investment theory and practice. During the course we will come across some of the most important and influential concepts of finance theory: the Markowitz Portfolio Selection Model, Bill Sharpe's Capital Asset Pricing Model (CAPM), Steve Ross' Arbitrage Pricing Theory (APT), and the famous Black & Scholes option pricing formula. These theories are useful in many applications. For example, at the personal level, they can help you form your desirable personal portfolio. At the firm level, they are tools for a firm's risk management.

**COURSE Objectives**

At the end of the course, you will be able to:

1. State a wide variety of financial securities found in equity, fixed income and derivatives markets. [4.4]<sup>1</sup>

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<sup>1</sup> The numbers in the brackets correspond to the goals of PILOs-BBA-FINA (Program Intended Learning Outcomes inline with Intended Learning Outcomes of Finance Graduates), listed on page 10. Of course, not all goals apply to any single course.

2. Explain the theoretical foundations, and make use of the widely-used asset pricing theories. [4.1, 4.3, 4.6]
3. Select the appropriate measures for different fund management style performance evaluations. [1.1, 1.2, 1.3]
4. Develop quantitative skills needed to succeed as an investment professional. [1.2]

The course will also provide you opportunity to:

5. Use information technology to locate data and other information needed for homework assignment, mostly through tutorial sessions. [7]
6. Improve communication skills through class discussion and written report on teamwork. [2, 5]

### **PREREQUISITE**

The prerequisite for this course is FINA 111. Some of the materials that we will cover are quite technical. It is therefore advisable to review basic mathematical and statistical concepts such as: Probability distribution, mean (average), variance, covariance; basic linear algebra concepts such as: Vectors, matrices and their manipulations; and basic finance concepts such as: Present value.

### **REQUIRED READING MATERIAL**

Textbook:

Z. Bodie, A. Kane and A.J. Marcus, Investments (8<sup>th</sup> edition), McGraw Hill Irwin.

The official web site for this textbook contains additional background materials, recent investment news, and on-line practice quizzes.

### **Exams and GRADING**

Your final grade will be based on the following relative weightings:

Class and tutorial participation (attendance and discussion)	10%
Assignments (done with a group of 5 with peer evaluation)	10%
Pop quizzes (not announced in advance)	10%
Midterm exam (Oct 28, 6:30-8:30pm, venue to be announced)	35%
Final exam (2 hours long, date and venue to be announced later)	35%

**Note:**

1. **The final exam is non cumulative, meaning that it does not include materials after the midterm. However, obviously, knowledge from first half may be needed to answer some questions.**
2. **Exams mostly consist of numerical problems, NOT multiple choice ones.**
3. **Absence from the exams will not be excused except for serious medical illness. A doctor's letter must be provided within one week of the exam.**
4. **One page (one side only) of formulas on an A4 paper is allowed for the exams. Note that, only formulas, nothing else, can appear**

### Letter grade distribution

A+, A, A-: Top 20-25%  
B+, B, B-: Next 35-40%  
C+, C, C-: Next 30-35%  
D+, D, D-: Next 5-10%  
F: Bottom 0-5%

### HOMEWORK AND TUTORIALS

All homework assignments should be written in an easily readable fashion. Therefore, I encourage you to type the assignment. If your handwriting is difficult to read, you may lose 5-10% of homework grade, depending on the severity of the problem.

Homework assignments have to be submitted to your TA on the due dates. No late assignment will be accepted.

Homework assignments will be returned during the next tutorial session. During the tutorials you will have the opportunity to ask questions and discuss any problems with your TA. The tutorial sessions are mandatory.

### MID-TERM MAKEUP

There will be **NO** makeup for midterm, even for legitimate absence. Instead, the final will count for 70%, rather than 35%. I strongly encourage you to take the midterm by any means. If you miss it, you only have one shot (the final exam).

### CLASS and Tutorial PARTICIPATION

Active participation is important for your learning experience and required. It helps you to think actively rather than passively. Your participation also provides me and your TA with feedback to gauge whether you understand the material. Often students ask me to write a letter of reference on their behalf. Please keep in mind that if you have never participated in class, I will not be able to write a letter for you.

#### **Class and tutorial participation rubric: 3% for class and 7% for tutorial**

Excellent	Fair	Poor
Always attending and on time	Attending most classes and often on time	Rarely attending and/or often late
Actively asking relevant and sometimes deep questions and answering with concise and correct	Regularly asking relevant question and answering with sensible answers	Rarely participating in asking and/or answering questions

**Note:**

- 1. You cannot switch sessions of either lectures or tutorials.**
- 2. You are required to take the same seat every time. In this way your attendance or absence will easily be noted.**

### **Peer Evaluation**

Each member of a group must give a *different* rank on scale of 1 to 4 with 4 being the best and 1 being worst for a group of 5 members. The final score for a teamwork assignment is computed as:

$$\text{Final score} = \text{Basic score} \times [1+(x-2.5)/10],$$

where  $x$  is the average rank of a member in the group.

### **Class Conduct**

1. Come to and leave class on time.
2. Turn off all communication devices before class. Failure to do so will result in reduction of your class participation grade.
3. Do not talk with others unless you are told to discuss with others. Failure to do so will result in reduction of your class participation grade.

### **Academic Integrity**

Honest and integrity are central values in all aspects of life. They are certainly highly valued at HKUST. As a student, you are committed to UST's academic honor code which can be accessed from: <http://www.ust.hk/vpao/integrity/>. Cheating will result in zero credit and be reported to university for further disciplinary action.

### **IMPORTANT DATES**

Reuters Demonstration and Trading Lab during class time: (tentatively on Sept 11 in the trading lab, room 4117)

#### Tutorials

- Tutorial schedule will be posted on LMES.
- The first tutorial will be on Sept 8 for T1A and Sept 9 for T1B.

#### Homework Assignments

- First Homework Assignment Due (Wednesday before class, Sept. 23)
- Second Homework Assignment Due (Wednesday before class, Oct. 14)
- Third Homework Assignment Due (Friday before class, Oct. 23)
- Fourth Homework Assignment Due (Wednesday before class, Nov. 11)
- Fifth Homework Assignment Due (Wednesday before class, Nov. 18)
- Sixth Homework Assignment Due (Wednesday before class, Dec. 2)
- Seventh Homework Assignment Due (Monday noon to your TA's office on Dec. 7)

#### Exams

- Midterm: Oct. 28 from 6:30 to 8:30pm; Venue: LTJ.
- Final: time and room to be announced by the University

## **COURSE OUTLINE AND Topic Objectives**

### **Module 1: Introduction (chapters 1-4)**

1. Sept 2—Chapter 1—The Investment Environment  
Chapter objectives:
  - 1.1 Understand differences in financial and real assets. [R]<sup>2</sup>
  - 1.2 Be able to identify the major participants in the financial markets. [R]
  - 1.3 Be able to describe the role of financial assets and markets in the economy and understand how the financial system meets the needs of economic participants. [MI]
  - 1.4 Be able to describe ongoing innovation in the financial markets. [R]
2. Sept 4—Chapter 2—Asset Classes and Financial Instruments  
Chapter objectives:
  - 2.1 Have a thorough understanding of the various financial instruments available to the potential investor. [R]
  - 2.2 Have an insight as to the interpretation, composition, and calculation process involved in the various market indexes presented on the evening news. [MI]
3. Sept 9—Chapter 3—How Securities Are Traded  
Chapter objectives:
  - 3.1 Have considerable insight as to how securities are traded on both the primary and secondary markets. [R]
  - 3.2 Understand the mechanics, risk, and calculations involved in both margin trading and short selling. [MI]
  - 3.3 Understand some of the implications, ambiguities, and complexities of insider trading and the regulations concerning these issues. [CT]
4. Sept 11—Reuters Demonstration—during class time, BUT in trading lab.
5. Sept 16—Chapter 4—Mutual Funds and Other Investment Companies  
Chapter objectives:
  - 4.1 Be able to identify key differences between open-end and closed-end investment companies. [R]
  - 4.2 Be able to describe the expenses associated with investment in mutual funds and identify the major types of investment policies of mutual funds. [R]
  - 4.3 Be able to describe services provided by mutual funds and identify sources of information on investment companies. [R]
6. Sept 18—Any leftover materials and numerical problem solving examples

First Homework Assignment Due (Wednesday before class, Sept 23)

### **Module 2: Portfolio Theory and Practice (chapters 5-8)**

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<sup>2</sup> Indicating level of learning: R=rote (list, state, recall, identify, define, solve, compute); MI=meaning integration (apply, explain, paraphrase, illustrate, interpret, discuss, connect, link, compare and contrast, integrate); CT=critical thinking (critique, justify, analyze, evaluate).

6. Sept 23—Chapter 5—Learning about Return and Risk from the Historical Record  
Chapter objectives:
- 5.1 Be able to describe the basic statistical measurements and properties that are used to develop portfolio theory. [R]
  - 5.2 Be able to calculate risk and return statistical measures, such as holding period returns, average returns, expected returns, and standard deviations, both *ex post* and *ex ante*. [R]
7. Sept 25—Chapter 6—Risk Aversion and Capital Allocation to Risky Assets  
Chapter objectives:
- 6.1 Understand the concept of risk aversion and utility function. [R]
  - 6.2 Be able to apply the concept of risk aversion in measuring a utility function. [MI]
  - 6.3 Understand the basic concepts of capital allocation. [R]
  - 6.4 Be able to calculate capital allocation across risky and risk-free assets. [R]
  - 6.5 Understand how leverage can be used in allocation [MI]
8. Sept 30—Chapter 7—Optimal Risky Portfolios  
Chapter objectives:
- 7.1 Be able to calculate standard deviation and return for two security portfolios. [R]
  - 7.2 Be able to find the minimum variance combinations of two risky assets. [R]
  - 7.3 Have a full understanding of systematic and firm-specific risk, and of how one can reduce the amount of firm-specific risk in the portfolio by combining securities with differing patterns of returns. [CT]
  - 7.4 Be able to quantify this risk-reduction concept by being able to calculate and interpret covariance and correlation coefficients. [MI]
9. Oct 2—Chapter 8—Index Models  
Chapter objectives:
- 8.1 Have a full understanding of systematic and firm-specific risk. [MI]
  - 8.2 Understand that if the portfolio is adequately diversified and firm-specific (or nonsystematic) risk is virtually eliminated, then beta (or systematic risk) becomes the relevant risk measure for the portfolio. [MI]
  - 8.3 Be able to identify inputs required to use the index model and understand the characteristic line. [R]
10. Oct 7—Any leftover materials and numerical problem solving examples

Second Homework Assignment Due (Wednesday before class, Oct 14)

### **Module 3: Equilibrium in Capital Markets (chapters 9-11)**

11. Oct 9—Chapter 9—The Capital Asset Pricing Model  
Chapter objectives:
- 9.1 Have a thorough understanding of the development and the theory of the capital asset pricing model (CAPM). [MI]
  - 9.2 Understand the relation between CAPM and the optimal portfolio theory. [CT]
  - 9.3 Be able to construct and use the security market line. [R]

12. Oct 14—Chapter 10—Arbitrage Pricing Theory and Multifactor Models of Risk and Return  
Chapter objectives:  
10.1 Have a thorough understanding of factor models and the arbitrage pricing theory (APT). [CT]  
10.2 Be able to use APT to identify mis-priced securities. [MI]
13. Oct 16—Chapter 11—The Efficient Market Hypothesis (EMH)  
Chapter objectives:  
11.1 Understand the concept of random walk. [CT]  
11.2 Be able to explain the different forms of EMH. [R]  
11.3 Understand the implications of EMH. [CT]  
11.4 Be able to explain the various market anomalies such as the small firm effect, January effect, etc. [MI]
14. Oct 21—Any leftover materials and numerical problem solving examples

Third Homework Assignment Due (Friday before class, Oct 23)

**Midterm: Oct. 28 from 6:30 to 8:30pm, Venue: LTJ. Class on Oct 28 is cancelled due to the midterm in the evening**

#### **Module 4: Fixed-Income Securities (chapters 14-16)**

15. Oct 23—Chapter 14—Bond Prices and Yields  
Chapter objectives:  
14.1 Be able to calculate yields and prices of various types of bonds. [R]  
14.2 Understand the concept of yield to maturity. [R]  
14.3 Be able to calculate the approximate yield to maturity (to be defined). [R]  
14.4 Understand the relationship between the yield curve and bond prices. [MI]
16. Oct 30—Chapter 15—The Term Structure of Interest Rates  
Chapter objectives:  
15.1 Have a thorough understanding of the concept of short-term and long-term rates. [R]  
15.2 Be able to calculate forward rates. [R]  
15.3 Understand how term structure concepts apply to valuation of securities. [MI]
17. Nov 4—Chapter 16—Managing Bond Portfolios  
Chapter objectives:  
16.1 Have a thorough understanding of duration. [MI]  
16.2 Be able to calculate duration of various bond portfolios. [R]  
16.3 Construct immunized portfolios suitable for different investor categories. [MI]  
16.4 Understand active bond portfolio management, from the concept of interest rate predictions and various possible market anomalies. [CT]
14. Nov 6—Any leftover materials and numerical problem solving examples

Fourth Homework Assignment Due (Friday before class, Nov 11)

## **Module 5: Equity Valuation Models (chapter 18)**

### 18. Nov 11—Chapter 18—Equity Valuation Models

Chapter objectives:

- 18.1 Be able to value a firm using the appropriate dividend discount model [MI]
- 18.2 Understand relative valuation and the various price multiples. [R]
- 18.3 Understand the limitations of each of these models. [CT]

Fifth Homework Assignment Due (Friday before class, Nov 18)

## **Module 6: Options, Futures, and Other Derivatives (chapters 20-22)**

### 19. Nov 13—Chapter 20—Option Markets: Introduction

Chapter objectives:

- 20.1 Be able to calculate potential profits resulting from various option trading strategies. [R]
- 20.2 Formulate portfolio management strategies to modify the risk-return attributes of the portfolio. [MI]
- 20.3 Understand the put-call parity relationship. [CT]
- 20.4 Be able to identify the embedded options in various assets and to determine how these option characteristics affect the prices of these assets. [R]

### 18. Nov 18 and Nov 20—Chapter 21—Option Valuation

Chapter objectives:

- 21.1 Have a thorough understanding of the factors affecting option prices. [CT]
- 21.2 Be able to compute option prices in the binomial model of the economy. [MI]
- 22.3 Be able to compute the Black Scholes value of an option. [R]
- 23.4 Understand the concept of hedge ratios. [CT]
- 24.5 Be able to construct portfolio insurance strategies using option hedge ratios. [MI]

### 22. Nov 25—Chapter 22—Futures Markets

Chapter objectives:

- 22.1 Be able to describe basic characteristics of futures contracts, short and long positions and profits from such positions, and margin trading arrangements for futures. [R]
- 22.2 Be able to develop prices for stock index contracts and describe how such contracts can be used to speculate and hedge. [MI]

### 14. Nov 27—Any leftover materials and numerical problem solving examples

Sixth Homework Assignment Due (Wednesday before class, Dec 2)

## **Module 7: Applied Portfolio Management (chapters 24, 26)**

### 22. Dec 2—Chapter 24—Portfolio Performance Evaluation

Chapter objectives:

- 24.1 Be able to calculate various risk-adjusted return measures. [R]
- 24.2 Be able to use these measures to evaluate investment performance. [R]
- 24.3 Be able to decompose excess returns into components attributable to asset allocation choices. [MI]

22. Dec 4—Chapter 26—Hedge Funds

Chapter objectives:

- 26.1 Be able to distinguish hedge funds vs. mutual funds. [R]
- 26.2 Understand common hedge fund strategies. [R]
- 26.3 Understand issues involved with hedge fund performance measurement. [CT]
- 26.4 Understand common hedge fund fee structures. [R]

Seventh Homework Assignment Due (Monday noon to your TA, Dec 7)

**Appendix:** PILOs-BBA-FINA (Program Intended Learning Outcomes inline with Intended Learning Outcomes of Finance Graduates)

**1. Think critically and creative in decision making**

- 1.1 Analyze the core issues and weigh the significance of key assumptions used in business decision-making scenarios.
- 1.2 Solve business problems using appropriate quantitative and analytical techniques.
- 1.3 Approach business problems from alternative perspectives and consider unconventional concepts and solutions.
- 1.4 Defend reasoned solutions to business problems.

**2. Communicate effectively in English and Chinese**

- 2.1 Produce professional quality business documents in English.
- 2.2 Deliver a professional quality presentation in English.
- 2.3 Communicate ideas persuasively to inform and convince others.
- 2.4 Explain the concepts and terminology of finance, both in technical jargon and everyday language.

**3. Understand the core business functions and integrate these functions to solve business problems**

- 3.1 Explain the interdependence and distinctive elements of finance, economics, and accounting.
- 3.2 Explain how finance supports the value-creation process and the other functional areas of the firm.

**4. Have in-depth grasp of their area of business concentration or major**

- 4.1 Explain and apply the major theories of investment analysis.
- 4.2 Explain and apply the major theories of corporate finance.
- 4.3 Price and trade derivative securities and use them to manage portfolio risks and corporate risks.
- 4.4 Explain the function and organization of financial institutions and financial markets.
- 4.5 Summarize the facts and lessons drawn from the history of financial markets and relate them to finance theory.
- 4.6 Conduct or interpret basic research on securities, portfolios, and financial markets.

## **5. Effective team member and leadership**

- 5.1 Demonstrate an understanding of team dynamics and the various roles played within the team.
- 5.2 Contribute to the successful and timely completion of a group project in line with their roles in teams.
- 5.3 Collaborate positively by actively seeking and engaging in discussion of the views of others while showing sensitivity to opposing views.
- 5.4 Demonstrate the ability to lead a team to success.

## **6. Operate in multicultural and international setting**

- 6.1 Demonstrate a global outlook and an understanding of cultural diversity, as evidenced by an understanding of globalization, the dimensions along which cultures vary and the implications of both for business.
- 6.2 Implement appropriate processes and behaviors for different cultural settings and audiences.

## **7. Use information technology in business applications**

- 7.1 Demonstrate proficiency in using IT applications in business and management.
- 7.2 Locate, gather, and organize information using appropriate information technology and systems.
- 7.3 Identify and utilize the main datasets, information services, software, and hardware relevant to finance.

## **8. Understand professional and ethical responsibility**

- 8.1 Explain the role played by managers in ensuring the integrity of the firm and maintaining appropriate levels of social responsibility.
- 8.2 Identify the activities/issues in their chosen profession that may present ethical challenges, and will articulate the consequences associated with unethical behavior.
- 8.3 Identify an ethical dilemma in a scenario case of business and management and apply an ethics model or framework to propose and defend a resolution.

## **9. Life-long learning**

- 9.1 Articulate personal skills and abilities acknowledging personal strengths and weaknesses
- 9.2 Set personal and professional goals, develop plans to achieve these, monitor their implementation and seek feedback from others in assessing achievement of these goals.
- 9.3 Identify areas of further learning to improve performance in achieving current tasks and future goals.