

Hong Kong University of Science & Technology

Investment Analysis and Portfolio Management

Fall 2009

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Lectures: L2C: Tue & Thu 09:00 – 10:20, Room 1505
L2A: Tue & Thu 13:30 – 14:50, Room 1505
L2B: Tue & Thu 15:00 – 16:20, Room 1505

Tutorials: T2C: Fri 11:00 – 11:50, Room 2302
T2A: Thu 11:00 – 11:50, Room 4006
T2B: Mon 15:30 – 16:20, Room 2302

Course Website: <http://lmes.ust.hk>

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COURSE DESCRIPTION

This course provides you with an introduction to the most fundamental aspects of investments. You will learn how to trade on financial exchanges, how to allocate money across several different types of securities/assets (how to *invest* rather than speculate), how to determine the *fair* price of a financial security, and how to determine whether a portfolio manager is doing a good job. You will also learn how to manage a portfolio consisting of fixed-income securities, and how to price, trade, and utilize derivative securities (futures and options).

During the course we will come across some of the most important and influential concepts of finance theory: the Markowitz Portfolio Selection Model, the Capital Asset Pricing Model (CAPM), the concept of arbitrage, and the Black & Scholes option pricing formula. These concepts are so important that Nobel prizes have been awarded for their discovery! To read more about these concepts see the web page of the Nobel Foundation: <http://www.nobel.se/economics/index.html>.

During this course you will also gain and improve your software skills in using the spreadsheet program Microsoft EXCEL and the financial data base REUTERS. These are valuable skills to have when you are looking for a job in the finance industry.

PREREQUISITES

Prerequisite for this course is the successful completion of FINA 111.

Some of the material we will cover is quite technical. It is therefore advisable for you to review basic mathematical and statistical concepts such as: net present value, interest calculations, probability theory, and regression analysis at the beginning of the course. The textbook contains a Quantitative Review that I suggest you read as soon as possible – even if you *believe* you master that material.

It is also very important that you familiarize yourself with the spreadsheet program Microsoft EXCEL. We will be using this program extensively throughout the semester. In the past, many students have wasted a lot of time simply because they did not know how to use EXCEL effectively. If you have never used EXCEL, I strongly recommend that you go through the self-guided EXCEL tutorial from the textbook: Excel Applications for Investments by Troy A. Adair, Jr., McGraw Hill Irwin International. One copy of the text is on reserve at the library.

TEACHING MATERIALS

1. Required Material

Z. Bodie, A. Kane and A.J. Marcus (BKM), Investments (8th edition), Mc-Graw Hill Irwin International Edition, 2009, ISBN 007-125916-3.

The official web site for this textbook contains additional background materials, recent investment news, and on-line practice quizzes: <http://www.mhhe.com/bkm>

McGraw-Hill also offers two additional websites you might find useful:

Investments Online (extra problems): <http://www.mhhe.com/business/finance/invonline/>

Finance Around the World: <http://www.mhhe.com/business/finance/financemap/main.html>

2. Supplementary Texts on Hong Kong Financial Markets (Optional)

The textbook is unapologetically US-centric. To make up for this deficiency, I suggest you consult one or several of the following texts to acquaint yourself with Hong Kong financial markets. Given our time constraints, and the importance I place on mastering principles over memorizing details, *generally speaking*, I will not hold you accountable for the intricate details of one market or another.

- L.C.K. Low, 2000, Financial Markets in Hong Kong, Springer. ISBN 981-4021-73-3.
- Richard Yau, 2004, Securities Investment Practice in Hong Kong, The Hong Kong Institute of Bankers (HKIB). ISBN 962-7322-37-7.
- L.S.F. Young and R.C.P. Chiang (eds.), 1997, The Hong Kong Securities Industry, The Stock Exchange of Hong Kong Ltd. ISBN 962-7946-028.
- Simon S.M. Ho, Robert Haney Scott, Kie Ann Wong (eds), 2004, The Hong Kong Financial System: A New Age, Oxford University Press.

I have put copies of each of these books on reserve at the library. The first text (Low) offers an overview of the institutional and regulatory environment. The second text (Yau) is intended for HKIB certificate candidates and details primitive and derivative securities markets in Hong Kong. The third text (Young and Chiang, YC) offers an in-depth look at HK equity and debt markets. The course outline presented at the end of this syllabus references specific chapters in this text. The last text (Ho *et al.*) provides an up-dated reference on the same topics.

Although I will make an earnest attempt to map some of the US securities and market features described in the textbook to their HK equivalents, the onus really is on you to make this translation. There are two benefits to doing so: 1) It puts you in control of your own learning process, and 2) It

teaches you about the world's most influential financial markets. This knowledge will prove invaluable, particularly if you wish to spend part of your career in the US or Europe.

A fundamental message of this course is that securities are priced not in isolation but rather relative to other securities in the investment universe: Securities prices are relative, not absolute. As globalization removes barriers to the flow of goods, services, and, in particular, financial capital, it behooves all of us to think globally, not just locally. Specifically, this means that HK securities are priced not only in relation to other HK securities but also relative to securities across the world. Thus, you cannot escape having to learn about other markets, even if you never plan to leave HK!

Another reason you should learn about US markets in particular is that the Hong Kong dollar (HK\$) is fixed (or "pegged") to the US dollar (USD). A fundamental law of international finance tells us that this means both countries should have the same interest rates. In fixing the exchange rate of the HK\$ to the USD, Hong Kong is essentially adopting the monetary policy of the United States. Whether contemporary US monetary policy suits the HK economy is unknown. However, this exchange rate policy does force Hong Kong to align its economic, fiscal, and other policies with those of the US. In short, the study of HK securities and financial markets cannot dissociate itself from those of the US.

You may wish to refer to the following internet links to learn more about HK's financial institutions:

The HK Monetary Authority (Exchange Fund and Bank Regulation): <http://www.info.gov.hk/hkma>

The HK Exchange (Primitive and Derivative securities markets): <http://www.hkex.com.hk>

Hong Kong and Shanghai Banking Corporation (Multinational HK bank): <http://www.hsbc.com.hk>
and its HK associate, Hang Seng Bank (62% owned by HSBC): <http://www.hangseng.com>

The Bank of China (large Chinese bank in HK): <http://www.bochk.com>

3. Suggested Reading (Optional)

A measure of a financial market's development is how well news is reflected in its securities prices. Market players who ignore the news inevitably fail. Consequently, I would encourage you to get in the habit of keeping up with current events and world affairs by reading a good daily financial newspaper (Financial Times, Wall Street Journal, South China Morning Post) and a business periodical (The Economist, Business Week, Fortune, Forbes, Far Eastern Economic Review).

4. Additional References (Optional)

Z. Bodie, A. Kane and A.J. Marcus, Essentials of Investments (6th edition), McGraw Hill Irwin International Edition, 2007, ISBN 007-304153-x. Abridged version of the main textbook.

John C. Cochrane, Asset Pricing, Princeton University Press, 2001. Advanced graduate textbook.

John C. Hull, Options, Futures, and Other Derivatives (5th edition), Prentice Hall, 2002. The leading modern textbook on derivatives.

5. Survey Articles

John Y. Campbell, "Asset Pricing at the Millennium", *Journal of Finance*, August 2000.
A non-technical survey for the profession.

John C. Cochrane, "New Facts in Finance", *Economic Perspectives*, Federal Reserve Bank of Chicago, 1999. (See also Part IV of Cochrane's book, above.)

TEACHING PHILOSOPHY AND PEDAGOGICAL APPROACH

While your goal may simply be to “pass the course”, my goal is to help you do so by thoroughly understanding the material. To achieve these common goals, we should strive for you to understand the material at the conceptual, analytical, applied, and general levels. A *conceptual* understanding means you see how a particular topic fits into the big picture of the course and how the main ideas of a topic fit together. An *analytical* understanding means you master the precise workings and nuances of a topic. An *applied* understanding means you can translate the analytics into step-by-step solutions to formulaic problems. A *general* understanding means you master the material well enough to solve non-formulaic problems (you can handle variations on the problems you have seen before), propose different analytical approaches (you can solve problems in more than one way), and offer new conceptual representations (you can draw parallels between topics that are not obviously related). While the analytical and applied levels may be all you have time for (or care about), achieving the conceptual and general levels of understanding will ensure that you not only pass the course but help you frame what you learn in this course within the broader context of your degree and education.

Our class time must be spent wisely. There is little value in my belaboring descriptive passages from the textbook: these are best left to your own scrutiny and study. You will still be held accountable for that material - even if I never mention it in class - if only because there is too little time to discuss each point during lectures. Homework assignments and exam question *may* test your knowledge of such material, however, the grade points allotted to this material will be limited. What I will spend time on in class – and stress in exams – is the material I consider to be the more technically difficult. I will try to clarify the textbook’s treatment and often provide a slightly different personal take on the same topic. However, I will stick quite closely to the textbook both in terms of content and presentation. I therefore urge you to do the assigned readings and problems as diligently as possible.

COURSE INTENDED LEARNING OUTCOMES

Once you have completed this course, you should be able to:

1. Allocate money across different assets classes in a scientific manner.
2. Price financial securities on the basis of fundamental financial principles.
3. Determine whether a portfolio manager is doing a good job.
4. Manage a portfolio consisting of fixed-income securities.
5. Price, trade, and utilize derivative securities (futures and options).
6. Perform financial analysis using Microsoft EXCEL and the REUTERS financial database.

ASSESSMENT & GRADING

Your final grade will be based on homework, tutorial activities, pop (surprise) quizzes, and two exams. The relative weightings are as follows:

Homework	10%
Tutorial activities	10%
Pop quizzes	10%
Midterm exam	30%
Final exam	40%

The letter grade you earn depends on your performance relative to other students taking the course. The final distribution of letter grades will be set in accordance with departmental and school policy.

HOMEWORK AND TUTORIALS

There are four homework assignments, which are to be done on a team basis. Each team should consist of three people from the **SAME** registered tutorial section. If you can’t form a group, Mr.

Leung will assign you to a group. Your team should stay together until the end of the term. Each team needs to submit only one write-up of each homework assignment, and all team members will receive the same grade for their work. It is therefore important that all team members contribute equally to the homework assignments. If you feel that some team members do not contribute their fair share to the assignments you should talk to Mr. Leung or me. We will treat any complaints confidentially.

Please inform Mr. Leung of your team members by September 12.

Homework assignment must be submitted in **hardcopy**. Each homework assignment **must** contain a **cover page** that lists the group number, the names and student id numbers of the members of the group that contributed to the assignment. Only those students whose names appear on the cover page will receive credit for their homework assignment.

All homework assignments should be written in an easily readable fashion. Therefore, I encourage you to type the essay parts of each homework assignment. For equations, graphs, figures, etc. you should use a pen instead of a pencil. If your handwriting is difficult to decipher you may lose 5% to 10% of the maximum homework grade, depending on the severity of the problem.

Some homework assignments require you to extract data from the REUTERS. A demonstration of REUTERS has been scheduled for September 17 during regular class time in the Financial Trading Lab (**room 4117**). All students are required to attend the demonstration.

The homework assignments will contain some problems from the end-of-chapter problems of the textbook. Since the solutions are available online in LMES, these problems will not be graded. These problems are meant only as an exercise and to give you some guidance on what type of questions to expect on exams. Of course, it is counterproductive to read the answers before you attempt to solve the problems yourself.

Homework assignments will be available on the course website once I have prepared them. You will have roughly two weeks to complete the assignment. Completed assignments must be turned in to Mr. Leung **by 12:00 noon** on the due dates to receive full credit. Any late assignment will earn zero credit – no exceptions. Homework assignments will be returned during the tutorial sessions. During the tutorials you will have the opportunity to ask questions and discuss any problems with Mr. Leung. The tutorial sessions are mandatory and count toward tutorial grade. The tutorial schedule and guidelines will be posted on the LMES.

EXAMS

There will be two comprehensive exams, a midterm and a cumulative final, which will normally consist of short-answer and multiple-choice questions. The midterm is scheduled for Thursday, October 22nd, from 19:00 to 21:00. All class sections will take the exam at the same time and in the same lecture hall (TBA). Details will be provided as they become available. A review session will be held on the preceding Tuesday (October 20) and class is cancelled on the exam day itself. I will offer guidance on the content and format of the exam about one week before the exam.

There will be no make-up exams offered. Should you miss the mid-term, for whatever reason, your final exam will be re-weighted accordingly, i.e., it will be worth **70%** of your final grade. Note that even though no make-up exam is offered, you must still explain your absence. Absence from the exam will not be excused except under circumstances described in the University Regulations. These cases must be substantiated by the appropriate documentation within one week of the missed exam.

Cheating will not be tolerated. Any student caught cheating during the exams will receive zero credit and may face further disciplinary action.

Please refer to <http://www.ust.hk/vpaa0/integrity/> for HKUST rules regarding academic integrity.

CLASS PARTICIPATION

Active class participation is important for your learning experience and highly encouraged. It helps you to think *actively* rather than *passively*. As you move from the academic arena to the professional world you will need to shift your mindset from one of passive participation to active intervention. Start that shift now! Active participation also keeps you involved and motivated rather than removed and disinterested. Your class participation also helps me gauge whether you understand the material.

Students often 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 CONDUCT

To foster the best learning environment and help develop your professional skills, I ask that we all abide by the following rules of conduct:

- 1) You must attend the section that you have registered for. No section or professor arbitrage.
- 2) Come to class. I may occasionally take attendance. Absentees and “visitors” will be noted.
- 3) We will start and end class on time. Late arrivals and early departures are rude not admissible.
- 4) Have your class materials (paper, pens, etc.) ready for the start of class. Close and pack them **after** I have dismissed class. Clicking binder rings and ruffling paper is rude and will not speed me along.
- 5) Talk in class only as called on in the course of participation activities. No chatter.
- 6) Mobile phones, PDAs, laptops, etc. must be kept off and stowed away. You *may* use your laptop in class if I am also using a computer for demonstrations. You may not “type” class notes. This is a needless distraction to you and others. Should you happen to forget to turn off your mobile phone before class, you must do so discretely as soon as possible or when it rings *without* taking the call.

STUDENT TEACHER INTERACTION

Office consultation

I hope you will drop by my office from time to time so we can chat. Otherwise, office consultations are meant to help you with material you find unclear once you have made every effort to understand it. These efforts include: preparing for class (do assigned readings and problems *before* class), attending class (no private make-up classes), participating in class (ask questions as they arise), consulting your peers (form study groups), re-reading the relevant sections, letting the matter sit for a few hours, then approaching the problem/question from another angle. Attend tutorials and consult Mr. Leung. Only once you have exhausted all these avenues should you consider visiting with me. For best results, have specific questions ready if and when you do decide to consult me. Aside from posted office hours, I will meet with you at any other mutually convenient time. I will hold extra office hours in the days before exams. Mr. Leung and I may also field common questions on LMES.

IMPORTANT DATES

Sept 12	Inform Mr. Leung of homework groups
Sept 17	Mandatory REUTERS training in the Financial Trading Lab (room 4117) – no class held. Instead, go to the training session during the regular time for your registered section.

TBA	1 st Homework set due
TBA	2 nd Homework set due
Oct. 22	Mid-term exam: 19:00 to 21:00 – all sections together Location: TBA
TBA	3 rd Homework set due
TBA	4 th Homework set due
TBA	Final exam

COURSE OUTLINE AND READING ASSIGNMENTS

Sept. 1	Review of the syllabus and course overview BKM: Chapter 1: <i>The Investment Environment</i> (YC: Chapter 1: <i>Overview of the Financial System</i>)
Sept. 3	Securities and Financial Markets in the US and HK BKM: Chapter 2: <i>Asset Classes and Financial Instruments</i> (YC: Chapter 3: <i>Hong Kong's Financial Markets</i>)
Sept. 8	Trading Securities BKM: Chapter 3: <i>How Securities Are Traded</i> (YC: Chapter 4: <i>Listing Procedures</i>) (YC: Chapter 5: <i>Exchange-Based Trading and Settlement</i>) (YC: Chapter 6: <i>Stock Market Indices</i>)
Sept. 10	Two Determinants of Investment Decisions: Return and Risk BKM: Chapter 5: <i>Learning About Return and Risk from the Historical Record</i> BKM: Chapter 6: <i>Risk Aversion and Capital Allocation to Risky Assets</i>
Sept. 15	Two Determinants of Investment Decisions: Return and Risk (continued)
Sept. 17	REUTERS training - mandatory Financial Trading Lab (room 4117)
Sept. 22, 24	Portfolio Mathematics and Capital Allocation BKM: Chapter 6 <i>Risk Aversion and Capital Allocation to Risky Assets</i>
Sept. 29 Oct. 1	Portfolio Analyses and the Markowitz Portfolio Selection Model National Day – No class
Oct. 6	BKM: Chapter 7 <i>Optimal Risky Portfolios</i>
Oct. 8	The Capital Asset Pricing Model (CAPM) BKM: 9.1 – 9.2
Oct. 13	Index Models BKM: 8.1 – 8.3
Oct. 15	APT and Multifactor Models BKM: Chapter 10: <i>Arbitrage Pricing Theory & Multifactor Models of Risk & Return</i>
Oct. 20	Mid-term Review
Oct. 22	Midterm Exam – No class

Time: 19:00 – 21:00, Location: TBA

Oct. 27	Portfolio Performance Evaluation BKM: 24.1
Oct. 29	The Efficient Market Hypothesis BKM: 11.1 – 11.4 & 12.2
Nov. 3	Fixed-Income Securities BKM: Chapter 14
Nov. 5	The Term Structure of Interest Rates BKM: 15.1 – 15.5
Nov. 10, 12	Managing Fixed-Income Portfolios BKM: 16.1 – 16.3 plus pp. 540-541 (excluding horizon analysis)
Nov. 17, 19	Futures Markets BKM: 22.1 – 22.4
Nov. 24	Options Markets BKM: 20.1 – 20.4 (YC Chapter 7: <i>Derivative Instruments – Options, Warrants and Futures</i>)
Nov. 26 Dec. 1	Options Valuation BKM: 21.1 – 21.4
Dec. 3	Final Review
TBA	Final Exam

MODULE INTENDED LEARNING OBJECTIVES

(form the basis of all assessment activities of the course)

Once you have completed this course, you should be able to:

1) The Investment Environment

1. Differentiate the between real assets and financial assets.
2. Explain how intermediaries bridge those who have/need money, i.e., investors & businesses.
3. Distinguish direct financing (investment banks) from indirect financing (commercial banks).
4. Distinguish between primary and secondary financial markets.
5. Recognize financial instruments as either market-traded (securities) or non-tradable.
6. Explain how the principle of separation (Separation Theorems) can benefit society.

2) Asset Classes and Financial Instruments

1. Organize the universe of financial securities as a tree of debt, equity, and derivative instruments.
2. Explain the different methods, weighting schemes, and limitations for calculating indices.
3. Calculate the various indices, interpret the results, and explain differences across methods.
4. Calculate the Hang Sang Index using various methods.
5. Distinguish between listed stocks in HK: Blue chips, red chips and H-share.

3) How Securities are Traded

1. Explain the different types of stock order and how to place them in practice.
2. Explain, execute, and compute the returns to buying securities on margin.

3. Explain, execute, and compute the returns to short selling securities.
4. Explain how securities trade on the HKEx (primary market and secondary market).
5. Use REUTERS to find company data stock prices, number of shares outstanding, etc.

4) Learning about Return and Risk from the Historical Record

1. Calculate holding period investment returns for simple and compound returns.
2. Calculate and convert annual percentage rate (APR) and effective annual return (EAR).
3. Calculate and distinguish between real and nominal returns.
4. Calculate dollar- and time-weighted returns and justify when each should be used.
5. Calculate arithmetic and geometric average returns and justify when each should be used.
6. Define expected and realized returns and risk.
7. Explain how to measure value-at-risk (VAR) under Normal and Non-Normal returns.

5) Risk Aversion and Capital Allocation

1. Calculate the expected risk & return of simple prospects and relate them to the risk-free prospect.
2. Distinguish between speculation, gambles, and lotteries and provide examples of each.
3. Describe risk preferences generally and how to compute quadratic utility specifically.
4. Apply the mean-variance criterion to analyze and interpret utility indifference curves.
5. Calculate the expected and realized risk and returns for portfolios of securities.
6. Express portfolio mathematics as vectors and matrixes of returns, weights, and covariances.
7. Support your analysis of portfolios with MS Excel tools such as solver, goal seek, and table.

6) Optimal Risky Portfolios

1. Frame the optimal complete portfolio as an allocation problem.
2. Calculate complete portfolio return and risk for unlevered and levered portfolios.
3. Draw the Capital Allocation Line (CAL) linking the riskfree asset and the optimal risky asset.
4. Identify the optimal complete portfolio, graphically and analytically.
5. Explain why passive investing (indexing) emerges as the best investment strategy.
6. Using Excel to construct the risk return and utility matrix to find the optimal portfolio.
7. Frame the optimal risky portfolio as a selection problem among risky securities.
8. Decompose a security's total risk into two sources: systemic (diversifiable) risk and specific risk.
9. Illustrate how risk is reduced by diversification as a function of the number of securities held.
10. Plot and interpret the efficient frontier for a universe of two or many securities.
11. Identify the minimum variance portfolio, graphically and analytically.
12. Calculate and interpret the securities weights to form the optimal complete and risky portfolios.

7) The Capital Asset Pricing Model (CAPM)

1. List the simplifying and necessary assumptions of the Capital Asset Pricing Model (CAPM).
2. State and explain the implications of the CAPM.
3. Plot the market portfolio in reference to the efficient frontier and Capital Market Line (CML).
4. Derive the market risk premium as a function of the average investor's risk aversion.
5. Show that under the CAPM equilibrium condition, only non-diversifiable risk is rewarded.
6. Relate a stock's expected return to its beta, the market risk premium, and the riskfree rate.
7. Use the Security Market Line (SML) to formulate buy, sell, or hold recommendations.
8. Compare and contrast the CAL, CML, and SML.

8) Index Models

1. Show why the Nobel-Prize winning Markowitz security selection model is quite impractical.
2. State the simplifying assumptions that make the Markowitz's model more tractable.
3. Show how systemic and firm-specific surprises (unanticipated events) affect realized returns.
4. Distinguish the single-factor and single-index models and derive their main implications.
5. Describe and execute several ways to compute a security's beta using historical data.

9) Arbitrage Pricing Theory and Multifactor Models of Risk and Return

1. Illustrate how multifactor models work through examples of plausible risk factors.
2. List and comment on the reasonableness of the assumptions of Arbitrage Pricing Theory (APT).
3. Explain the law of one price by working through an example.
4. Analyze and implement return and risk arbitrage opportunities in the factor-model context.
5. Compare and contrast APT to SML to CAPM.
6. Describe what factors and multifactor models have been proposed and tested in the literature.

10) Portfolio Performance Evaluation

1. State, calculate, interpret, and contrast seven performance measures.
2. Rank investment funds (or their managers) using these performance measures.
3. Illustrate the limitations of these measures in evaluating performance in practice.

11) The Efficient Market Hypothesis

1. Explain why the appearance of random prices supports (*versus* negates) market efficiency.
2. Relate market efficiency to the way the market responds to new (*versus* old) information.
3. Define the forms of market efficiency in reference to the information set considered.
4. Comment on the usefulness of technical and fundamental analysis relative to market efficiency.
5. Provide examples of market anomalies and comment on what these mean for market efficiency.

12) Fixed-Income Securities

1. Describe what bonds are, how they are structured (coupons and principal), and traded.
2. Price a bond at issuance knowing the interest rate, the coupon rate, the principal, and its maturity.
3. Price a bond after issuance and between coupon dates.
4. Explain why the price of a bond is inversely related to its interest rate (yield to maturity).
5. Calculate the yield to maturity (IRR) and other types of bond yields (e.g. yield to call).
6. Explain how default risk and recovery rates (in default) affect bond yields (and thus prices).
7. Explain how credit risk rating agencies determine credit risk and assign credit ratings.

13) The Term Structure of Interest Rates

1. Plot and explain the term structure of as the relation between bond yield and bond maturity.
2. Trace the time path of bond prices and forward rates when the term structure is certain.
3. Trace the time path of bond prices and futures rates when the term structure is certain.
4. Analyze the risk and return for three bond investment strategies (reinvest, bullet, overshoot).
5. Explain and interpret the main theories of the term structure in relation to these strategies.

14) Managing Fixed-Income Portfolios

1. Relate the sensitivity of bond prices to bond maturity, bond coupon, and current bond yield.
2. Express the effective maturity (*versus* stated maturity) of a bond by Macaulay's Duration.
3. Calculate duration, modified duration and relate these to the sensitivity of bond prices.
4. Frame duration as a first-order approximation of how bond prices change to changes in yield.
5. Use a second-order approximation, convexity, to calculate bond price sensitivity more precisely.
6. Use MS Excel to calculate duration, convexity, and actual bond price changes.
7. Explain why managing interest rate risk can be important, e.g. for commercial banks.
8. Explain the immunization procedure operates by balancing reinvestment and repricing risks.
9. Illustrate the price changes of an immunized portfolio for various changes in the yield curve.
10. Build an immunized portfolio with periodic (dynamic) rebalancing.
11. Describe contingent active bond portfolio management and suggest some trading techniques.

15) Futures Markets

1. Describe what a futures contract is and how it is traded.
2. Illustrate the use of futures contract in hedging and speculation.
3. Contrast and compare forward & futures contracts.

4. Describe different types of futures contracts traded in Hong Kong.
5. Illustrate the payoffs on futures contracts, graphically, analytically, and numerically.
6. Illustrate the zero-sum feature of futures contracts (and derivatives markets in general).
7. Illustrate margin requirements by tracking gains and losses to traders over the life of a contract.
8. Define basis risk. Give an example and spell out the implications for potential hedgers.
9. Compare and contrast a clearing-house market to an Over-the-Counter market structure.
10. Illustrate the spot-futures parity theorem with consideration of cost of carry.
11. Illustrate futures price calendar spreads and possible arbitrage opportunities.

16) Options Markets

1. Explain how options work (give a simple example) and name all their features (strike price, etc).
2. List the most common types of underlying assets on which options are traded (HK & elsewhere).
3. Decompose option prices into intrinsic and time values and analyze their determinants.
4. Graphically, analytically, and numerically describe the payoff and profit functions facing the buyer and seller of a call option (separate & combined) and a put option (separate & combined).
5. Illustrate different options strategies and plot their payoffs as a function of the underlying price.
6. Frame the Put-Call Parity Theorem as a no-arbitrage condition and use to price options.

17) Options Valuation

1. Calculate option price using the binomial option pricing model (3 stages).
2. State the Black-Scholes option pricing model and use it to calculate option price
3. Calculate and interpret implied volatility from the Black-Scholes option pricing model.