MSc Finance Modules

Asset Pricing

Overview

Course Content

The aims of this module are to:
(i) provide students with the necessary theoretical and analytical tools which underpin the pricing of assets;
(ii) familiarize students with the environment of a trading room

Areas to be covered include:

Financial markets
Overview of main markets; how firms and governments raise finance; financial instruments; trading securities.

Valuation
Valuing stocks.

Asset returns and portfolio theory
Measuring asset returns; theory of choice under uncertainty; mean-variance portfolio theory.

Asset-pricing models
Assessing the theoretical and empirical validity of various asset pricing models.

Equity markets
EMH; anomalies; behavioural finance

Learning Outcomes

Upon successful completion of this module, students will:
1. Be familiar with the various theories on individuals' investment decision making
2. apply techniques for formally assessing risk.
3. understand the methodologies employed in investigating asset pricing behaviour in the capital market
4. be able to critically evaluate the various asset pricing models in terms of both theory and empirical evidence
5. be able to critically appraise the EMH, anomalies and behavioural finance.
6. be familiar with the trading-room environment and the Bloomberg database.

Skills

This module provides opportunities for the student to acquire or enhance the following skills:

• Subject-specific skills
o Use of computer-based packages to analyse and evaluate relevant data
o Ability to criticially read and evaluate finance and risk-related academic literature
o Appreciation, construction and analysis of financial and economic models of practical risk situations

• Cognitive Skills
o Problem solving
o Logical reasoning
o Independent enquiry
o Criticial evaluation and interpretation
o Self-assessment and reflection

• Transferable Skills
o The ability to synthesis information/data from a variety of sources
o Preparation and communication of ideas in both written and presentational forms
o Ability to work both independently and in groups
o Organisation and Time Management
o Use of IT.

Financial Market Structure

Overview

The aim of this module is to ensure that students understand the structure, dynamics and trading mechanisms of global financial markets, as well as appreciate the role of key institutions involved in these markets.

Areas to be covered:

1. Firstly, we analyse the role, structure and economic principles of the key players participating in financial markets.
2. Secondly, we examine the function and characteristics of two key markets: fixed income and foreign exchange.
3. Thirdly, we will analyse the trading mechanics of financial markets, and in doing so, we will examine the development and organisation of major exchanges.

Learning Outcomes

Upon successful completion of this module, students will have an understanding of:-
1. The structure and strategy of key participants in financial markets
2. The trading structures of financial markets
3. Development and organisation of major exchanges
4. How market structure will be reflected in pricing of securities, trading behaviour, trading mechanisms and market design
5. The role of information in financial markets and how it is processed in practice

Skills

This module provides opportunities for the student to acquire or enhance the following skills:

• Subject-specific skills
o Ability to critically read and evaluate the academic microstructure literature
o Appreciation, construction and analysis of trading strategies

• Cognitive Skills
o Problem solving
o Logical reasoning
o Independent enquiry
o Critical evaluation and interpretation
o Self-assessment and reflection

• Transferable Skills
o The ability to synthesis information/data from a variety of sources
o The ability to present and communicate complex ideas to a non-specialist audience
o Ability to work in groups
o Organisation and Time Management

Corporate Finance

Overview

Course Description:
The purpose of this course is to analyse how corporations make major financial decisions. The theory of corporate behaviour is discussed and the relevance of each theoretical model is examined by an empirical analysis of actual corporate decision making.

Course Aim:
The aims of this module are to:
(i) familiarize students with the issues confronting corporations when making investment and financing decisions;
(ii) develop the ability of students to obtain corporate information from the Bloomberg database.

Course Coverage:
• Corporate Governance
• Investment Appraisal
• Dividend Policy
• Capital Structure
• Initial Public Offerings
• Mergers and Acquisitions

Learning Outcomes

Upon successful completion of this module, students will be able to:
• describe and synthesize academic theories which explain the approaches of corporations to investment and financing decisions;
• analyse how corporations can increase shareholder value;
• evaluate empirical evidence regarding whether corporate decision making is consistent with academic theories;
• apply theoretical principles to hypothetical situations;
• use the Bloomberg database in a trading-room environment.

Skills

This course provides opportunities for the student to acquire or enhance the following skills:

Subject-specific Skills
• The ability to construct arguments and exercise problem solving skills in the context of theories of finance and risk management
• The ability to use computer-based mathematical / statistical / econometric packages to analyse and evaluate relevant data
• The ability to read and evaluate finance and risk-related academic literature
• The ability to appreciate, construct and analyse mathematical, statistical, financial and economic models of practical risk situations

Cognitive Skills
• Problem solving
• Logical reasoning
• Independent enquiry

• Critical evaluation and interpretation
• Self assessment and reflection

Transferable Skills
• The ability to synthesise information/data from a variety of sources including from databases, books, journal articles and the internet
• The preparation and communication of ideas in finance, information economics and risk management in both written and presentational forms
• The ability to work both independently and in groups
• Organisation and time management
• Problem solving and critical analysis
• Work-based skills; use of IT, including word-processing, email, internet and statistical/econometric/risk management packages
• The ability to communicate quantitative and qualitative information together with analysis, argument and commentary in a form appropriate to different intended audiences.

Financial Data Analytics

Overview

The purpose of this course is to provide an introduction to econometric techniques used in finance. It contains a treatment of classical regression and an introduction to time series techniques. There will be an emphasis on applied work using econometric packages.

The course is designed to give students both theoretical and practical experience of statistical and econometric techniques. A wide range of topics is typically covered including the basic regression model, which includes a discussion of the classical violations of this model and methods for their correction. Students will learn a computer statistical software package (R).

Learning Outcomes

Upon successful completion of this course students will have an understanding of:-
• the main issues relating to the appropriate econometric modelling of financial and economic time series;
• and have gained experience in the use of econometric software and be able to demonstrate their software skills in completing assignments;
• and be able to discuss, applied econometric research topics in finance;
• and have improved their data management, programming and research skills.

Skills

Subject-specific Skills
• The ability to construct arguments and exercise problem solving skills in finance
• The ability to use computer-based mathematical/statistical/econometric packages to analyse and evaluate relevant data
• The ability to read and evaluate finance and risk-related academic literature

Cognitive Skills
• Problem solving
• Logical reasoning
• Independent enquiry
• Critical evaluation and interpretation
• Self-assessment and reflection

Transferable Skills
• The ability to synthesise information/data from a variety of sources
• The preparation and communication of ideas in finance, information economics and risk management
• Organisation and time management
• Problem solving and critical analysis
• Work-based skills; use of IT, including word-processing, email, internet and statistical/econometric/risk management packages
• The ability to communicate quantitative and qualitative information together with analysis, argument and commentary

Advanced Financial Data Analytics

Overview

The aims of this module are to:
Deepen participants' understanding of financial predictions and decision-making by exploring the revolutionary impact of combining econometrics and machine learning in financial analytics. Integrate machine learning and classical financial time series econometrics to tackle complex financial problems characterised by uncertainty and conflicting objectives.
Explore the role of machine learning in processing large datasets and accurately modelling the complexities of financial markets.
Advocate for adopting a growth mindset for learning advanced financial data analytics, emphasising embracing challenges, persisting through setbacks, leveraging criticism, and finding lessons in others' success. Equip participants with the necessary insights and tools to navigate the sophisticated realm of financial analytics, encouraging a lifelong commitment to learning and development in the field.

Learning Outcomes

Upon successful completion of this module students will be able to:
1. Extract meaning from noisy financial data
2. Critique stylised facts of financial data for economic inference
3. Evaluate the output of statistical tests

Skills

This module provides opportunities for the student to acquire or enhance the following skills:-
1. Problem solving – innovative ability to implement statistical tests
2. Logical reasoning – analysing data
3. Digital Proficiency – ability to write code
4. Abstraction – developing generic re-usable solutions
5. Critical Thinking – applying and interpreting statistics

Financial Modelling in Python

Overview

The aims of this module are to:
i. develop the students' computational skills
ii. introduce a range of numerical techniques of importance in finance
iii. familiarise students with financial models and how to implement them

Areas to be covered include:
A primer on financial instrument pricing
o Bonds, forwards, options
o Discounting
o Probability distributions
o Expectation theory

Python
o Arrays and data structures
o Programming constructs
o Functions and classes

Numerical Methods
o Root finding
o Linear Algebra

Financial Modelling
o Stochastic processes
o Interest rate models

Option Pricing
o Black Scholes Merton
o The Greeks
o Lattice Models
o Model extensions

Monte Carlo
o Monte Carlo simulation
o Variance reduction
o Markov Chains

Credit Risk
o Merton Model

Learning Outcomes

Upon successful completion of this module, students will:

1. Describe and discuss the modelling frameworks used to value financial instruments.
2. Understand the salient features of prominent derivatives contracts.
3. Translate financial problems into mathematical models with appropriate numerical solutions
4. Have experience using Python to implement financial models
5. Critically evaluate the efficacy of different approaches to derivative pricing

Skills

This module provides opportunities for the student to acquire or enhance the following skills:

• Subject-specific skills
o The ability to appreciate, construct and analyse mathematical, statistical, and financial models
o Use of coding languages to implement financial models.

• Cognitive Skills
o Problem solving
o Abstraction
o Logical reasoning
o Critical evaluation and interpretation
o Self-assessment and reflection

• Transferable Skills
o Organisation and time management
o Use computational technology

Money and Banking

Overview

The overall aim of the module is to provide students with an understanding of monetary and banking institutions.

The course has five constituent parts.
1. Firstly, we want to understand why banks exist and what functions they perform.
2. Secondly, we develop a theory of monetary institutions, and in so doing, we seek to examine the origins and evolution of money. This part of the course will be mainly theoretical because we examine monetary institutions under laissez-faire.
3. Thirdly, we examine government intervention in money by asking the question: what is the rationale for government intervention in money and banking? We will also examine the institution which has evolved to become the major player in the conduct of monetary policy – the central bank.
4. Fourthly, we will examine government intervention in banking institutions.
5. Fifthly, we will analyse bubbles and financial crises.

Learning Outcomes

At the conclusion of the course participants will have an understanding of:-
• the role of banks as issuers of money;
• the history of monetary institutions and how this is relevant to understanding the sort of monetary regime that presently exists;
• why central banks act as they do;
• and be able to analyse the properties of alternative monetary regimes;
• the causes and consequences of bubbles and banking crises .

Skills

This module provides opportunities for the student to acquire or enhance the following skills:-
Subject-specific Skills
• The ability to construct arguments and exercise problem solving skills in the context of theories of finance and risk management
• The ability to read and evaluate finance and risk-related academic literature
• The ability to marry regulatory structure with the principles of risk sharing and risk mitigation
• Cognitive Skills

• Problem solving
• Logical reasoning
• Independent enquiry
• Critical evaluation and interpretation
• Self assessment and reflection

Transferable Skills
• The ability to synthesise information/data from a variety of sources including from databases, books, journal articles and the internet
• The preparation and communication of ideas in finance, information economics and risk management in both written and presentational forms
• The ability to work both independently and in groups
• Organisation and time management
• Problem solving and critical analysis
• Work-based skills; use of IT, including word-processing, email, internet and statistical/econometric/risk management packages
• The ability to communicate quantitative and qualitative information together with analysis, argument and commentary in a form appropriate to different intended audiences

Derivatives

Overview

The aim of this course is to develop in students a theoretical and practical knowledge of derivative instruments.
This module provides participants with an exhaustive coverage of widely used derivative products stressing pricing and uses for financial engineering and risk management. The module provides an overview of derivative instruments, markets, participants and uses. It focuses on the pricing and uses of futures, forwards and options. The cost of carry relationship, the binomial approach, the Black-Scholes model and its variants are detailed to equip participants with the basic tools for pricing derivatives. The module examines practical uses of derivative securities as risk management tools for corporations and financial institutions.

Areas to be covered include:

THE MOVEMENT OF FUTURES PRICES: some basic facts. CTAs, managed futures, hedge funds. Financialization of Commodity Markets. Time series momentum.

MEAN VARIANCE APPROACHES TO HEDGE RATIO DETERMINATION, STOCK INDEX FUTURES AND HEDGING EFFECTIVENESS: The mean-variance approach to hedge ratio

construction. Hedging with stock index futures. Hedging effectiveness and hedge ratio estimation - OLS, ECM and GARCH procedures. Duration and Expiration effects.

THE STOCHASTIC PROCESS OF ASSET PRICES AND THE DERIVATION OF THE BLACK-SCHOLES MODEL:The Wiener process and rare events in financial markets; Ito processes; Ito's lemma; generalised Ito's lemma; Black-Scholes differential equation; Black-Scholes pricing formula; options on stocks paying known dividends; pseudo-American model; option on stock indices, currency options and options on futures;

VOLATILITY: Estimating volatility: historical; implied - application of Newton-Raphson. Empirical characteristics of volatility: smiles; term structure skew; mean reversion; Forecasting volatility: application of GARCH; empirical evidence of volatility forecasts - implied versus historical; Bisection.

EXOTIC OPTIONS: Types of exotic options - barrier options; lookback options; strike options; binary or digital options; compound options; and chooser options.

INTEREST RATE DERIVATIVES: The standard market models; models of short rate; HJM and LMM models.

RISK AND REGULATION WITH EMPHASIS ON VALUE AT RISK: Regulation of Financial Institutions; value at risk and forecast accuracy; capital adequacy and value at risk; value at risk and the variance covariance approach; value at risk and non-parametric methods such as historical simulation and bootstrapping; value at risk and linear and non-linear positions.

CREDIT RISK AND CREDIT DERIVATIVES: Default probabilities; Recovery rates; Default correlation; Credit default swaps; Asset-backed securities.

REAL OPTIONS: The option to expand, contract, default, abandon and switch. The valuation of real options in the face of compoundness, interaction between options and ownership. Real options and the valuation of internet companies.

Learning Outcomes

Upon successful completion of this module, students will have an understanding of:-
1. understand the mechanisms of futures and forward market
2. price futures and forward instruments
3. understand the mechanisms of options markets
4. understand concepts of stochastic processes and its application in financial modelling
5. understand and derive binomial tree model
6. understand and derive Black-Scholes-Merton model

7. estimate historical and implied volatility
8. construct hedges using futures and options

Skills

This module provides opportunities for the student to acquire or enhance the following skills:

Subject-specific Skills
• The ability to construct arguments and exercise problem solving skills in the context of theories of finance and risk management
• The ability to use computer-based mathematical / statistical / econometric packages to analyse and evaluate relevant data
• The ability to read and evaluate finance and risk-related academic literature
• The ability to appreciate, construct and analyse mathematical, statistical, financial and economic models of practical risk situations
• The ability to connect business problems with risk management
• The ability to marry regulatory structure with the principles of risk sharing and risk mitigation

Cognitive Skills
• Problem solving
• Logical reasoning
• Independent enquiry
• Critical evaluation and interpretation
• Self assessment and reflection

Transferable Skills
• The ability to synthesise information/data from a variety of sources including from databases, books, journal articles and the internet
• The preparation and communication of ideas in finance, information economics and risk management in both written and presentational forms
• The ability to work both independently and in groups
• Organisation and time management
• Problem solving and critical analysis
• Work-based skills; use of IT, including word-processing, email, internet and statistical/econometric/risk management packages
• The ability to communicate quantitative and qualitative information together with analysis, argument and commentary in a form appropriate to different intended audiences

Dissertation - MSc Finance

Overview

Course Contents
This course covers individual dissertation supervision for each Masters student. Students are given guidance in regard to all aspects of writing their dissertation, including financial modelling, collecting and compiling data and econometric testing.

Learning Outcomes

Students will learn how to write a dissertation to professional level, including how to formulate a well-defined hypothesis, write a literature review, and how to collect and test data.

Skills
Writing and data compilation as well as econometric skills.

Applied Research Project

Overview

The applied research project provides students with the opportunity to utilise the knowledge and skills acquired over the previous two semesters to plan, develop and produce a substantial piece of original, independent applied research.
Lectures and computer-based workshops will cover the following areas:
1. Research Methodology
2. Fundamental analysis and strategy analysis
3. Data Management, Analysis, Visualisation and Inference
4. Financial analysis [ratios/cash flows], forecasting profit & EPS.
5. Valuation 1: DDM and DCF approach
6. Valuation 2: EVA and Price- multiples
7. Critical assessment of model adequacy
8. Presenting Information and Data

Learning Outcomes

Upon successful completion of this project, students will:
1. Demonstrate an ability to design and manage a piece of individual research.
2. Apply knowledge and skills developed in previous modules to contemporary issues in financial markets.

3. Establish links between financial theory and financial practice.
4. Exhibit intellectual discipline in identifying and critique the appropriate information.
5. Identify appropriate econometric methods for critically analysing a contemporary issue in finance.
6. Critically evaluate the appropriateness of modelling assumptions.
7. Present their thinking in a professional industry-style research paper.

Skills

This applied research project provides opportunities for the student to acquire or enhance the following skills:

· Subject-specific skills
-Use of computer-based packages to analyse and evaluate relevant data
-Ability to critically read and evaluate finance and risk-related academic literature
-Appreciation, construction and analysis of financial and economic models of practical risk situations

· Cognitive Skills
-Problem solving
-Logical reasoning
-Independent enquiry
-Critical evaluation and interpretation
-Self-assessment and reflection
-Intellectual humility
-Intellectual discipline

· Transferable Skills
-The ability to synthesis information/data from a variety of sources
-Preparation and communication of ideas in both written and presentational forms
-Ability to work both independently
-Organisation and Time Management
-Use of IT