Course information 2025-26

FN3206 Derivatives & Risk Management

General information

MODULE LEVEL: 6

CREDIT: 30

NOTIONAL STUDY TIME: 300 hours

MODE: Locally Taught, Independent Learner Route and Online Taught

Summary

(A) Derivatives

The course focuses on financial derivatives, with a particular emphasis on equity derivatives (standard call and put options, exotic options), futures and forward contracts, and interest rate derivatives (swaps, caps, and floors, swaptions). The course systematically addresses three basic questions: how do these products work, i.e. what are their payoffs? How can they be used, for hedging purposes or as part of trading strategies? And above all: how are they priced? The course emphasises a small number of powerful ideas: absence of arbitrage, replication, and risk-neutral pricing. Both discrete-time models (mainly binomial trees) and the Black-Scholes model are covered.

(B) Risk Management

The course aims to introduce quantitative concepts and techniques in many areas of finance. Sample topics include risk measures (e.g., Value-at-Risk and Expected Shortfall, including implementation and back-testing), univariate and multivariate volatility models, Monte Carlo simulations, and associated topics in Econometrics. The course also focuses on endogenous risk and financial market risk regulations. Recent stress events, such as the global crisis in 2008, Covid-19 in 2020 and Russia's invasion of Ukraine are used to illustrate the various methodologies presented in the course. Implementing the models and tools in R is an essential part of the course. The homework assignments are designed to guide the students to all stages of the analytical process, from locating, downloading, and processing financial data to the implementation of the tools and interpretation of results.

Conditions

Please refer to the relevant programme structure in the EMFSS Programme Regulations to check:
- where this course can be placed on your degree structure; and
- details of prerequisites and corequisites for this course.

You should also refer to the Exclusions list in the EMFSS Programme Regulations to check if any exclusions apply for this course.

Aims and objectives

- To provide a comprehensive introduction to options, forwards, and futures, and other financial derivatives.
- To provide a toolkit for understanding a range of models used for market risk forecasting in the financial industry and key issues in using these models.

Learning outcomes

At the end of this course and having completed the essential reading and activities students should be able to:

- Develop an understanding of the fundamental theorem of asset pricing (FTAP).
- Understand the connection between absence of arbitrage, replication, and risk-neutral pricing.
- Price a range of derivatives using binomial trees.
- Have a good understanding of the Black-Scholes formula.
- Appreciate the importance of the Greeks in risk management.
- Value forwards and futures.
- Understand the yield curve and value interest rate derivatives.
- Identify the time series properties of financial asset prices and returns.
- Univariate and multivariate volatility models.
- Define and compare different risk measures: volatility, Value at Risk and Expected Shortfall.
- Implementation and back-testing of risk models.
- Use Monte Carlo methods for risk in derivatives and bonds.
- Understand endogenous risk.
- Appreciate market risk regulations.

Employability skills

Below are the three most relevant employability skills that students acquire by undertaking this course which can be conveyed to future prospective employers:

1. Decision making
2. Complex problem solving
3. Creativity and innovation

Essential reading

Detailed course programmes and reading lists are distributed at the start of the course. Illustrative texts include:

For Derivatives, please refer to the following suggested text

Options, Futures, and Other Derivatives by John Hull, Pearson.

For Risk Management, please refer to the following textbook

Financial Risk Forecasting: The Theory and Practice of Forecasting by Jon Danielsson, Wiley.

Assessment

This course is assessed by a three-hour and fifteen-minute closed-book written examination.

Syllabus

The course is divided into two parts:

(A) Derivatives; and (B) Risk Management.

(A) Derivatives

Topics include the binomial model, Black-Scholes, the Greeks, exotic options, forwards and futures, fixed income basics, and interest rate options.

(B) Risk Management

Topics include statistical properties of prices in financial markets, volatility forecasting, risk measures, risk forecasting, backtesting, simulation methods for risk in derivatives, endogenous risk, and market risk regulations.