MSc Financial Risk and Investment Analysis modules

Autumn Term

Essential Quantitative Finance

The objective of this double-weighted module is to give students a thorough grounding in the essential mathematics and statistics required for Teaching Block 2 modules on the Financial Risk and Investment Analysis degree, and to motivate students to learn the necessary skills by first formulating the quantitative finance problem, and then teaching the tools required to solve it. The module is focussed uniquely on financial applications of mathematics and statistics, with all the main concepts illustrated by numerous examples and Excel spread sheets. The very high practical content will make it accessible to all students on the MSc Financial Risk and Analysis degree, as one of the course entry requirements includes some previous training in mathematics. The module also aims to encourage the development of IT skills and in particular students will be trained to use Excel spread sheets for data representation and manipulation, through workshops with examples.

Interest-Rate Sensitive Instruments

This module presents the fundamentals of fixed-income and floating-rate investments, one of the largest segments of global financial markets. It covers: valuation of cash flows; bond price and yield; interest rate risk, duration and convexity; principle of no-arbitrage; spot and forward interest rates; bond futures; forward rate agreements; yield curves; Libor; credit spreads; basic features and characteristics of interest-rate sensitive instruments and their associated interest rate risk and credit risk; present value of basis point; mapping portfolios to risk factors; securitization and asset (and mortgage) backed securities; credit rating; credit scoring.

Equity and Foreign Exchange Investments

How equities are traded; foreign exchange risk; trading forex; asset management and investment companies. Risk aversion, diversification, capital allocation to risky assets, optimal risky portfolios. Single index models; capital market equilibrium; capital market line; securities market line; market portfolio; equity beta. Multi-factor models; Fama-French factors; applications. Balance sheets, P&L reports, financial ratios. Macroeconomic and industry analysis; price/earnings ratios, equity valuation models. Global economic balances, purchasing power parity, monetary and fiscal policy, coordination of government controls. The London forward FX market; FX dealing, types of orders, forward derivatives instruments; no-arbitrage pricing; relationship between interest rates and foreign exchange. FX risk in international equities; FX risks arising for corporates. Fundamental and technical FX trading strategies; high-frequency and algorithmic trading.

Spring Term

Commodities and Alternative Investments

This module describes the common types of alternative investments, their valuation and their unique risks including those associated with limited liquidity and specialized legal structures. Major categories of alternative investments, including real estate, private equity, hedge funds, structured products and – most recently – volatility. The course begins with commodity markets and the impact of fundamental commodity concepts such as contango, backwardation, physical delivery, seasonality and storage on commodity market trading and the pricing of commodity futures.

Swaps, Futures and Options

This course introduces the markets, trading and valuation and applications of forwards/futures, swaps and options. For each type of derivative we cover: characteristics of the markets and the instruments traded, hedging applications, no-arbitrage valuation. The module covers the following topics:

- Characteristics of Forwards and Futures
- Fair Values for Futures and Forwards
- Hedging with Forwards and Futures
- Swaps
- Credit Derivatives
- Foundations of Option Pricing
- Characteristics of Vanilla Options
- Trading Options

- Interest Rate Options and Swaptions
- Exotic Options
- Models with Stochastic/Local Volatility and Jumps

Spring and Summer Terms

Portfolio Management

On this first of two, double-weighted practical projected-based modules, students working in small teams (typically 4 – 6) will be given a mandate to construct an investment portfolio; they will track its performance, write a report and make a presentation to a client, as if they were already working in the fund management industry. Formal lectures during Teaching Block 2 focus on:

a) Methods for integrating information, both objective and subjective (Treynor-Black, Black-Litterman, Least-discrimination approaches), for portfolio allocation
b) Understanding utility-based investment criteria (certainty equivalent, Generalized Sharpe and information ratios) for portfolio optimisation.
c) Examining specific portfolio strategies (e.g., pension funds, hedge funds, portfolio insurance)

Market and Credit Risk Analysis

This is the second double-weighted project-focussed module. Students will choose between a designated market risk analysis or credit risk analysis project, concerning the application of either Value at Risk (VaR) and ETL or CVA to a hypothetical portfolio, based on real historical data. The students work individually to analyse the risks of the portfolio using its historical performance "on paper", which they begin to track during Teaching Block 2. In Teaching Block 3 they write a detailed report on their work and finally make an individual presentation of the results, as if to the Head of Risk Management and the Risk Management & Control team in a financial institution.

The foundations of market risk analysis and the basic VaR models for assessing market risk, including the mapping of fixed-income, equity and option portfolios to risk factors, the construction of covariance matrices and their application to the market risk of portfolios are required to undertake this project. These skills are taught in formal lectures and seminars during Teaching Block 2 and assessed during the last week of Teaching Block 2 and during Assessment Period 2.