

## **PROGRAMME AIMS AND LEARNING OUTCOMES**

The programme's primary aim is to develop the specialised quantitative skills required (including material from stochastic calculus, probability theory, linear algebra, and analytic optimisation) to implement theory in two distinct areas of quantitative finance: financial engineering and risk management. It aims to develop the specialised quantitative skills that are required to implement theory in different areas of quantitative finance, providing training in programming, numerical methods and statistics a thorough grounding in pricing and risk management.

The programme aims to develop students' power of inquiry, critical analysis and logical thinking and to apply theoretical knowledge to current issues of policy and practice in the field of quantitative finance. These skills will be essential in carrying out a piece of original empirical research. This research constitutes the final dissertation stage of the Masters programme. To this end, the programme offers high quality teaching informed by theoretical and empirical research and is taught by research-active staff.

The programme aims to prepare graduates for career paths in financial institutions that require advanced technical skills in quantitative analysis, financial research, quantitative asset management, derivatives structuring, financial programming, quantitative strategies implementation and risk management. It also aims to provide many of the tools required to undertake high quality research in academic and financial institutions. The programme meets the requirements of the national qualifications framework for a level M (Masters) degree.

Upon completion of the programme, students passing at the MSc level of achievement should be able to demonstrate:<sup>1</sup>

- i. A comprehensive understanding of asset pricing and investment finance principles, together with underlying theories of security markets. Also, a comprehensive understanding of risk measures and the associated statistical tools for risk management.
- ii. An advanced knowledge of pricing financial securities (equities, bonds and derivatives) and a systematic understanding of their applications to areas such as investments and financial risk management.

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<sup>1</sup> On completion of the programme, students will also achieve additional learning outcomes relating to intellectual, practical, and transferable skills. See the Programme Specification for further details.

- iii. An advanced knowledge of areas in mathematics and statistics necessary to gain a deep understanding of financial models, such as (i) stochastic calculus, (ii) probability theory, (iii) linear algebra and (iv) analytic optimisation.
- iv. A comprehensive understanding of the theory and practice of portfolio selection, management and performance evaluation in association with market risk measurement and management.
- v. Have advanced knowledge and systematic understanding of the main theoretical and applied concepts in mathematical finance including: hedging strategies; binomial model; risk-neutral valuation; diffusion-type models for stock prices; Black-Scholes equation, stochastic volatility models.
- vi. A comprehensive understanding and working knowledge of computer programming in C++ –with applications in finance.–An advanced knowledge of computational methods applied to asset pricing problems.
- vii. A comprehensive understanding of interest rate models and interest rate derivatives, and some appreciation of the related credit risk. Also, a comprehensive understanding, measurement and management of market and credit risk.
- viii. An advanced knowledge of the credit rating system and credit risk measures, and a detailed understanding of the credit risk regulatory environment such as Basel II.
- ix. An advanced knowledge of statistical survival concepts applied to credit risk problems.
- x. Knowledge and experience in the development of a research enquiry and to select the tools necessary for executing the research; the skills to pursue independent learning, to analyse and interpret quantitative and qualitative data and to present results in a form that is appropriate [MSc only].
- xi. A critical awareness of research issues, methodologies and methods in quantitative finance and financial engineering combined with a knowledge of corresponding skills in planning and managing a research project equipping students to carry out a piece of research [MSc only].