

COURSE SPECIFICATION DOCUMENT

Academic School/Department:	Richmond Business School
Programme:	Economics Finance & Investment
FHEQ Level:	6
Course Title:	Financial Mathematics
Course Code:	MTH 6101
Student Engagement Hours:	160
Lectures:	35
Seminar / Tutorials:	10
Independent / Guided Learning:	100
Supervision:	15
Semester:	Fall or Spring
Credits:	16 UK CATS credits 8 ECTS credits 4 US credits

Course Description:

This course will cover: Essential mathematics (calculus, differential equations, linear algebra and elementary probability theory), mathematics in finance (Central Limit Theorem and Brownian motion, Stochastic calculus and random behaviour, Markov Processes and Martingales, Wiener process, Monte Carlo simulation of pricing and simple trading models), Binomial and Black-Scholes Models and their significance in asset pricing and analysis of financial derivatives.

Prerequisites:

MTH 4100 Calculus with Applications and MTH 4120 Probability & Statistics I

Aims and Objectives:

The course will provide students with the essential mathematical foundations underpinning Mathematical Finance and Economics. The topics cover will reflect their importance in a proper understanding of the financial theory and practice. Calculus, linear algebra, Probability theory and stochastic processes provide the language in which students need to express and solve mathematical problems in finance and economics due to the inherent randomness of asset prices. By the end of this course, students are expected to achieve a sufficient level of competence in selected mathematical methods and techniques to facilitate further study of Quantitative Finance or Mathematical Economics; they will also find it easier and rewarding to take up careers in Investment Banking, Asset and Wealth Management and Financial Risk Management.

Programme Outcomes:

Economics: A2, A4, B2, C3, C4, C8, D

Finance and Investment: A4, B4, C1, C2, D2

A detailed list of the programme outcomes is found in the Programme Specification. This is maintained by Registry and located at:

<https://www.richmond.ac.uk/programme-and-course-specifications/>

Learning Outcomes:

By the end of this course, successful students should be able to:

- Have a good understanding of the relevant mathematical concepts in Calculus, Linear Algebra and Probability Theory and apply them to problems of quantitative finance and economics.
- Use the language and tools of probability theory with confidence in the context of financial models and applications.
- Acquire an understanding of stochastic processes in discrete and continuous time and be familiar with the basic examples and properties of such processes appearing in financial modelling.
- Recognise the central role of stochastic calculus for mathematical models in finance, and show familiarity with basic notions and tools, at informal level
Threshold criteria: Be able to apply practically established mathematical financial models such as Binomial and Black-Scholes models to solve financial and business problems in conjunction with stochastic calculus and other tools.

Indicative Content:

- Probability measures
- Central Limit Theorem
- Brownian Process and stochastic calculus
- Random processes, Wiener process
- Markov process and martingales, and Monte Carlo Simulation
- Binomial Model, Black-Scholes Model and Asset pricing
- Pricing Financial derivatives, Options and Futures

Assessment:

This course conforms to the University Assessment Norms approved at Academic Board and located at: <https://www.richmond.ac.uk/university-policies/>

