



SYLLABUS 2025-2026

Quantitative Finance & Financial Modelling

MODULE SPECIFICATION

Module Code	2526_DFC_2_EN_024 / 2526_DFC_3_EN_007
Campus	Oxford
Department(s)	Law, Finance and Control
Level / Semester	Masters Year 2 (M2); Equivalent to FHEQ level 7 Semester 09
Language of Instruction	English
Teaching Method	☒ In-person (face-to-face) ☐ Distance learning (live online) ☐ e-Learning (asynchronous) ☐ Hybrid: _____
Pre-requisite(s)?	None
ECTS <i>Reminder: 1 ECTS = between 20 and 30hr- student workload</i>	5
Equivalent FHEQ credits	10
Study Hours	100 hours which comprise of 28 directed learning and 72 independent learning/assessment hours

MODULE DESCRIPTION

Module Aims	This module aims to provide students with a deep understanding of the mathematical and statistical techniques used in modern finance. The module covers key concepts in stochastic processes, probability theory, and time-series analysis to analyse market trends and financial data. Students will develop practical skills in building financial models using tools such as Excel, R, and Python to simulate financial outcomes and assess market behaviour. The module also explores advanced topics like option pricing models, including the Black-Scholes and
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	binomial models, and their applications in derivative pricing. In addition, students will learn risk management techniques, including Value at Risk (VaR), stress testing, and scenario analysis, essential for managing financial risk. The module further delves into simulation and optimisation methods, such as Monte Carlo simulations and optimisation algorithms, applied in portfolio management. With an emphasis on financial econometrics, students will gain expertise in regression analysis, volatility modelling, and predictive analytics, enhancing their ability to make informed financial decisions.
Teaching Arrangement	The module will be delivered through a combination of lectures and tutorials (to introduce theoretical concepts and practical applications); hands-on workshops with financial modelling tools such as Excel, R, and Python; case studies and group projects to foster collaborative problem-solving; and guest lectures by industry professionals to provide real-world insights.
Learning Outcomes	By the end of this module, students should be able to: 1. Analyse complex financial data using advanced quantitative techniques, including time-series analysis and stochastic processes. 2. Apply financial modelling tools, such as Excel, R, and Python, to construct models for market prediction and risk assessment. 3. Evaluate pricing models, including Black-Scholes and binomial methods, in the context of derivative valuation. 4. Synthesise optimisation and simulation methods for portfolio management and financial risk management. 5. Critically assess the application of financial econometrics in predicting market trends and developing investment strategies.
Competency Goals <i>(Knowledge, expertise and interpersonal skills)</i>	PGE_M_CG01 - To be equipped with efficient business skills
Alignment with Programme Learning Goals	PGE_M_CG01_LO01 - To apply appropriate financial skills PGE_M_CG01_LO06 - To apply knowledge in order to meet the expectations of the professional world

SESSION TOPICS / MODULE SCHEDULE

(Please note, a session/sequence may be more than one scheduled class)

Session 1: Quantitative Techniques in Finance

Content:

- Stochastic processes, probability theory, and time-series analysis

Last reviewed: 25/07/2025

Assignments:

- Assignments will be announced closer to the relevant session dates

Session 2: Financial Modelling

Content:

- Building models in Excel, R, and Python to analyse market trends and simulate financial outcomes

Assignments:

- Assignments will be announced closer to the relevant session dates

Session 3: Option Pricing Models

Content:

- Black-Scholes, binomial models, and their applications in derivative pricing

Assignments:

- Assignments will be announced closer to the relevant session dates

Session 4: Risk Management Techniques

Content:

- Value at Risk (VaR), stress testing, and scenario analysis

Assignments:

- Assignments will be announced closer to the relevant session dates

Session 5: Simulation and Optimisation

Content:

- Monte Carlo simulations and optimisation algorithms and their role in portfolio management
- Bloomberg Room

Assignments:

- Assignments will be announced closer to the relevant session dates

Session 6: Financial Econometrics

Content:

- Regression analysis, volatility modelling, and predictive analytics in financial decision-making

Assignments:

- Assignments will be announced closer to the relevant session dates

KEY TEXTS

1. Klaas, J. (2019) *Machine learning for finance: The practical guide to using data-driven algorithms in banking, insurance, and investments*. Birmingham, United Kingdom: Packt Publishing.
2. Chen, H. (2025) *Financial data science with python: An integrated approach to analysis, modeling, and machine learning*. New York, NY: Business Expert Press.

SUPPLEMENTARY TEXTS

1. Additional readings and materials will be provided closer to the relevant session dates.

Last reviewed: 25/07/2025

MODES OF ASSESSMENT

Continuous Assessment (40%)	Project
Final Exam (60%)	Written exam

MODULE DESIGN TEAM

- Author: *Mitra Arami*
- Reviewer: *Ambrose Egwuonwu*
- External Reviewer: *Arun Chalise*