



Module Specification

Financial Mathematics

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Part 1: Information

Module title: Financial Mathematics

Module code: UFMFUG-15-3

Level: Level 6

For implementation from: 2023-24

UWE credit rating: 15

ECTS credit rating: 7.5

Faculty: Faculty of Environment & Technology

Department: FET Dept of Computer Sci & Creative Tech

Partner institutions: None

Field: Computer Science and Creative Technologies

Module type: Module

Pre-requisites: Mathematical Methods 2023-24

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: In this module you will study the mathematical concepts that underpin financial trading with derivative contracts that are an important element of modern investment strategies. The topic of stochastic calculus has important applications in finance, but is also used to model problems that occur in biology and the physical world.

Features: Not applicable

Educational aims: In this module you will extend your knowledge of calculus to situations involving random variables.

Outline syllabus: Financial concepts: Risk-free and risky assets, the stock market, interpreting financial information.

Derivative contracts: Forward and futures contracts, European and American style options, path dependent options, arbitrage, risk neutral valuation. Dividend payments, pay-off and profit diagrams. The Black Scholes model, Ito's lemma, put-call parity, hedging, Binomial tree model.

Dynamics of random walks: Random variables, lognormal distribution, volatility, discrete and continuous stochastic models, Wiener and Generalised Wiener process, Geometric Brownian motion, mean reverting processes, Ito process, stochastic differential equations.

Part 3: Teaching and learning methods

Teaching and learning methods: Scheduled contact includes lectures and workshops. The latter serve partly to resolve issues brought up by the students on a week-by-week basis, and also to provide an arena for other learning activities appropriate to developing theory or to exploring applications.

Self-study includes: engaging with the resources provided; working on example sheets; locating and utilising other materials to support learning.

Contact: 36 hours

Assimilation and skill development: 54 hours

Coursework: 15 hours

Exam preparation: 45 hours

Total: 150 hours

Module Learning outcomes: On successful completion of this module students will achieve the following learning outcomes.

MO1 To solve linear stochastic differential equations and obtain the probability distribution of the underlying variable

MO2 Select and apply appropriate techniques to price financial derivative contracts

MO3 Explain the underlying concepts and limitations of the Black-Scholes theory and be able to implement a dynamic hedging strategy to manage risk

MO4 Communicate mathematical concepts, analysis and results through a written report

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 114 hours

Face-to-face learning = 36 hours

Total = 150

Reading list: The reading list for this module can be accessed at [readinglists.uwe.ac.uk](https://uwe.rl.talis.com/modules/ufmfug-15-3.html) via the following link <https://uwe.rl.talis.com/modules/ufmfug-15-3.html>

Part 4: Assessment

Assessment strategy: The module will be assessed through an assignment that requires the application of mathematical concepts and approaches to the pricing of financial derivative contracts and the analysis of advanced trading strategies. The assignment will require the comparison of different trading and risk management strategies involving forward and option style contracts. Students will use individual data obtained from the financial markets to describe the underlying financial asset.

The output will be a 10 to 12 page report.

The resit assessment will take the same format as the first sit assessment but will be based on a different trading scenario.

Assessment tasks:**Report (First Sit)**

Description: Assignment - length difficult to quantify as will contain significant amount of mathematical and graphical material. Report will be typically 10 to 12 pages in length.

Weighting: 100 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4

Report (Resit)

Description: Assignment - length difficult to quantify as will contain significant amount of mathematical and graphical material. Report will be typically 10 to 12 pages in length.

Weighting: 100 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Mathematics [Sep][FT][Frenchay][4yrs] - Not Running MMath 2021-22

Mathematics [Sep][FT][Frenchay][3yrs] BSc (Hons) 2021-22

Mathematics and Statistics [Sep][SW][Frenchay][4yrs] - Not Running BSc (Hons) 2020-21

Mathematics and Statistics {Foundation} [Sep][FT][Frenchay][4yrs] - Not Running BSc (Hons) 2020-21

Mathematics {Foundation} [Sep][FT][Frenchay][4yrs] - Not Running BSc (Hons) 2020-21

Mathematics [Sep][SW][Frenchay][5yrs] - Not Running MMath 2020-21

Mathematics [Sep][SW][Frenchay][4yrs] BSc (Hons) 2020-21

Mathematics [Sep][SW][Frenchay][4yrs] BSc (Hons) 2020-21

Mathematics {Foundation}[Sep][FT][Frenchay][4yrs] BSc (Hons) 2020-21

Mathematics and Statistics {Foundation} [Sep][SW][Frenchay][5yrs] BSc (Hons)
2019-20

Mathematics {Foundation} [Sep][SW][Frenchay][5yrs] BSc (Hons) 2019-20