



## MODULE SPECIFICATION

| Part 1: Information       |  |                    |                                     |
|---------------------------|--|--------------------|-------------------------------------|
| Module Title              | Financial Mathematics                  |                    |                                     |
| Module Code               | UFMFUG-15-3                            | Level              | Level 6                             |
| For implementation from   | 2020-21                                |                    |                                     |
| UWE Credit Rating         | 15                                     | ECTS Credit Rating | 7.5                                 |
| Faculty                   | Faculty of Environment & Technology    | Field              | Engineering, Design and Mathematics |
| Department                | FET Dept of Engin Design & Mathematics |                    |                                     |
| Module type:              | Standard                               |                    |                                     |
| Pre-requisites            | Mathematical Methods 2020-21           |                    |                                     |
| Excluded Combinations     | None                                   |                    |                                     |
| Co- requisites            | None                                   |                    |                                     |
| Module Entry requirements | None                                   |                    |                                     |

| Part 2: Description  |
|--|
| <p><b>Overview:</b> 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.</p> <p><b>Educational Aims:</b> In this module you will extend your knowledge of calculus to situations involving random variables.</p> <p><b>Outline Syllabus:</b> Financial concepts: Risk-free and risky assets, the stock market, interpreting financial information.</p> <p>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.</p> <p>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.</p> |

## STUDENT AND ACADEMIC SERVICES

**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

### Part 3: Assessment

Component A. An online examination that assesses the student's understanding of concepts and techniques that involve analysis of real financial data within a trading strategy involving derivative contracts.

| First Sit Components               | Final Assessment | Element weighting | Description        |
|------------------------------------|------------------|-------------------|--------------------|
| Examination (Online) - Component A | ✓                | 100 %             | Online Examination |
| Resit Components                   | Final Assessment | Element weighting | Description        |
| Examination (Online) - Component A | ✓                | 100 %             | Online Examination |

### Part 4: Teaching and Learning Methods

|                   |  |                  |
|-------------------|--|------------------|
| Learning Outcomes | On successful completion of this module students will achieve the following learning outcomes:   |                  |
|                   | <b>Module Learning Outcomes</b>  | <b>Reference</b> |
|                   | To solve linear stochastic differential equations and obtain the probability distribution of the underlying variable                           | MO1              |
|                   | Select and apply appropriate techniques to price financial derivative contracts  | MO2              |
|                   | Explain the underlying concepts and limitations of the Black-Scholes theory and be able to implement a dynamic hedging strategy to manage risk | MO3              |
|                   | Communicate mathematical concepts, analysis and results through a short written report   | MO4              |
| Contact Hours     | <b>Independent Study Hours:</b>  |                  |
|                   | Independent study/self-guided study  | 114              |
|                   | <b>Total Independent Study Hours:</b>  | 114              |

## STUDENT AND ACADEMIC SERVICES

|              |   |     |
|--------------|---|-----|
|              | <b>Scheduled Learning and Teaching Hours:</b>   |     |
|              | Face-to-face learning   | 36  |
|              | <b>Total Scheduled Learning and Teaching Hours:</b>   | 36  |
|              | <b>Hours to be allocated</b>  | 150 |
|              | <b>Allocated Hours</b>  | 150 |
| Reading List | <p><i>The reading list for this module can be accessed via the following link:</i></p> <p><a href="https://uwe.rl.talis.com/modules/ufmfug-15-3.html">https://uwe.rl.talis.com/modules/ufmfug-15-3.html</a></p> |     |

### Part 5: Contributes Towards

This module contributes towards the following programmes of study:

Mathematics [Sep][FT][Frenchay][4yrs] MMath 2018-19

Mathematics and Statistics [Sep][FT][Frenchay][3yrs] BSc (Hons) 2018-19

Mathematics [Sep][FT][Frenchay][3yrs] BSc (Hons) 2018-19

Statistics [Sep][FT][Frenchay][3yrs] BSc (Hons) 2018-19