

Module code

SPM-3406

Type of module

Undergraduate: Mathematical Sciences – Elective

Financial Mathematics



Modular credits

4

Total student
engagement

56 hours

Prerequisite

SPM-2202 (Linear Algebra and its Applications) SPM-2205 (Ordinary Differential Equations)

Anti-requisite

None

Aims

To develop students' ability to analyse financial markets and apply stochastic modelling techniques to value financial instruments and solve problems in quantitative finance.

Module learning outcomes (MLO)

On successful completion of this module, a student will be expected to be able to:

MLO 1

Analyse how stock markets operate and evaluate the properties of key financial instruments such as bonds, stocks, and options.

MLO 2

Evaluate bond pricing models and analyse the factors influencing bond valuation.

MLO 3

Estimate the drift and volatility of a stock from a sequence of stock prices.

MLO 4

Apply the Black-Scholes and binomial models to value financial derivatives and analyse hedging strategies.

MLO 5

Construct and evaluate stochastic models for financial assets by interpreting market behaviour and assessing model assumptions and limitations.

Module contents

Definition and brief history of financial derivatives	Brief review of additive and multiplicative models	General random walk model
Geometric Brownian motion model and Wiener process	Ito's lemma and random diffusion equation	Black-Scholes model
Arbitrage principle	Hedging techniques	Greek letters
Black-Scholes analysis	Deterministic and stochastic volatility	Random interest rates
Dividend paying options	American options	Transaction costs
Binomial model		

Assessment

60% **40%**
Examination Coursework



■ Examination — 60% ■ Class tests — 40%

Formative assessment

Weekly tutorial sessions, discussion and feedback

Summative assessment

COMPONENT	WEIGHTING
Examination	60%
Coursework	40%
Individual	40%
Class tests	40%

Graduate attributes and skills

Programme learning objectives (PLO) addressed

1 PLO 1 (Core Mathematical Knowledge)	2 PLO 2 (Analytical Problem-Solving)
3 PLO 3 (Computational and Digital Tools)	4 PLO 4 (Mathematical Communication)

Sustainability concept addressed

4

SDG 4 Quality Education

8

SDG 8 Decent Work and Economic Growth

9

SDG 9 Industry, Innovation and Infrastructure

Digital skills/software used (not limited to)

- Word processing software (e.g. Microsoft Word)
- Financial modelling and analysis software (e.g. Microsoft Financial Math)
- Spreadsheet and numerical analysis software (e.g. Microsoft Excel)
- Mathematical document preparation software (e.g. Scientific Word)
- Learning management and collaboration platforms (e.g. Canvas)

Micro-credentialling option

No

Stackable towards GenBESTARI Undergraduate Degree Programme or other relevant Lifelong Learning Programmes

No

Document details

Office ODVCE

Document date 26 June 2026

Status New

Approval GBF (12/02/2026)