

MTH359 Applied Financial Mathematics I

Level: 3

Credit Units: 5 Credit Units

Language: ENGLISH

Presentation Pattern: EVERY JULY

Synopsis:

MTH359 Applied Financial Mathematics I gives an introduction to basic option theory and pricing formula for the Black-Scholes model. The alternating phases of economic growth and decline cause fluctuations in financial assets which is a major pain point. Hence, mathematics is applied to finance to better understand and manage the risks associated with trading options. Mathematical rigor will be emphasized in the course.

Topics:

- Basic concepts financial markets
- Type of options: Puts & Calls, European & American
- Interest rates
- Binomial tree model for modelling price processes
- Hedging strategies and risk-neutral option valuation
- Normal distributions
- Wiener processes (Brownian motion)
- Stochastic differential equations
- Itô's lemma
- Black-Scholes analysis and formula
- Boundary and final conditions
- Implied volatility

Textbooks:

David G. Luenberger: Investment Science
ISBN-13: 9780195391060

Learning Outcome:

- Differentiate between the types of options: Puts & Calls, European & American.
- Compute the expected value of a financial contract using binomial tree model.
- Construct the Itô's integral.
- Set up hedging strategies to minimise risks.
- Solve pricing problems with the application of Black-Scholes formula.
- Calculate the implied volatility for an option contract.

Assessment Strategies (Evening Class):

Components	Description	Weightage Allocation (%)
Overall Continuous Assessment	COMPUTER MARKED ASSIGNMENT 1	10
	TUTOR-MARKED ASSIGNMENT 1	20
Overall Examinable Components	Written Exam	70
Total		100