

<b>Module code</b>	SM-4333		
<b>Module Title</b>	Financial Mathematics		
<b>Degree/Diploma</b>	Bachelor of Science (Mathematics)		
<b>Type of Module</b>	Major Option		
<b>Modular Credits</b>	4	<b>Total student Workload</b>	10 hours/week
		<b>Contact hours</b>	4 hours/week
<b>Prerequisite</b>	SM-2201 Ordinary Differential Equations SM-2203 Linear Algebra and its Applications		
<b>Anti-requisite</b>	None		
<b>Aims</b>			
The module is designed to enable students to acquire a knowledge and understanding of some of the basic concepts of financial mathematics, including stochastic models for stocks and the pricing of contingent claims.			
<b>Learning Outcomes</b>			
<i>On successful completion of this module, a student will be expected to be able to:</i>			
Lower order :	40%	- list the functions of a stock market and describe the properties of the more important financial instruments that are traded in them (bonds, stocks and options)	
Middle order :	40%	- calculate the market price of a bond; estimate the drift and volatility of a stock from a sequence of stock prices; use the Black-Scholes and binomial models to price options	
Higher order:	20%	- construct stochastic models of high-volatility financial assets - work independently and in a team	
<b>Module Contents</b>			
<ul style="list-style-type: none"> <li>- Introduction to options and markets: Definition and brief history of financial derivatives</li> <li>- Asset Price model: Brief review of additive and multiplicative model; general random walk model; geometric Brownian motion model and Wiener process.</li> <li>- Black-Scholes partial differential equation: Taylor's series, Ito's lemma and random diffusion equation.</li> <li>- Black-Scholes model: Arbitrage principle, hedging techniques, Greek letters, Black-Scholes analysis and principle; boundary and final conditions for Black-Scholes formulae.</li> <li>- Variation of the Black-Scholes model: Deterministic and stochastic volatility; random interest rate; dividend paying option; American option and transaction costs.</li> <li>- Binomial model: Risk-neutral principle, discrete random walk and price jumps.</li> </ul>			
<b>Assessment</b>	Formative assessment	Tutorial and feedback.	
	Summative assessment	Examination: 60% Coursework: 40% - 2 class tests (40%)	