Subject Description Form

Subject Code	AMA358
Subject Title	Applied Probability Models for Investment
Credit Value	3
Level	3
Pre-requisite	Introduction to Statistics for Business (AMA1501) or Introduction to Statistics (AMA1502) or Probability and Engineering Statistics (AMA2104) or Introduction to Statistics (AMA2634/AMA2634A) or Probability and Distributions (AMA2691) or equivalent
Exclusion	Applied Probability Models (AMA355)
Objectives	This subject is for students to understand basic probability theory and some advanced probability models which enable them to apply in investment and actuarial science.
Intended Learning Outcomes	Upon satisfactory completion of the subject, students should be able to: a. understand the concepts of conditional probability and conditional expectations; b. understand the fundamental concepts and perform basic operations of discrete Markov chains; c. construct probability models in situations with uncertainty; d. get familiar with distributions that are useful in investment science; e. evaluate critically the statistical and physical properties of the Brownian motion and apply to pricing stock options problems; f. communicate effectively in a well-structured manner and build up an open-minded attitude; g. understand the ethical and social responsibility of an investment or insurance professional.
Subject Synopsis/ Indicative Syllabus	*Preliminary (8 hours)* Conditional probability and conditional expectations, normal and lognormal distributions. *Markov chains (12 hours)* Discrete and continuous time Markov chains, Chapman-Kolmogorov equations, classification of states, limiting probabilities, applications. *Poisson Process (11 hours)* Counting process, Poisson process, inter-arrival and waiting time distributions, non-homogeneous Poisson process, applications.

	Brownian motion (8 hours) Introduction to Brownian motion, hitting times, maximum value, Brownian motion with drift, geometric Brownian motion, applications.
Teaching/Learning Methodology	The subject will be delivered mainly through lectures and tutorials. The lectures will be conducted to introduce the concepts of applied probability models for investment in the syllabus, which are then reinforced by learning activities involving demonstration, tutorial exercise and assignments.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)						
		a	b	c	d	e	f	g
1. Assignments	20%	✓	✓	✓	✓			
2. Tests	20%	✓	✓	✓	✓		✓	
3. Examination	60%	✓	✓	✓	✓	✓	✓	✓
Total	100 %							

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

The subject focuses on knowledge, skill and understanding of **Applied Probability Models for Investment**, thus, **Exam-based assessment** is the most appropriate assessment method, including 20% test and 60% examination. Moreover, 20% worth of assignments are included as a component of continuous assessment so as to keep the students in progress.

Continuous Assessment comprises of assignments and tests. A written examination is held at the end of the semester.

Student Study Effort Expected	Class contact:	
	▪ Lecture	26 Hrs.

	▪ Tutorial	13 Hrs.
	Other student study effort:	
	▪ Assignment	20 Hrs.
	▪ Self-study	58 Hrs.
	Total student study effort	117 Hrs.
Reading List and References	References: Ross, S.M. Introduction to Probability Models 11th edition Academic Press 2014 Pinsky, M. A., and Karlin, S. An Introduction to Stochastic Modeling 4th edition Academic Press 2010	