Subject Description Form

Subject Code	AMA355
Subject Title	Applied Probability Models
Credit Value	3
Level	3
Pre-requisite/ Co-requisite/ Exclusion	Pre-requisites: Linear Algebra (AMA141 or AMA151) or Introduction to Calculus and Linear Algebra (AMA211) and Statistics (AMA237) or Basic Statistics (AMA261) or Probability & Distributions (AMA269 or AMA2691) Exclusion: Applied Probability Models for Investment (AMA358)
Objectives	To enable students to understand a variety of advanced probability models and apply them to actuarial science.
Intended Learning Outcomes	Upon satisfactory completion of the subject, students should be able to: 1. perform basic operations of discrete Markov chains; 2. theorize the basic concepts of a counting process, homogeneous Poisson processes, and nonhomogeneous Poisson processes; 3. relate interarrival and waiting time distributions and study their applications; 4. evaluate critically the statistical and physical properties of the Brownian motion and apply them to stock price processes.
Subject Synopsis/ Indicative Syllabus	*Markov chains* Discrete and continuous time Markov chains, classification of states, transition probability functions, Chapman-Kolmogorov equations, limiting probabilities, birth and death processes, the Kolmogorov differential equations, applications. *Poisson processes* Counting process, Poisson process, interarrival and waiting time distributions, nonhomogeneous Poisson process, applications. *Brownian motion* Brownian motion, hitting times.
Teaching/Learning Methodology	The learning outcomes will be achieved through a combination of lectures, tutorials, interactions between the lecturers and students, assignments, tests and the final examination.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)			
		1	2	3	4
a. Assignments	20%	✓	✓	✓	✓
b. Tests	20%	✓	✓	✓	✓
c. Examination	60%	✓	✓	✓	✓
Total	100 %				

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

The learning outcomes will be assessed by a combination of assignments, mid-term tests and the final examination.

To pass this subject, students are required to obtain Grade D or above in **both** the Continuous Assessment and the Examination components.

Student Study Effort Required

Class contact:	
▪ Lecture	28 Hrs.
▪ Tutorial	14 Hrs.
Other student study effort:	
▪ Assignment	18 Hrs.
▪ Self-study	40 Hrs.
Total student study effort	100 Hrs.

Reading List and References

Textbook:

Ross, S.M. Introduction to Probability Models, 10th Edition Academic Press, 2009