

Subject Description Form

Subject Code	AMA500
Subject Title	Higher Mathematics for Actuarial Science and Risk Analysis
Credit Value	3
Level	5
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	This subject is to provide students with the concepts and skills of linear algebra, calculus, and probability. Emphasis will be on the knowledge in calculus, linear algebra, and probability, addressing the concept, definition, and general techniques.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: <ul style="list-style-type: none"> (a) demonstrate a detailed knowledge of calculus (derivative, integral and double integral) that form the core of actuarial science and risk analysis. (b) acquire a practical understanding of linear algebra, including matrix operations and solving a system of linear equations, applied to actuarial and risk calculations. (c) obtain a deeper understanding of probability and set theory, applied to data analysis within the insurance and the financial industries.
Subject Synopsis/ Indicative Syllabus	<p>Linear Algebra (9 hours): Matrices; determinants; system of linear equations.</p> <p>Calculus (21 hours): Limits and derivatives; rules of differentiation; indefinite and definite integrals; partial derivatives; double integrals.</p> <p>Probability (9 hours): Set theory; axioms of probability; introduction to random variables; probability and probability distributions.</p>
Teaching/Learning Methodology	Emphasis is placed on a pro-active learning approach. Fundamental knowledge will be introduced in the lectures, with interspersed questions, exercises for class discussion and after class self study. Formal tutorial classes will be conducted with additional worked examples and tutorial questions being discussed. Students will be expected to read up, do exercises and reflect critically on the material covered in lecture.

Assessment Methods in Alignment with Intended Learning Outcomes	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)		
			a	b	c
	1. Assignments/Test	40%	✓	✓	✓
	2. Examination	60%	✓	✓	✓
Total	100 %				
<p>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p> <p>By learning how to solve a collection of theoretical and practical mathematical problems designed and distributed in assignments, tests and examination, the students will master the basic techniques in linear algebra, calculus, and fundamental probability, and will be able to apply the techniques to model and solve practical problems in applied mathematics and risk analysis.</p> <p>Remarks: The credits of this elective subject do not contribute towards the 30 credits required by graduation.</p>					
Student Study Effort Expected	Class contact:				
	▪ Lecture		26 Hrs.		
	▪ Tutorial		13 Hrs.		
	Other student study effort:				
	▪ Coursework and self-study		98 Hrs.		
	Total student study effort		137 Hrs.		
Reading List and References	Hung, K.F., Kwan, C.K., and Pong, T.Y.	Foundation Mathematics & Statistics	McGraw Hill,	2013	
	Stewart, J.	Calculus. 8 th ed.	Cengage Learning,	2016	
	Thomas, G.B., Weir, M.D. and Hass, J.	Thomas' Calculus 13 th ed.	Pearson Education, Inc.,	2014	
	Howard A.	Elementary Linear Algebra 11 th ed.	John Wiley and Sons,	2014	
	Walpole, R.E., Myers, R.H., Myers, S.L. and Ye, K.Y.	Probability and Statistics for Engineers and Scientists. 9 th ed.	Prentice Hall,	2011	
	Mendenhall, W.,	Introduction to Probability	Duxbury Press,		

	Beaver, R.J. and Beaver, B.M.	and Statistics. 14 th ed.	2013
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