

## Subject Description Form

<b>Subject Code</b>	AMA287
<b>Subject Title</b>	Engineering Mathematics II
<b>Credit Value</b>	3
<b>Level</b>	2
<b>Pre-requisite / Co-requisite/ Exclusion</b>	Nil
<b>Objectives</b>	The subject aims to introduce students to some basic tools in mathematics. The emphasis will be on application of mathematical methods to solving problems in engineering.
<b>Intended Learning Outcomes</b>	Upon completion of the subject, students will be able to: <ol style="list-style-type: none"> <li>1. apply mathematical reasoning to analyse essential features of different problems;</li> <li>2. extend their knowledge of mathematical techniques and adapt known solutions to different situations in engineering;</li> <li>3. apply appropriate mathematical techniques to model and solve problems.</li> </ol>
<b>Subject Synopsis/ Indicative Syllabus</b>	<p><i>Linear algebra</i>            Matrices and determinants; Vectors; Gaussian elimination; LU factorization; Pivoting; Ill-conditioned systems; Positive definite matrices and their basic properties; Cholesky's factorization; Positive definite quadratic form; Applications in equilibrium problems such as small and large displacement problems in trusses; Flow in pipe network; Eigenvalue and eigenvector; Diagonalization of real symmetric matrices; Computation of eigenvectors; Power method; QR algorithm; Applications in determining principal stresses, frequencies and mode shapes of lumped mass systems.</p> <p><i>Least-squares problems:</i>            Normal equations; Projection onto subspace; Minimization of residual; Curve fitting and survey adjustment.</p>
<b>Teaching/Learning Methodology</b>	A two hour mass lecture will be conducted each week to initiate students into the ideas, concepts and techniques of the topics in the syllabus, which is then reinforced by a one hour tutorial designed to consolidate and develop students' knowledge through discussion and practical problem solving.

Assessment Methods in Alignment with Intended Learning Outcomes	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)		
			1	2	3
	a. Continuous Assessment	40%	✓	✓	✓
	b. Examination	60%	✓	✓	✓
Total	100 %				
<p>Continuous Assessment comprises of assignments, in class quizzes, online quizzes and a mid-term test. A 3-hour examination is held at the end of the semester.</p> <p>Questions used in assignments, quizzes, tests and examinations are set to test students' ability with regard to any one of the intended learning outcomes.</p> <p>To pass this subject, students are required to obtain Grade D or above in <b>both</b> the Continuous Assessment and the Examination components.</p>					
Student Study Effort Required	Class contact:				
	▪ Lecture		28 Hrs.		
	▪ Tutorial and Student Presentation		14 Hrs.		
	Other student study effort:				
	▪ Quizzes, Mid-term test and Examination		8 Hrs.		
	▪ Self-study		90 Hrs.		
	Total student study effort			140 Hrs.	
Reading List and References	<u>Textbook:</u>				
	Kolman, B. & Hill, D.R.	Elementary Linear Algebra with applications 9 <sup>th</sup> edition		Prentice Hall 2007	
	<u>References:</u>				
	Anton, H.	Elementary Linear Algebra 9 <sup>th</sup> edition		John Wiley & Sons 2004	
	Hager, W.W.	Applied Numerical Linear Algebra		Prentice-Hall 1987	
	Chapra, S.C. & Canale, R.P.	Numerical Methods for Engineers: with Programming and Software Applications 5 <sup>th</sup> edition		McGraw Hill 2006	
Kreyszig, E.	Advanced Engineering Mathematics 9 <sup>th</sup> edition		Wiley 2006		