

Subject Description Form

Subject Code	AMA1751
Subject Title	Linear Algebra
Credit Value	3
Level	1
Pre-requisite	Nil
Exclusion	Calculus and Linear Algebra (AMA1007) Calculus and Linear Algebra (AMA10071) Basic Mathematics II - Calculus and Linear algebra (AMA1120)
Objectives	This subject aims to introduce students to basic principles and knowledge of elementary linear algebra. Emphasis will be on the understanding of fundamental concepts as well as applications of mathematical techniques in solving practical problems.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: (a) Understand the concept of linear algebra and perform basic operations; (b) make use of the knowledge and techniques in linear algebra and adapt known results to various situations; (c) demonstrate abilities of logical and analytical thinking.
Subject Synopsis/ Indicative Syllabus	<u>Matrix algebra</u> Linear equations and matrices, matrix operations, row-reduction, echelon form, determinants. <u>Vector spaces</u> Vector space axioms, subspace, spanning sets, linear dependence and independence, bases and dimension. <u>Linear transformations</u> Definition of linear transformation, kernel and range, the matrix of a linear transformation, eigenvalues and eigenvectors, complex eigenvalues. <u>Inner product spaces</u> Inner product, norm, orthogonality, orthogonal projections, Gram-Schmidt orthogonalization process, diagonalization of symmetric matrices, least square problems, singular value decomposition.
Teaching/Learning Methodology	The subject will mainly be delivered through lectures and tutorials. The lectures will be conducted to introduce the theoretical background, and practical problems / scenarios will be discussed in the tutorial sessions to illustrate how the theory developed can be applied in practice.

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/Quizzes	20%	✓	✓	✓
	2. Midterm Test	20%	✓	✓	✓
	3. Examination	60%	✓		✓
	Total	100%			
	Continuous Assessment comprises of assignments and/or quizzes, and test(s). A written examination is held at the end of the semester.				
Student Study Effort Required	Class contact:				
	▪ Lecture			26 Hrs.	
	▪ Tutorial			13 Hrs.	
	Other student study effort:				
	▪ Assignments/Quizzes			35 Hrs.	
	▪ Self-study			35 Hrs.	
	Total student study effort			109 Hrs.	
Reading List and References	<u>References:</u>				
	Steven Leon	Linear Algebra with Applications 9 th Edition	Pearson 2014		
	David Lay	Linear Algebra and its Applications 5 th Edition	Pearson 2014		
	Gilbert Strang	Introduction to Linear Algebra 5 th Edition	Wellesley-Cambridge Press 2016		