Subject Description Form

Subject Code	AMA151
Subject Title	Linear Algebra
Credit Value	3
Level	1
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	This subject is to introduce students to the ideas and techniques of basic linear algebra and its applications.
Intended Learning Outcomes	Upon satisfactory completion of the subject, students should be able to: 1. perform basic operations of matrix algebra and apply them to solve system of linear equations; 2. discuss the basic concepts of vector spaces, linear transformations and inner product spaces with geometric interpretation; 3. apply the techniques of linear algebra to problems in statistics and applied mathematics.
Subject Synopsis/ Indicative Syllabus	*Matrix algebra (9 hours)* Linear equations and matrices, matrix operations, row-reduction, echelon form, determinants. *Vector spaces (9 hours)* Vector space axioms, subspace, spanning sets, linear dependence and independence, bases and dimension. *Linear transformations (11 hours)* Definition of linear transformation, kernel and range, the matrix of a linear transformation, change of basis, eigenvalues and eigenvectors. *Inner product spaces (11 hours)* Inner product, norm, orthogonality, Gram-Schmidt orthogonalization process, diagonalization of symmetric matrices. *Applications (2 hours)* Leontief Open Economic Model and Leontief Closed Economic Model. Age-specific population growth (Leslie matrix model).
Teaching/Learning Methodology	The subject will be delivered mainly through lectures and tutorials. The lectures will be conducted to provide students with an integrated knowledge required for the understanding of the basic mathematical concepts and techniques. To develop students' ability for logical thinking, effective communication and ability to apply the theory they learn in lectures, tutorial and presentation sessions will be held.

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
a. Assignments/Quizzes	16%	✓	✓	✓
b. Tests	24%	✓	✓	
c. 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 **Linear Algebra**, thus, **Exam-based assessment** is the most appropriate assessment method, including 24% test and 60% examination. Moreover, 16% worth of assignments and quizzes are included as a component of continuous assessment so as to keep the students in progress.

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

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	33 Hrs.
▪ Self-study	33 Hrs.
Total student study effort	108 Hrs.

Reading List and References	Textbook:		
	Anton, H.	Elementary Linear Algebra 10th edition	John Wiley & Sons 2010
	References:		
	Kolman, B. & Hill, D.R.	Elementary Linear Algebra with applications 9th edition	Prentice Hall 2007
	Lay, D.C.	Linear Algebra and Its Applications 4th edition	Addison Wesley 2011
	Apostol, T.M.	Linear Algebra: A First Course with Applications to Differential Equations 1st edition	Wiley-Interscience 1997
	Strang, G.	Linear Algebra with its Applications 4th edition	Brooks Cole 2005