Subject Description Form

Subject Code	AMA2701A
Subject Title	Advanced Calculus and Linear Algebra
Credit Value	0
Level	2
Pre-requisite	Calculus and Linear Algebra I (AMA1007) or equivalent
Exclusion	Advanced Calculus and Linear Algebra (AMA2701)
Objectives	This subject is to introduce students to the ideas and techniques of differential equations, linear algebra and their applications.
Intended Learning Outcomes	Upon satisfactory completion of the subject, students should be able to: a. Solve simple differential equations of first and second order. b. perform basic operations of matrix algebra and apply them to solve system of linear equations; c. discuss the basic concepts of vector spaces, linear transformations and inner product spaces with geometric interpretation; d. apply the techniques of linear algebra to problems in statistics and applied mathematics.
Subject Synopsis/ Indicative Syllabus	*Differential equations (9 hours)* Simple first order differential equations, second order linear differential equations with constant coefficients, applications. *Vector spaces (8 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.
Teaching/Learning Methodology	The subject will be delivered mainly through lectures and tutorials. The lectures will be conducted to provide the 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/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)			
		a	b	c	d
1. Assignments / Quizzes	16%	✓	✓	✓	✓
2. Tests	24%	✓	✓		✓
3. 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 **Advanced Calculus and 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.

Student Study Effort Expected

Class contact:	
Lecture	26 Hrs.
Tutorial	13 Hrs.
Other student study effort:	
Assignment	33 Hrs.
Self-study	33 Hrs.
Total student study effort	105 Hrs.

Reading List and References

Textbooks:

Anton, H.	Elementary Linear Algebra 10th edition	John Wiley & Sons 2010
Hung, K.F. & Pong, G.T.Y.	Foundation Mathematics Revised edition	McGraw Hill 2008

References:

Kolman, B. & Hill, D.R.	Elementary Linear Algebra with applications 9th edition	Prentice Hall 2007
Lay, D.C.	Linear Algebra with 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	Brooks Cole

	4th edition	2005