Subject Description Form

Subject Code	AMA2512
Subject Title	**Applied Mathematics II**
Credit Value	2
Level	2
Pre-requisite	Applied Mathematics I (AMA2511)
Exclusion	Intermediate Calculus and Linear Algebra (AMA2007/AMA2707) Mathematics I (AMA2111)
Objectives	This subject aims to introduce students to some fundamental knowledge of engineering mathematics. Emphasis will be on the understanding of fundamental concepts as well as applications of mathematical methods in solving practical problems in science and engineering.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. Apply mathematical reasoning to analyze essential features of different problems in their discipline; b. Extend their knowledge of mathematical and numerical techniques and adapt known solutions in various situations; c. Develop and extrapolate the mathematical concepts in synthesizing and solving new problems d. Demonstrate abilities of logical and analytical thinking.
Contribution to Programme Outcomes (Refer to Part I Section 10)	▪ Programme Outcome 1: Demonstrate an ability to apply knowledge of mathematics, science, and engineering appropriate to the Biomedical Engineering (BME) discipline. (Teach)
Subject Synopsis/ Indicative Syllabus	**Linear Algebra:** General properties of matrices; elementary row operations; elementary matrices; systems of linear equations; inverse of a square matrix; determinant; eigenvalues and eigenvectors; orthogonality. **Fourier series:** Expansion of periodic functions by Fourier series; Parseval's Identity. **Calculus of several variables:** Revision of calculus of one variable; Partial derivatives, maxima & minima; directional derivatives, Lagrange multiplier.
Teaching/Learning Methodology	The subject will be delivered mainly through lectures and tutorials. The lectures aim to deliver and to explain the concepts, theories and techniques. Tutorials will mainly be used to develop students' problem solving ability. Students are encouraged to enhance their understanding of the subject matters through self-study.

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. Homework, quizzes and mid-term test	40%	✓	✓	✓	✓		
	2. Examination	60%	✓	✓	✓	✓		
	Total	100 %						

Continuous Assessment comprises of assignments, in-class quizzes, online quizzes and a mid-term test. An examination is held at the end of the semester.

Questions used in assignments, quizzes, tests and examinations are used to assess students' level of understanding of the basic concepts and their ability to use mathematical techniques in solving problems in science and engineering.

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

The subject focuses on understanding of basic concepts and application of techniques in engineering mathematics. As such, an assessment method based mainly on examinations/tests/quizzes is considered appropriate. Furthermore, students are required to submit homework assignments regularly in order to allow subject lecturers to keep track of students' progress in the course.

Student Study Effort Expected	Class contact:	
	▪ Lecture	19 Hrs.
	▪ Tutorial	7 Hrs.
	▪ Mid-term test and examination	4 Hrs.
	▪ Assignments and Self study	60 Hrs.
	Total student study effort	90 Hrs.

Reading List and References	- CHAN, C.K., CHAN, C.W., & HUNG, K.F., *Basic Engineering Mathematic*, McGraw Hill 2015 - Anton, H., Elementary Linear Algebra, 11th edition, John Wiley & Sons 2014 - Kreyszig, E., *Advanced Engineering Mathematics*, 10th edition, Wiley 2011 - James, G., *Modern Engineering Mathematics*, Pearson 2015 - Thomas, G.B., Weir, M.D., & Hass, J.R., *Thomas' Calculus*, 14th edition, Addison Wesley 2017
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