Subject Description Form

Subject Code	AMA1120
Subject Title	Basic Mathematics II –Calculus and Linear algebra
Credit Value	3
Level	1
Pre-requisite	Basic Mathematics I – Calculus and Probability & Statistics (AMA1110)
Objectives	This subject aims to introduce students to the basic concepts and applications of elementary calculus and statistics. Emphasis will be on the understanding of fundamental concepts and the use of mathematical techniques in handling practical problems in science and engineering.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: (a) apply analytical reasoning to solve problems in science and engineering; (b) make use of the knowledge of mathematical/statistical techniques and adapt known solutions to various situations; (c) apply mathematical modeling in problem solving; (d) demonstrate abilities of logical and analytical thinking.
Subject Synopsis/ Indicative Syllabus	<u>Elementary calculus</u>: Mean Value Theorem with applications to optimization and curve sketching. Definite and indefinite integrals, fundamental theorem of calculus, methods of integration (integration by substitution, integration by parts, integration of rational functions using partial fractions and integration of trigonometric and hyperbolic functions), reduction formulas, applications to geometry and physics. Improper Integrals. <u>Linear algebra</u>: Basic properties of matrices and determinants, linear systems, Gaussian elimination, inverse of a square matrix, Cramer's rule, vectors in 2-space or in 3-space, applications to geometry.
Teaching/Learning Methodology	Basic concepts and elementary techniques of differential and integral calculus and linear algebra will be taught in lectures. These will be further enhanced in tutorials through 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)			
		a	b	c	d
1.Assignments and tests	40%	✓	✓	✓	✓
2. Examination	60%	✓	✓	✓	✓
Total	100 %				

Continuous Assessment comprises of assignments and tests. An examination is held at the end of the semester.

	Questions used in assignments, 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 differential/integral calculus, elementary statistics and elementary linear algebra. As such, an assessment method based mainly on examinations/tests 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	26 Hrs.
	▪ Tutorial	13 Hrs.
	Other student study effort:	
	▪ Homework and self-study	81 Hrs.
	Total student study effort	120 Hrs.

Reading List and References	Chung, K.C. *A Short Course in Calculus and Matrices*, McGraw Hill 2013
	Hung, K.F., Kwan, Wilson, Pong, T.Y. *Foundation Mathematics & Statistics*, McGraw Hill 2013
	Larson, R., Edwards, B. *Single Variable Calculus*, Brooks/Cole 2012
	Larson, R. *Elementary Linear Algebra*, Brooks/Cole 2013