Subject Description Form

Subject Code	AMA1110
Subject Title	Basic Mathematics I – Calculus and Probability & Statistics
Credit Value	3
Level	1
Pre-requisite	Nil
Exclusion	Calculus and Linear Algebra (AMA1007) Calculus for Engineers (AMA1130) Calculus (AMA1131) Foundation Mathematics for Accounting and Finance (AMA1500) Calculus (AMA1702)
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.
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	<u>Elementary calculus</u>: Limit and continuity, derivatives and their geometric meaning, rules of differentiation including chain rule, Leibniz's rule and L'Hopital's rule, exponential and logarithmic functions, trigonometric functions and their inverses, hyperbolic and inverse hyperbolic functions, applications of differential calculus. <u>Elementary Probability and Statistics</u>: Descriptive statistics, random variables, probability and probability distributions, binomial, Poisson and normal distributions, applications. Population and random samples. Sampling distributions related to sample mean, sample proportions, and sample variances. Concepts of a point estimator and a confidence interval. Point and interval estimates of a mean and the difference between two means.

Teaching/Learning Methodology	Basic concepts and elementary techniques of differential and integral calculus and elementary statistics 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 mid-term tests	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 differential/integral calculus, elementary statistics. 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	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 ▪ Walpole, R.E., Myers, R.H., Myers, S.L. Ye, K. *Probability and Statistics for Engineers and Scientists*, Prentice Hall, 2012
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