Subject Description Form

Subject Code	AMA211
Subject Title	Introduction to Calculus and Linear Algebra
Credit Value	3
Level	2
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	The subject aims to introduce students to some fundamental knowledge of calculus and linear algebra. The emphasis will be on application of mathematical methods to solving practical problems.
Subject Learning Outcomes	Upon completion of the subject, students will be able to: 1. apply mathematical reasoning to analyse essential features of different mathematical problems; 2. extend their knowledge of mathematical techniques and adapt known solutions to different situations; 3. develop and extrapolate mathematical concepts in synthesizing and solving new problem; 4. search for useful information in solving problems.
Subject Synopsis/ Indicative Syllabus	*Calculus:* Limits and continuous functions; derivatives and slopes; rules of differentiation; applications of differentiation, such as curve sketching, optimization and approximation; real-life applications of differentiation; indefinite integrals; definite integrals and Simpson's rule; applications of integration such as area and volume computation; real-life applications of integration. *Linear Algebra:* Systems of linear equations; matrices and vectors; geometric meaning of vectors; multiplication and elementary transformation of matrices; inverse; determinants; dimension and rank of matrices; linear dependency; eigenvalues and eigenvectors; real-life applications of linear algebra.
Teaching/Learning Methodology	The subject will be delivered mainly through lectures, tutorials and presentation. The lectures are organized to deliver and to explain the concepts, theories and techniques, aiming to provide the students with an integrated knowledge and materials

	required for the understanding and application of relevant mathematical concepts and techniques related to calculus and linear algebra. Tutorials help students to develop their ability of logical thinking, effective communication and to solve the difficult exercises which the students cannot solve by themselves.
Assessment Methods in Alignment with Intended Learning Outcomes	<table><tr><td rowspan="2">Specific assessment methods</td><td rowspan="2">% weighting</td><td colspan="4">Intended subject learning outcomes to be assessed (Please tick as appropriate)</td></tr><tr><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>a. Assignment and Mid-term Test</td><td>40%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr><tr><td>b. Examination</td><td>60%</td><td>✓</td><td>✓</td><td>✓</td><td></td></tr><tr><td>Total</td><td>100%</td><td></td><td></td><td></td><td></td></tr></table> Continuous Assessment comprises of assignments and tests. A written examination is held at the end of the semester. Questions used in assignments, tests and examinations are set to test students' ability with regard to any one of the intended learning outcomes. 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 — 26 Hrs.
	▪ Tutorial — 13 Hrs.
	Other student study effort:
	▪ Assignment — 20 Hrs.
	▪ Self-study — 58 Hrs.
	Total student study effort — 117 Hrs.
Reading List and References	<u>Textbook:</u> Larson, R. & Edwards, B.H. Calculus: Early Transcendental Functions 6th edition Brooks Cole 2014

References:

Anton, H.	Elementary Linear Algebra 11th edition	John Wiley & Sons 2014
Stewart, J.	Single Variable Calculus 8th edition	Brooks Cole 2015
Anton, H. & al	Calculus, 10th edition	J. Wiley & Sons 2012
Anton, H. & al	Calculus: Early Transcendentals, 10th edition	J. Wiley & Sons 2012