Subject Description Form

Subject Code	AMA150
Subject Title	Calculus
Credit Value	3
Level	1
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	This subject is to provide students with basic skills of Calculus, which is the core of many mathematical disciplines such as Optimization, Financial Mathematics, Statistics, Simulation etc.
Intended Learning Outcomes	Upon satisfactory completion of the subject, students should be able to: 1. discuss the concepts of limit of a sequence, limit of a function and continuity; 2. develop the understanding of derivative of a function and its geometric meaning, and the ability to compute derivatives using various rules of differentiation; 3. apply differential calculus to calculate rates of change, locate maximum, minimum and points of inflexion, approximate Δy by differential and sketch the graph of a given function; 4. master the concepts of indefinite integrals as anti-derivatives and definite integrals as limit of sums and understand the fundamental theorem of calculus and other integration theorem; 5. evaluate indefinite integrals using techniques such as change of variables, integration by parts and partial fraction decomposition; 6. solve simple differential equations of first and second order.
Subject Synopsis/ Indicative Syllabus	*Limit and Continuity*: *(9 hours)* Convergence of a sequence and limit theorems, limit of a function, continuity. *Differential Calculus: (12 hours)* Derivative of a function and its geometric meaning, rules of differentiation, higher derivatives, Mean value theorem, L'Hopital's rule, application of differential calculus to maximum and minimum, rates of change, linear approximations, monotonically increasing / decreasing functions, curve sketching. *Integral Calculus: (12 hours)* Anti-derivatives, definite integrals, fundamental theorem of calculus, techniques of integration, reduction formulas, Taylor's Theorem, simple applications. *Differential equations*: *(9 hours)* First order separable and linear differential equations, second order linear differential equations with constant coefficients, method of undetermined coefficients, applications.

Teaching/Learning Methodology

The subject will be delivered mainly through lectures and tutorials. The lectures will be conducted to provide 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	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		1	2	3	4	5	6
a. Assignments/Quizzes	16%	✓	✓	✓	✓	✓	
b. Tests	24%	✓	✓	✓	✓		
c. Examination	60%	✓	✓	✓	✓	✓	✓
Total	100 %						

Continuous Assessment comprises of assignments and/or quizzes, and tests. A written examination is held at the end of the semester.

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	28 Hrs.
▪ Tutorial and Student Presentations	14 Hrs.
Other student study effort:	
▪ Assignment	15 Hrs.
▪ Self-study	55 Hrs.
Total student study effort	112 Hrs.

Reading List and References

Textbook:

Stewart, James	Calculus 7th ed.	Brooks Cole Cengage Learning, c2012

References:

Adams, R. A. & Essex. C.	Calculus: Single Variable 7th edition	Prentice Hall Canada 2009
Thomas, G.B., Weir, M.D. & Hass, J.R.	Thomas' Calculus 12th edition	Addison Wesley 2009