Subject Description Form

Subject Code	AMA1130
Subject Title	Calculus for Engineers
Credit Value	3
Level	1
Pre-requisite / Exclusion	Nil
Objectives	To acquire knowledge of calculus up to first year university level, and to apply these tools for their feasible solution of practical problems in engineering.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. master the basics of differentiation and recognize its usefulness applications in engineering problems; b. master the basics of integration and recognize its usefulness applications in engineering problems; c. apply the basics of calculus in formulating and applying to engineering problems;
Subject Synopsis/ Indicative Syllabus	1. 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 in optimization. Mean Value Theorem in differentiation. 2. 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 engineering. Mean Value Theorem in integration.
Teaching/Learning Methodology	Emphasis is placed on a pro-active learning approach. Fundamental knowledge will be introduced in the lectures, with interspersed questions, exercises and quizzes for class discussion and after class self study. Formal tutorial classes will be conducted (1 hour per week), with additional worked examples and tutorial sheets being discussed. Students will be expected to read up, do exercises and reflect critically on the material covered in class. A companion web site-cum-discussion forum will be available to facilitate questioning and discussion. Additional face-to-face discussion sessions can be arranged on request.

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
	1.Coursework	40	✓	✓	✓
	2. Final Examination	60	✓	✓	✓
	Total	100 %			

Student Study Effort Expected	Class contact:	
	▪ Lectures	26 Hrs.
	▪ Tutorials	13 Hrs.
	Other student study effort:	
	▪ Coursework and Self Study	81 Hrs.
	Total student study effort	120 Hrs.
Reading List and References	Hung, KF, Kwan, WCK, Pong, GTY. Foundation Mathematics & Statistics. McGraw Hill 2013. Thomas, GB, Weir, MD, & Hass, JR. Thomas' Calculus Early Transcendentals 14th ed. Pearson Education 2017. Lang, S. A First Course in Calculus, 3rd ed., Springer Verlag, 1986.	