

## Subject Description Form

<b>Subject Code</b>	AMA204
<b>Subject Title</b>	Mathematics IIA
<b>Credit Value</b>	3
<b>Level</b>	2
<b>Pre-requisite / Co-requisite/ Exclusion</b>	Pre-requisite: Mathematics IA (AMA203)
<b>Objectives</b>	This subject aims to introduce students to the fundamentals of basic engineering mathematics. Emphasis will be on the basic theory as well as application of mathematical methods to solving engineering problems.
<b>Subject Learning Outcomes</b>	Upon completion of the subject, students will be able to: <ol style="list-style-type: none"> <li>1. apply mathematical reasoning to analyse essential features of different engineering problems;</li> <li>2. extend their knowledge of mathematical techniques and adapt known solutions to different situations of engineering context;</li> <li>3. develop and extrapolate mathematical concepts in synthesizing and solving engineering problems;</li> <li>4. search for useful information in problem solving.</li> </ol>
<b>Subject Synopsis/ Indicative Syllabus</b>	<p><i>Calculus and functions of several variables:</i>            Infinite series; Power series; Taylor series; Fourier series; Partial differentiation; Maxima and minima; Lagrange multiplier.</p> <p><i>Partial differential equations:</i>            Formulation of partial differential equations; Method of separation of variables; Initial and boundary value problems.</p> <p><i>Vector Calculus:</i>            Vectors; Scalar and vector products; Gradient, divergence and curl operators; Multiple integrals; Line, surface and volume integrals; Green's theorem; divergence theorem and Stokes' theorem.</p>
<b>Teaching/Learning Methodology</b>	The subject will be delivered mainly through lectures and tutorials. The lectures aim to provide students with an integrated knowledge required for the understanding and application of mathematical concepts and techniques. Tutorials will mainly be used to develop students' problem solving ability.

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
	a. Continuous Assessment	40%	✓	✓	✓	✓
	b. Examination	60%	✓	✓	✓	✓
Total	100%					
<p>Continuous Assessment comprises of assignments, in class quizzes, online quizzes and a mid-term test. A 3-hour examination is held at the end of the semester.</p> <p>Questions used in assignments, quizzes, tests and examinations are used to assess the student's level of understanding of the basic concepts and their ability to use mathematical techniques in solving problems in science and engineering.</p> <p>To pass this subject, students are required to obtain grade D or above in <b>both</b> the continuous assessment and the examination components.</p>						
Student Study Effort Required	Class contact:					
	▪ Lecture					28 Hrs.
	▪ Tutorial					14 Hrs.
	▪ Mid-term test and Examination					5 Hrs.
	Other student study effort:					
	▪ Assignments and self-study					73 Hrs.
	Total student study effort					120 Hrs.
Reading List and References	<u>Textbook:</u>					
	Chan, C.K., Chan, C.W. & Hung, K.F.	Basic Engineering Mathematics Updated 3 <sup>rd</sup> edition	McGraw Hill 2011			
	<u>References:</u>					
	Anton, H.	Elementary Linear Algebra 9 <sup>th</sup> edition	John Wiley & Sons 2004			
	Thomas, G.B., Weir, M.D. & Hass, J.R.	Thomas' Calculus 12 <sup>th</sup> edition	Addison Wesley 2009			
James, G.	Advanced Modern Engineering Mathematics 3 <sup>rd</sup> edition	Prentice Hall 2005				