

## Subject Description Form

<b>Subject Code</b>	AMA2511
<b>Subject Title</b>	<b>Applied Mathematics I</b>
<b>Credit Value</b>	2
<b>Level</b>	2
<b>Pre-requisite</b>	Calculus I (AMA1101) or Calculus IA (AMA1102) or Basic Mathematics II –Calculus and Linear algebra (AMA1120)
<b>Objectives</b>	This subject aims to introduce students to some fundamental knowledge of engineering mathematics. Emphasis will be on the understanding of fundamental concepts as well as applications of mathematical methods in solving practical problems in science and engineering.
<b>Intended Learning Outcomes</b>	Upon completion of the subject, students will be able to: <ul style="list-style-type: none"> <li>a. Apply mathematical reasoning to analyze essential features of different problems in their discipline;</li> <li>b. Extend their knowledge of mathematical and numerical techniques and adapt known solutions in various situations;</li> <li>c. Develop and extrapolate the mathematical concepts in synthesizing and solving new problems;</li> <li>d. Demonstrate abilities of logical and analytical thinking.</li> </ul>
<b>Contribution to Programme Outcomes (Refer to Part I Section 10)</b>	<ul style="list-style-type: none"> <li>▪ Programme Outcome 1: Demonstrate an ability to apply knowledge of mathematics, science, and engineering appropriate to the Biomedical Engineering (BME) discipline. (Teach)</li> </ul>
<b>Subject Synopsis/ Indicative Syllabus</b>	<p><b>Complex Numbers:</b> Algebra and geometry of complex numbers; polar form; DeMoivre's theorem; roots of a complex number.</p> <p><b>Ordinary differential equations:</b> Simple ODE of first and second order; variation of parameters; applications.</p> <p><b>Laplace Transform:</b> Laplace transform and inverse Laplace transform; properties of Laplace transformation with applications to solving initial value problems.</p> <p><b>Series:</b> Infinite series; convergence tests; alternating series; power series; Taylor's and Maclaurin's expansion.</p>

<b>Teaching/Learning Methodology</b>	<p>The subject will be delivered mainly through lectures and tutorials. The lectures aim to deliver and to explain the concepts, theories and techniques. Tutorials will mainly be used to develop students' problem solving ability. Students are encouraged to enhance their understanding of the subject matters through self-study.</p>																																
<b>Assessment Methods in Alignment with Intended Learning Outcomes</b>	<table border="1" data-bbox="467 394 1448 793"> <thead> <tr> <th data-bbox="475 405 784 583" rowspan="2">Specific assessment methods/tasks</th> <th data-bbox="792 405 954 583" rowspan="2">% weighting</th> <th colspan="4" data-bbox="963 405 1440 520">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th> </tr> <tr> <th data-bbox="963 531 1076 583">a</th> <th data-bbox="1084 531 1198 583">b</th> <th data-bbox="1206 531 1320 583">c</th> <th data-bbox="1328 531 1440 583">d</th> </tr> </thead> <tbody> <tr> <td data-bbox="475 594 784 678">1.Homework, quizzes and mid-term test</td> <td data-bbox="792 594 954 678">40%</td> <td data-bbox="963 594 1076 678">✓</td> <td data-bbox="1084 594 1198 678">✓</td> <td data-bbox="1206 594 1320 678">✓</td> <td data-bbox="1328 594 1440 678">✓</td> </tr> <tr> <td data-bbox="475 688 784 730">2. Examination</td> <td data-bbox="792 688 954 730">60%</td> <td data-bbox="963 688 1076 730">✓</td> <td data-bbox="1084 688 1198 730">✓</td> <td data-bbox="1206 688 1320 730">✓</td> <td data-bbox="1328 688 1440 730">✓</td> </tr> <tr> <td data-bbox="475 741 784 783">Total</td> <td data-bbox="792 741 954 783">100 %</td> <td colspan="4" data-bbox="963 741 1440 783"></td> </tr> </tbody> </table> <p data-bbox="467 825 1448 930">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.</p> <p data-bbox="467 951 1448 1087">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.</p> <p data-bbox="467 1108 1448 1171">To pass this subject, students are required to obtain grade D or above in both the continuous assessment and the examination components.</p> <p data-bbox="467 1192 1448 1255">Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p> <p data-bbox="467 1276 1448 1476"><i>The subject focuses on understanding of basic concepts and application of techniques in engineering mathematics. 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.</i></p>					Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)				a	b	c	d	1.Homework, quizzes and mid-term test	40%	✓	✓	✓	✓	2. Examination	60%	✓	✓	✓	✓	Total	100 %				
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<b>Student Study Effort Expected</b>	Class contact:																																
	▪ Lecture		19 Hrs.																														
	▪ Tutorial		7 Hrs.																														
	▪ Mid-term test and examination		4 Hrs.																														
	▪ Assignments and Self study		60 Hrs.																														

	Total student study effort	90 Hrs.
<b>Reading List and References</b>	<ul style="list-style-type: none"> <li data-bbox="467 254 1333 323">▪ CHAN, C.K., CHAN, C.W., &amp; HUNG, K.F., <i>Basic Engineering Mathematics</i>, McGraw Hill 2015.</li> <li data-bbox="467 365 1409 434">▪ Anton, H., <i>Elementary Linear Algebra</i>, 11th edition John Wiley &amp; Sons 2014</li> <li data-bbox="467 476 1414 546">▪ Kreyszig, E., <i>Advanced Engineering Mathematics</i>, 10th edition, Wiley 2011</li> <li data-bbox="467 588 1305 621">▪ JAMES, G., <i>Modern Engineering Mathematics</i>, Pearson 2015</li> <li data-bbox="467 663 1354 732">▪ Thomas, G.B., Weir, M.D., &amp; Hass, J.R., <i>Thomas' Calculus</i>, 13th edition, Pearson Education 2014</li> </ul>	