

## 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="467 384 1446 793"> <thead> <tr> <th data-bbox="467 384 792 583" rowspan="2">Specific assessment methods/tasks</th> <th data-bbox="792 384 954 583" rowspan="2">% weighting</th> <th colspan="4" data-bbox="954 384 1446 520">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th> </tr> <tr> <th data-bbox="954 520 1076 583">a</th> <th data-bbox="1076 520 1198 583">b</th> <th data-bbox="1198 520 1320 583">c</th> <th data-bbox="1320 520 1446 583">d</th> </tr> </thead> <tbody> <tr> <td data-bbox="467 583 792 678">1.Homework, quizzes and mid-term test</td> <td data-bbox="792 583 954 678">40%</td> <td data-bbox="954 583 1076 678">✓</td> <td data-bbox="1076 583 1198 678">✓</td> <td data-bbox="1198 583 1320 678">✓</td> <td data-bbox="1320 583 1446 678">✓</td> </tr> <tr> <td data-bbox="467 678 792 730">2. Examination</td> <td data-bbox="792 678 954 730">60%</td> <td data-bbox="954 678 1076 730">✓</td> <td data-bbox="1076 678 1198 730">✓</td> <td data-bbox="1198 678 1320 730">✓</td> <td data-bbox="1320 678 1446 730">✓</td> </tr> <tr> <td data-bbox="467 730 792 793">Total</td> <td data-bbox="792 730 954 793">100 %</td> <td colspan="4" data-bbox="954 730 1446 793"></td> </tr> </tbody> </table> <p data-bbox="467 825 1446 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="467 940 1446 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 1098 1446 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 1182 1446 1255">Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p> <p data-bbox="467 1266 1446 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:																																
	<ul style="list-style-type: none"> <li>▪ Lecture</li> </ul>	19 Hrs.																															
	<ul style="list-style-type: none"> <li>▪ Tutorial</li> </ul>	7 Hrs.																															
	<ul style="list-style-type: none"> <li>▪ Mid-term test and examination</li> </ul>	4 Hrs.																															
	<ul style="list-style-type: none"> <li>▪ Assignments and Self study</li> </ul>	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 1338 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 1373 434">▪ Anton, H., <i>Elementary Linear Algebra</i>, 11th edition, John Wiley &amp; Sons 2014</li> <li data-bbox="467 476 1419 546">▪ Kreyszig, E., <i>Advanced Engineering Mathematics</i>, 10th edition, Wiley 2011</li> <li data-bbox="467 588 1308 621">▪ JAMES, G., <i>Modern Engineering Mathematics</i>, Pearson 2015</li> <li data-bbox="467 663 1360 732">▪ Thomas, G.B., Weir, M.D., &amp; Hass, J.R., <i>Thomas' Calculus</i>, 14th edition, Pearson Education 2017</li> </ul>	