

## 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>Co-requisite/ Exclusion</b>	<b>Exclusion:</b> Intermediate Calculus and Linear Algebra (AMA2007), Mathematics I (AMA2111)
<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 1437 793"> <thead> <tr> <th data-bbox="474 403 787 583" rowspan="2">Specific assessment methods/tasks</th> <th data-bbox="794 403 954 583" rowspan="2">% weighting</th> <th colspan="4" data-bbox="961 403 1430 520">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th> </tr> <tr> <th data-bbox="961 529 1078 583">a</th> <th data-bbox="1084 529 1201 583">b</th> <th data-bbox="1208 529 1325 583">c</th> <th data-bbox="1331 529 1430 583">d</th> </tr> </thead> <tbody> <tr> <td data-bbox="474 592 787 676">1.Homework, quizzes and mid-term test</td> <td data-bbox="794 592 954 676">40%</td> <td data-bbox="961 592 1078 676">✓</td> <td data-bbox="1084 592 1201 676">✓</td> <td data-bbox="1208 592 1325 676">✓</td> <td data-bbox="1331 592 1430 676">✓</td> </tr> <tr> <td data-bbox="474 684 787 730">2. Examination</td> <td data-bbox="794 684 954 730">60%</td> <td data-bbox="961 684 1078 730">✓</td> <td data-bbox="1084 684 1201 730">✓</td> <td data-bbox="1208 684 1325 730">✓</td> <td data-bbox="1331 684 1430 730">✓</td> </tr> <tr> <td data-bbox="474 739 787 793">Total</td> <td data-bbox="794 739 954 793">100 %</td> <td colspan="4" data-bbox="961 739 1430 793"></td> </tr> </tbody> </table> <p data-bbox="467 823 1446 928">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="467 970 1446 1096">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 1138 1446 1213">Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p> <p data-bbox="467 1255 1446 1453"><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>Reading List and References</b>	<ul style="list-style-type: none"> <li>▪ CHAN, C.K., CHAN, C.W., &amp; HUNG, K.F., <i>Basic Engineering Mathematics</i>, McGraw Hill 2015.</li> <li>▪ Anton, H., <i>Elementary Linear Algebra</i>, 11th edition, John Wiley &amp; Sons 2014</li> <li>▪ Kreyszig, E., <i>Advanced Engineering Mathematics</i>, 10th edition, Wiley 2011</li> <li>▪ JAMES, G., <i>Modern Engineering Mathematics</i>, Pearson 2015</li> <li>▪ Thomas, G.B., Weir, M.D., &amp; Hass, J.R., <i>Thomas' Calculus</i>, 14th edition, Pearson Education 2017</li> </ul>
<b>Date of Last Revision</b>	July 2019