

Subject Description Form

Subject Code	AMA2511
Subject Title	Applied Mathematics I
Credit Value	2
Level	2
Pre-requisite	Basic Mathematics II –Calculus and Linear algebra (AMA1120)
Exclusion	Intermediate Calculus and Linear Algebra (AMA2007/AMA2707) Mathematics I (AMA2111)
Objectives	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.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: <ul style="list-style-type: none"> a. Apply mathematical reasoning to analyze essential features of different problems in their discipline; b. Extend their knowledge of mathematical and numerical techniques and adapt known solutions in various situations; c. Develop and extrapolate the mathematical concepts in synthesizing and solving new problems; d. Demonstrate abilities of logical and analytical thinking.
Contribution to Programme Outcomes (Refer to Part I Section 10)	<ul style="list-style-type: none"> ▪ Programme Outcome 1: Demonstrate an ability to apply knowledge of mathematics, science, and engineering appropriate to the Biomedical Engineering (BME) discipline. (Teach)
Subject Synopsis/ Indicative Syllabus	<p>Complex Numbers: Algebra and geometry of complex numbers; polar form; DeMoivre’s theorem; roots of a complex number.</p> <p>Ordinary differential equations: Simple ODE of first and second order; variation of parameters; applications.</p> <p>Laplace Transform: Laplace transform and inverse Laplace transform; properties of Laplace transformation with applications to solving initial value problems.</p> <p>Series: Infinite series; convergence tests; alternating series; power series; Taylor’s and Maclaurin’s expansion.</p>

Teaching/Learning Methodology	<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>																																									
Assessment Methods in Alignment with Intended Learning Outcomes	<table border="1" data-bbox="467 394 1435 821"> <thead> <tr> <th data-bbox="467 394 789 579" rowspan="2">Specific assessment methods/tasks</th> <th data-bbox="789 394 954 579" rowspan="2">% weighting</th> <th colspan="4" data-bbox="954 394 1435 520">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th> </tr> <tr> <th data-bbox="954 520 1078 579">a</th> <th data-bbox="1078 520 1200 579">b</th> <th data-bbox="1200 520 1323 579">c</th> <th data-bbox="1323 520 1435 579">d</th> </tr> </thead> <tbody> <tr> <td data-bbox="467 579 789 699">1. Homework, quizzes and mid-term test</td> <td data-bbox="789 579 954 699">40%</td> <td data-bbox="954 579 1078 699">✓</td> <td data-bbox="1078 579 1200 699">✓</td> <td data-bbox="1200 579 1323 699">✓</td> <td data-bbox="1323 579 1435 699">✓</td> </tr> <tr> <td data-bbox="467 699 789 758">2. Examination</td> <td data-bbox="789 699 954 758">60%</td> <td data-bbox="954 699 1078 758">✓</td> <td data-bbox="1078 699 1200 758">✓</td> <td data-bbox="1200 699 1323 758">✓</td> <td data-bbox="1323 699 1435 758">✓</td> </tr> <tr> <td data-bbox="467 758 789 821">Total</td> <td data-bbox="789 758 954 821">100 %</td> <td colspan="4" data-bbox="954 758 1435 821"></td> </tr> </tbody> </table> <p data-bbox="467 856 1446 957">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="467 982 1446 1115">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 1157 1446 1226">Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p> <p data-bbox="467 1251 1446 1444"><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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Reading List and References	<ul style="list-style-type: none"> ▪ CHAN, C.K., CHAN, C.W., & HUNG, K.F., <i>Basic Engineering Mathematics</i>, McGraw Hill 2015. ▪ Anton, H., <i>Elementary Linear Algebra</i>, 11th edition, John Wiley & Sons 2014 ▪ Kreyszig, E., <i>Advanced Engineering Mathematics</i>, 10th edition, Wiley 2011 ▪ JAMES, G., <i>Modern Engineering Mathematics</i>, Pearson 2015 ▪ Thomas, G.B., Weir, M.D., & Hass, J.R., <i>Thomas' Calculus</i>, 14th edition, Pearson Education 2017
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