

## Subject Description Form

<b>Subject Code</b>	AMA150A
<b>Subject Title</b>	Calculus
<b>Credit Value</b>	0
<b>Level</b>	1
<b>Pre-requisite/ Co-requisite/ Exclusion</b>	Exclusion : Calculus (AMA150)
<b>Objectives</b>	This subject is to provide students with basic skills of Calculus, which is the core of many mathematical disciplines such as Optimization, Financial Mathematics, Statistics, Simulation etc.
<b>Intended Learning Outcomes</b>	<p>Upon satisfactory completion of the subject, students should be able to:</p> <ol style="list-style-type: none"> <li>1. discuss the concepts of limit of a sequence, limit of a function and continuity;</li> <li>2. develop the understanding of derivative of a function and its geometric meaning, and the ability to compute derivatives using various rules of differentiation;</li> <li>3. apply differential calculus to calculate rates of change, locate maximum, minimum and points of inflexion, approximate <math>\Delta y</math> by differential and sketch the graph of a given function;</li> <li>4. master the concepts of indefinite integrals as anti-derivatives and definite integrals as limit of sums and understand the fundamental theorem of calculus and other integration theorem;</li> <li>5. evaluate indefinite integrals using techniques such as change of variables, integration by parts and partial fraction decomposition;</li> <li>6. solve simple differential equations of first and second order.</li> </ol>
<b>Subject Synopsis/ Indicative Syllabus</b>	<p><i>Limit and Continuity: (7 hours)</i> Convergence of a sequence and limit theorems, limit of a function, continuity.</p> <p><i>Differential Calculus: (12 hours)</i> Derivative of a function and its geometric meaning, rules of differentiation, higher derivatives, Mean value theorem, L'Hopital's rule, application of differential calculus to maximum and minimum, rates of change, linear approximations, monotonically increasing / decreasing functions, curve sketching.</p> <p><i>Integral Calculus: (12 hours)</i> Anti-derivatives, definite integrals, fundamental theorem of calculus, techniques of integration, reduction formulas, Taylor's Theorem, simple applications.</p> <p><i>Differential equations: (8 hours)</i> First order separable and linear differential equations, second order linear differential equations with constant coefficients, method of undetermined coefficients, applications.</p>

<b>Teaching/Learning Methodology</b>	The subject will be delivered mainly through lectures and tutorials. The lectures will be conducted to provide the students with an integrated knowledge required for the understanding of the basic mathematical concepts and techniques. To develop students' ability for logical thinking, effective communication and ability to apply the theory they learn in lectures, tutorial and presentation sessions will be held.																																																															
<b>Assessment Methods in Alignment with Intended Learning Outcomes</b>	<table border="1" data-bbox="432 387 1422 831"> <thead> <tr> <th rowspan="2">Specific assessment methods</th> <th rowspan="2">% weighting</th> <th colspan="6">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th> </tr> <tr> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> <th>6</th> </tr> </thead> <tbody> <tr> <td>a. Assignments/Quizzes</td> <td>16%</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> </tr> <tr> <td>b. Tests</td> <td>24%</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>c. Examination</td> <td>60%</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>Total</td> <td>100 %</td> <td colspan="6"></td> </tr> </tbody> </table> <p data-bbox="432 846 1437 913">Continuous Assessment comprises of assignments and/or quizzes, and tests. A written examination is held at the end of the semester.</p> <p data-bbox="432 947 1437 1014">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>								Specific assessment methods	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)						1	2	3	4	5	6	a. Assignments/Quizzes	16%	✓	✓	✓	✓	✓		b. Tests	24%	✓	✓	✓	✓			c. Examination	60%	✓	✓	✓	✓	✓	✓	Total	100 %																
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