

Subject Description Form

Subject Code	AMA3723
Subject Title	Further Mathematical Methods for Finance
Credit Value	3
Level	3
Pre-requisite	Calculus and Linear Algebra I (AMA1007) or equivalent
Exclusion	Advanced Calculus and Linear Algebra (AMA2701/AMA2701A) Advanced Mathematical Methods for Economics and Finance (AMA273)
Objectives	This subject is to introduce students to the ideas and techniques of linear algebra, differential equations and their applications.
Intended Learning Outcomes	Upon satisfactory completion of the subject, students should be able to: <ul style="list-style-type: none"> a. perform basic operations of matrix algebra and apply them to solve system of linear equations; b. discuss the basic concepts of matrix algebra and differential equations; c. apply the techniques of linear algebra to solve problems in applied mathematics and finance analytics; d. use differential equations to model basic problems in economics and finance, and know how to solve certain classes of first and second order linear ordinary and partial differential equations.
Subject Synopsis/ Indicative Syllabus	<p><i>Matrix algebra (7 hours)</i> Matrix addition and multiplication, determinant and inverse of square matrices, system of linear equations as a matrix equation, linear dependence and independence.</p> <p><i>Eigenvalue problems (6 hours)</i> Eigenvalues and eigenvectors, diagonalization of matrices (with distinct eigenvalues), applications.</p> <p><i>Inner products (7 hours)</i> Inner product, norm, orthogonality, Gram-Schmidt orthogonalization process, least square problems</p> <p><i>Ordinary Differential equations (9 hours)</i> First-order equations; second-order equations; applications</p> <p><i>Partial Differential Equations: (10 hours)</i> Classification of PDE; separation of variables; solution of initial and boundary value problems for standard PDE; series of solutions (Fourier series); transforming the Black-Scholes Equation into the Heat Equation</p>

Teaching/Learning Methodology	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.																																							
Assessment Methods in Alignment with Intended Learning Outcomes	<table border="1" data-bbox="464 461 1433 824"> <thead> <tr> <th rowspan="2">Specific assessment methods/tasks</th> <th rowspan="2">% weighting</th> <th colspan="4">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th> </tr> <tr> <th>a</th> <th>b</th> <th>c</th> <th>d</th> </tr> </thead> <tbody> <tr> <td>1. Assignments / Quizzes</td> <td>15%</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>2. Tests</td> <td>25%</td> <td>✓</td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>3. Examination</td> <td>60%</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>Total</td> <td>100 %</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p data-bbox="464 853 1433 927">Continuous Assessment comprises of assignments and/or quizzes, and tests. A written examination is held at the end of the semester.</p>						Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)				a	b	c	d	1. Assignments / Quizzes	15%	✓	✓	✓	✓	2. Tests	25%	✓	✓			3. Examination	60%	✓	✓	✓	✓	Total	100 %				
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	Bleecker, D. & Csordas, G. Basic Partial Differential Equations	International Press, 1996
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