

SUMMARY OF INFORMATION ON EACH COURSE

1.	Name of Course	Mathematical Techniques	
2.	Course Code	TMA1111	
3.	Status of Course [Applies to (cohort)]	Common Core for B.IT (Hons) Data Communications and Networking B.IT (Hons) Information Technology Management B.IT (Hons) Artificial Intelligence B.IT (Hons) Security Technology B.Sc (Hons) Bioinformatics	
4.	MQF Level/Stage Note : <i>Certificate – MQF Level 3</i> <i>Diploma – MQF Level 4</i> <i>Bachelor – MQF Level 6</i> <i>Masters – MQF Level 7</i> <i>Doctoral – MQF Level 8</i>	Bachelor – MQF Level 6	
5.	Version (State the date of the Senate approval – history of previous and current approval date)	Date of previous version : - Date of current version: June 2014	
6.	Pre-Requisite	None	
7.	Name(s) of academic/teaching staff	Tan Choo Kim Pang Ying Han	
8.	Semester and Year offered	Trimester 1, Year 1	
9.	Objective of the course in the programme : The purpose of this course is to provide students with various essential mathematical concepts and analytical techniques for problem solving.		
10.	Justification for including the course in the programme : Information Technology (IT) relies heavily on concepts from mathematics and statistics. The major areas of this subject include vector, matrices, complex numbers, techniques of differentiation, techniques of integration, ordinary differential equations and hypothesis testing and regression, which provide IT students with the ability to manipulate mathematical concepts and to generate and interpret statistical data in order to be successful in their future careers.		
11.	Course Learning Outcomes :	Domain	Level
	LO1 To apply the basic concepts, skills and various techniques in problems solving.	Cognitive	Level 3
	LO2 To solve the problems of vectors, matrices, complex numbers, differentiation, integration, differential equations and regression.	Cognitive	Level 3
	LO3 To identify the types of differential equations.	Cognitive	Level 1
	LO4 To evaluate the hypotheses.	Cognitive	Level 6

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12.	Mapping of Learning Outcomes to Programme Outcomes :									
	Learning Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
	LO1	x	x							
	LO2	x	x							
	LO3		x							
	LO4	x	x							
13.	Assessment Methods and Types :									
	Method and Type	Description/Details						Percentage		
	1 Assignment	Written						15%		
	2 Quizzes	Written						15%		
	3 Test	Written Examination						20%		
	4 Final Exam	Written Examination						50%		
14.	Mapping of assessment components to learning outcomes (LOs)									
	Assessment Components	LO1	LO2	LO3	LO4					
	Assignment	15	15	50	50					
	Quizzes	15	15	50	50					
	Test	20	20	-	-					
	Final Examination	50	50	-	-					
15.	Details of Course-									
	Topics	Mode of Delivery (eg : Lecture, Tutorial, Workshop, Seminar, etc.) Indicate allocation of SLT (lecture, tutorial, lab) for each subtopic								
		Lecture	Tutorial							
	Vectors and Matrices	6				2				
Vector algebra in R^n space, Representation of lines and planes by vectors, Matrices and linear transformations, Matrix operations, Solutions of linear systems by matrices, Eigen values and Eigen vectors.										
Complex Numbers	4				1					
Complex numbers and their properties, complex numbers as vectors, The complex plane, Complex algebra, Functions of a complex variable.										

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<p>Techniques of Differentiation</p> <p>Limits, Continuity, Derivative, Differentiation rules, Derivatives of functions. The chain rule. Higher-order derivatives, Implicit differentiation, Partial differentiation.</p>	7	2
<p>Techniques of Integration</p> <p>Areas as limits of sums, The definite integral, Properties of definite integral, The Fundamental theorem of calculus, Method of substitution, Integration by parts.</p>	7	3
<p>Ordinary Differential Equations</p> <p>Linear and non-linear equations, Degree and order, Initial-value problems, First order equations: Separable differential equations, Linear differential equations, Exact differential equations, Integrating factors. Higher-order equations: Second order linear Differential equations, Homogeneous equations with constant coefficients, Non-homogeneous equations.</p>	9	3
<p>Hypothesis Testing and Regression</p> <p>Formulation of hypotheses: Null and alternative hypotheses, Criteria for acceptance of hypotheses, Significance levels, t-test, z-test, Chi-square test, ANOVA, Regression and correlation coefficients.</p>	9	2
<p>Total</p>	42	13

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	Total Student Learning Time (SLT)	Face to Face / Guided Learning	Independent Learning
	Lecture	42	42
	Tutorials	13	13
	Laboratory/Practical	0	0
	Presentation	0	0
	Assignment	0	12
	Mid Term Test	2	8
	Final Exam	2	20
	Quizzes	6 times	6
	Sub Total	59	101
	Total SLT	160	
16.	Credit Value	160/4=4	
17.	Reading Materials :		
	Textbooks		
	1. James Stewart, (2012). Calculus, 7 th Ed. Cengage Learning. 2. Richard Bronson, (2009). Schaum's Outline of Differential Equations, 3 rd Ed. McGraw Hill. 3. E. Kreyszig, (2009). Advanced Engineering Mathematics, 10 th Ed. John Wiley & Sons.		
	Reference Material (including 'Statutes' for Law)		
	1. Robert, A. Adams, (2011). Calculus, a Complete Course, 6th Ed. Prentice Hall. 2. M.D. Weir and J. Thomas Hass, (2011). Calculus, 12th Ed. Pearson. 3. M. F. Triola, (2012). Elementary Statistics: Technology Update, 11 th Ed. Pearson. 4. D. G. Zill, W. S. Wright, M. Cullen, (2013). Differential Equations with Boundary-Value Problems, 8 th Ed. Cengage Learning.		

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Appendix (to be compiled when submitting the complete syllabus for the programme) :

1. Mission and Vision of the University and Faculty
2. Programme Objectives or Programme Educational Objectives
3. Programme Outcomes (POs)
4. Mapping of POs to the 8 MQF domain
5. Summary of the Bloom's Taxonomy's Domain Coverage in all the Los in the format below :

Subject	Learning Outcomes (please state the learning Outcomes)	Bloom's Taxonomy Domain		
		Affective	Cognitive	Psychomotor
ABC1234	Learning Outcome 1			
	Learning Outcome 2			
	Learning Outcome 3			
	Learning Outcome 4			
DEF5678	Learning Outcome 1			
	Learning Outcome 2			
	Learning Outcome 3			
	Learning Outcome 4			

6. Summary of LO to PO measurement
7. Measurement and Tabulation of result for LO achievement
8. Measurement Tabulation of result for PO achievement

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