

1.	Name of Course/Module	Mathematical Techniques I
2.	Course Code	TMT1171
3.	Status of Subject	[Leave blank]
4.	MQF Level/Stage	Bachelor Degree – MQF Level 6
5.	Version (state the date of the last Senate approval)	[Leave blank]
6.	Requirement for Registration	None
7.	Name(s) of academic/teaching staff	Tan Choo Kim Lee Chin Poo Heng Swee Huay Ali Afzalian Mand Jin Zhe Low Cheng Yaw Nazrul Muhaimin Ahmad Rouzbeh Behnia Tee Connie
8.	Semester and Year offered	[Leave blank]
9.	Objective of the course/module in the programme :	
	To provide various essential mathematical concepts and analytical techniques for problem solving.	
10.	Learning Outcomes :	
	At the completion of the subject, students should be able to:	
	LO1: Describe the basic concepts of vectors and matrices, limits, continuity, derivatives and integrals, complex numbers , and sequences and series, and also the basic skills involved. (Cognitive, Level 1)	
	LO2: Comprehend the basic concepts of vectors and matrices, limits, continuity, derivatives and integrals, complex numbers , and sequences and series, and also the basic skills involved.(Cognitive, Level 3)	
	LO3: Use the basic concepts and skills to solve problems concerning vectors and matrices, limits, continuity, derivatives and integrals, complex numbers , and sequences and series. (Cognitive, Level 4)	
	LO4: Identify and apply various skills needed to solve more complex problems concerning vectors and matrices, limits, continuity, derivatives and integrals, complex numbers, and sequences and series. (Cognitive, Level 4)	
	LO5: To combine solutions to various parts of a problem into an integral whole. (Cognitive, Level 5)	
	LO6: Evaluate alternative ways of solving a problem, and solve. (Cognitive, Level 6)	
11.	Synopsis:	
	The major areas of study includes : sequences and series with Taylor, Maclaurin and Binomial series, vector and matrices with linear transformation, eigen values and eigen vector, complex numbers with its properties, techniques of differentiation and its application and finally techniques of integration and its application.	
	Bidang pengajian meliputi : jujukan dan siri dengan siri Taylor, Maclaurin dan Binomial, vektor dan matrik dengan penjelmaan linear, nilai eigen dan vektor eigen, nombor kompleks dengan cirinya, teknik pembezaan dengan kegunaannya dan akhir sekali teknik pengamiran dengan kegunaannya.	
12.	Mapping of Subject to Programme Outcomes :	

	Programme Outcomes		% of Contribution
	PO1: [Leave blank]		25.00
	PO2: [Leave blank]		75.00
13.	Assessment Methods and Types :		
	Method and Type	Description/Details	Percentage
	Test	Written Exam	25%
	Quiz/tutorials	Written Exam	25%
	Final Exam	Written Exam	50%
14.	Details of Subject		
	Topics	Mode of Delivery	
		Lecture	Tutorial
	Sequences and Series Sequences of real numbers, Monotone sequence, Convergence, Absolute and conditional convergence, Infinite series, Convergence tests, Addition and multiplication of series. Power series, Radius of convergence, Taylor and Maclaurin series and their applications, Taylor polynomials and Taylor's formula, The binomial theorem and binomial series	6	2
	Vectors and Matrices Vector algebra in R^n space, Linear independence, Representation of lines and planes by vectors, Matrices and linear transformations, Matrix operations, Solutions of linear systems by matrices, Rank and inverse, Eigen values and Eigen vectors.	7	4
	Complex Numbers Complex numbers and their properties, complex numbers as vectors, The complex plane, Complex algebra, Functions of a complex variable.	4	2
	Techniques of Differentiation Limits, Continuity, Derivative, Mean-value theorem, Differentiation rules, Derivatives of functions (trigonometric, hyperbolic, logarithmic etc.). The chain rule, using derivatives, Higher-order derivatives, Implicit differentiation, Partial differentiation, Applications of derivatives.	6	3
	Techniques of Integration Areas as limits of sums, The definite integral, Properties of definite integral, The Fundamental theorem of calculus, Method of substitution, Areas between curves, Integration by parts, Inverse substitution, Integrals of rational functions, Improper integrals, Multiple integrals, Applications of integration.	5	3
	Total	28	14
15.	Tutorials		

	<ul style="list-style-type: none"> • Sequences and Series • Vectors and Matrices • Complex Numbers • Techniques of Differentiation • Techniques of Integration 		
16.	Total Student Learning Time (SLT)	Face to Face (Hour)	Total Guided and Independent Learning
	Lecture	28	28
	Tutorials	14	14
	Laboratory/Practical	-	-
	Presentation	-	-
	Assignment	-	-
	Mid Term Test	2	5
	Final Exam	2	20
	Quizzes/Tutorials	4 times	4
	Sub Total	46	76
	Total SLT	$122/40 = 3.05 \Rightarrow 3$	
17.	Credit Value	3	
18.	Reading Materials :		
	Textbook	Reference Materials	
	1. James Stewart, Calculus, Brooks/Cole Publishing Company, 2003	1. E. Kreyszig, "Advanced Engineering Mathematics", John Wiley & Sons. 9/E, 2006. 2. K. A. Stroud, "Engineering Mathematics", ELBS, 1995. 3. Robert A. Adams, "Calculus, a Complete Course", Prentice Hall, 6/E, 2007.	
19.	Appendix (to be compiled when submitting the complete syllabus for the programme) : <ol style="list-style-type: none"> 1. Mission and Vision of the University and Faculty 2. Mapping of Programme Objectives to Vision and Mission of Faculty and University 3. Mapping of Programme Outcome to Programme Objectives 4. Programme Objective and Outcomes (Measurement and Descriptions) 		