COURSE INFORMATION

School/Faculty:	Faculty of Civil/Electrical/Mechanical		
Program name:			
Course code:	SSCE1693	**Academic Session/Semester:**	20242025/2
Course name:	Engineering Mathematics I	**Pre/co requisite (course name and code, if applicable):**	N/A
Credit hours:	3 hours		

Course synopsis	Engineering Mathematics I include topics in basic calculus and algebra. The focus is on differentiation and integration of functions involving inverse trigonometric functions, hyperbolic and inverse hyperbolic functions; improper integrals; series; vectors including line and plane equation; matrices including vector spaces, eigenvalues, and eigenvectors; polar coordinates; and complex numbers including De Moivre's theorem.
Course coordinator (if applicable)	DR. NOOREHAN YAACOB

	Name	Office	Contact no.	E-mail
Course lecturer(s)	DR. MOHAMAD SHAHIIR SAIDIN	C10-317	013-4676374	shahiir@utm.my
	DR. NOOREHAN YAACOB	C10-425	017-6037364	noorehan@utm.my
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Mapping of the Course Learning Outcomes (CLO) to the Programme Learning Outcomes (PLO), Teaching & Learning (T&L) methods and Assessment methods:

No.	CLO*	PLO **(MQF Cluster Code)	***Taxonomies and ****Graduate Attributes	T&L methods	*****Assessment methods
CLO1	Solve problems related to further transcendental functions and its derivatives.	PLO1 (C1)	C3, SC1	Lecture, active learning	Q, T1
CLO2	Apply integrals, improper integrals, and series for related problems.	PLO1 (C1)	C3, SC1	Lecture, active learning	Q, T2, F
CLO3	Analyse problems using vector methods and matrix algebra.	PLO1 (C1)	C4, SC1	Lecture, active learning	Asg, F

CLO4	Manipulate polar equations, parametric equations, and complex numbers for related problems.	PLO1 (C1)	C4, SC1	Lecture, active learning, application	Asg, F

Refer ***Taxonomies of Learning and ****UTM's Graduate Attributes where applicable to measure outcomes achievement.

****Graduate Attributes: SC1= Scholars.

*****Assessment: T – Test; Q – Quiz; Asg – Assignment; F – Final Exam.

**MQF Cluster Code

C1 = Knowledge & Understanding

Details on Innovative T&L practices:

No.	Type	Implementation
1	Active learning	In-class activities
2	IT integration	Use digital apps to encourage mathematical thinking and problem-solving

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Transferable skills (generic skills learning in course of study which can be useful and utilised in other settings) :

CS1 – Ability to convey ideas in writing clearly, effectively, and comprehensibly.

TH1 – Ability to define and analyze complex, overlapping, ill-defined problems and make well-supported judgement.

SC2 – Ability to be receptive to new ideas towards self-directed or autonomous learning.

Student learning time (SLT) / Effective Learning Time (ELT) details:

Week/ Meeting	Course Content Outline and Subtopics	CLO*	Learning and Teaching Activities										TOTAL SLT
			Face-to-Face (F2F)								Non F2F Independent Learning		
			Physical				Online (Synchronous)				Online (Asynchronous)	Others	
			L	T	P	O	L	T	P	O			
Week 1 17/03/25 - 21/03/25 **Sultan Johor's Birthday:** 23/03/25	**Further Transcendental Functions**: Inverse trigonometric functions, hyperbolic functions, and its inverse in logarithmic form. Solving equations related to these functions.	1					3	1				2	6

Week	Topic											
Week 2 24/03/25 - 28/03/25	**Differentiation**: Differentiation of functions involving inverse trigonometric functions, hyperbolic functions, and inverse hyperbolic functions.	1				3	1				2	6
Week 3 31/03/25 - 04/04/25 **Aidilfitri Eid:** 31/03/25 - 01/04/25	Implicit and parametric differentiations. Chain rules and higher order differentiation. **Integration**: Integration techniques – standard integral table, substitution, by parts, and partial fractions.	1, 2				3	1				2	6
Week 4 07/04/25 - 11/04/25	Integration of expressions involving inverse trigonometric functions, hyperbolic functions, inverse hyperbolic functions. Using table of integrals to integrate related functions.	2	3	1							3	7
Week 5 14/04/25 - 18/04/25	**Improper Integrals**: Evaluation of limits including l'Hopital rule, limits of indeterminate forms of type 0/0 and ∞/∞. Improper integrals with infinite limits of integration and infinite integrands.	2	3	1							3	7
Week 6 21/04/25 - 25/04/25 **Test 1** 21/4/2025 Monday 8.15PM - 9.30PM	**Series**: Expansion of finite series, infinite series, power series, and the summations of r, r^2 and r^3. Tests of convergence: divergence test, ratio test and integral test.	2	3	1							3	7

Week / Date	Topic												
Week 7 28/04/25 - 02/05/25 **Labour Day:** 01/05/25	Maclaurin's series of standard functions including applications to finding limits, and approximating definite integrals. **Vectors**: Vector in space and its operations including dot product and cross product. Equation of line and plane. Angle between two lines, intersection of two lines.	2, 3	3	1								3	7
Week 8 05/05/25 - 09/05/25	**Midsem break**												
Week 9 12/05/25 - 16/05/25 **Wesak day:** 12/05/25	Intersection of two planes. Shortest distance from a point to a line, a point to a plane.	3	3	1								3	7
Week 10 19/05/25 - 23/05/25	Angle between two planes, and angle between a line and a plane.	3	3	1								3	7
Week 11 26/05/25 - 30/05/25 **Test 2** 29/5/2025 Thursday 8.15PM - 9.45PM	**Matrix Algebra**: Minors, cofactors, adjoints, and determinants. Solve system of linear equations using inverse matrix and Cramer's rule. Elementary row operations (ERO).	3	3	1								3	7
Week 12 02/06/25 - 06/06/25 **Hari Keputeraan YDP Agong:** 02/06/25 **Aidiladha Eid:** 07/06/25	Use ERO to obtain inverse matrix and solve system of linear equations using Gauss elimination. Involve cases like unique, many or no solution for system of linear equations. Eigenvalue and eigenvector.	3	3	1								3	7

Week	Topic											
Week 13 9/06/25 - 13/06/25	**Polar Coordinates**: Point representation in polar coordinates, relationship between polar and Cartesian coordinates. Graph sketching including tests of symmetries. Intersection of curves.	4	3	1							3	7
Week 14 16/06/25 - 20/06/25	**Complex Numbers**: Definition of imaginary number and complex number. Algebraic operations and solving equations involving complex numbers. Modulus and argument.	4	3	1							3	7
Week 15 23/06/25 - 27/06/25 **Awal Muharram:** 27/06/25	Application of de Moivre's theorem to show some trigonometric identities, to find power and roots of complex numbers.	4	3	1							3	7
										SUB-TOTAL SLT :		**95**

	Continuous Assessment	%	Face-to-Face (F2F)		NF2F Independent Learning for Assessment		TOTAL SLT
			Physical	Online (Synchronous)	Online (Asynchronous)	Others	
1	Quiz 1	5		0.25		0.75	1
2	Quiz 2	5	0.25			0.75	1
3	Assignment	15				6	6
5	Test 1	15	1.25			2.25	3.5
6	Test 2	20	1.5			3	4.5
					SUB-TOTAL SLT :		**16**

	Summative Assessment	%	Face-to-Face (F2F)		NF2F Independent Learning for Assessment		TOTAL SLT

Summative Assessment	%	Physical	Online (Synchronous)	Online (Asynchronous)	Others	TOTAL SLT
1 Final Exam	40	2.75			6.25	9
2						0
3						0
4						0
5						0
					SUB-TOTAL SLT :	9
					SLT for Assessment:	25
					GRAND TOTAL SLT:	120

A	% SLT for F2F Physical Component	41.46
B	% SLT for Online & Independent Learning Component :	58.54
C	%SLT for Online Component:	10.21
D	% SLT for All Practical Component:	0.00
D1	% SLT for F2F Physical Practical Component:	0.00
D2	% SLT for F2F Online Practical Component:	0.00
Please tick (/) if this course is Industrial Training/ Clinical Placement/ Practicum using 50% of Effective Learning Time (ELT)		

Identify special requirement or resources to deliver the course (e.g.,software,nursery, computer lab, simulation room etc)
Lecture room with computer, LCD, and internet connection.

References (include required and further readings, and should be the most current)
Textbook (if applicable) **Main references** 1.Abd Wahid Md Raji et. al (2017). Engineering Mathematics for Science and Engineering Students. UTM Press. **Additional references** 1. Joel R. Hass, Christopher E. Heil, Maurice D. Weir, Przemyslaw Bogacki. (2023). Thomas' Calculus, 15th edition. Pearson. 2. Ferenc Szidarovszky, Sandor Molnar, Mark Molnar. (2023). Introduction to Matrix Theory with Applications in Economics and Engineering 2nd Edition. World Scientific. 3. Robert Sobot. (2022). Engineering Mathematics by Example. Springer Cham. 4. Glyn James. (2020). Modern Engineering Mathematics. Pearson Education Limited. **Online** UTM E-Learning. http://elearning.utm.my

Other additional information (if applicable)

Academic honesty and plagiarism:

Assignments are individual tasks and NOT group activities (UNLESS EXPLICITLY INDICATED AS GROUP ACTIVITIES)

Copying of work (texts, simulation results etc.) from other students/groups or from other sources is not allowed. Brief quotations are allowed and then only if indicated as such. Existing texts should be reformulated with your own words used to explain what you have read. It is not acceptable to retype existing texts and just acknowledge the source as a reference. Be warned: students who submit copied work will obtain a mark of zero for the assignment and disciplinary steps may be taken by the Faculty. It is also unacceptable to do somebody else's work, to lend your work to them or to make your work available to them to copy.

Attendance is compulsory. Students with less than 80% of total attendance are not allowed to sit for the Final Examination. Any form of plagiarism is not allowed.

Other additional information (if applicable)

Assignments must be submitted on due dates. Late submission shall not be accepted and will not be graded. Students are required to behave and follow the dressing regulation and etiquette as stated in university regulation while in class.

Disclaimer:

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ELT = (Theory + Industrial Guidance + Assessment) x 50%

Total of credit for LI/Practical = ELT/40 Notional Hours

Note: For ODL Programme : Courses with mandatory practical requirement imposed by programme standards or any related standards can be exempted from complying to the minimum 80% ODL delivery rule in the SLT.

Prepared by:	Certified by:
Name: NOOREHAN YAACOB	**Name:**
Signature:	**Signature:**
Date: 27/2/2025	**Date:**