

COURSE OUTLINE

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Course Code:SSCE1693 ENGINEERING MATHEMATICS I Total Lecture Hours: 42 hours	Semester: I Academic Session: 2016/2017

Lecturer : DR. ZUHAILA ISMAIL
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Synopsis : This is a first course in Engineering Mathematics. Contents include topics in basic calculus and algebra. The focus is on differentiation and integration of inverse trigonometric functions, hyperbolic and their inverse functions; improper integrals; series; vectors; matrices including vector spaces, eigenvalues and eigenvectors; polar coordinates; and complex numbers.

Learning Outcomes:

By the end of the course, students should be able to:

No.	Course Learning Outcomes	Programme Outcome(s)	Taxonomies and Soft-Skills	Assessment Methods
C01	apply limits, derivatives, and integrals to further transcendental functions.	P01	C3	Q,T,F
C02	express functions as power series and analyze convergence of infinite series and use Taylor series to estimate limits and integrals.	P01	C3	Q,PR,T,F
C03	solve problems using vector methods and matrix algebra.	P01	C3	Q,A,T,F
C04	analyse and graph polar equations, and solve problems involving polar and parametric equations.	P01	C4	Q,A,F
C05	manipulate complex numbers and solve related problems.	P01	C4	Q,PR,F
C06	communicate effectively in verbal and written form.	P06	A2, P3	A,PR,Pr

(T - Test ; PR - Project ; Q - Quiz; A -Assignment ; Pr - Presentation; F - Final Exam)

Prepared by: Name: Dr. Niki Anis bin Ab Karim Signature: Date: 28 August 2016	Certified by: (Course Panel Head) Name: Signature: Date:
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STUDENT LEARNING TIME (SLT)

Teaching and Learning Activities	Student Learning Time (hours)
1. Face-to-Face Learning	
a. Lecturer-Centered Learning	
i. Lecture	42
b. Student-Centered Learning (SCL)	
i. Laboratory/Tutorial	14
ii. Student-centered learning activities - Active Learning, Project Based Learning	
2. Self-Directed Learning	
a. Non-face-to-face learning or student-centered learning (SCL) such as manual, assignment, module, e-Learning, etc.	12
b. Revision	35
c. Assessment Preparations	10
3. Formal Assessment	
a. Continuous Assessment	4
b. Final Exam	3
Total (SLT)	120

TEACHING METHODOLOGY

Lecture and Discussion, Assignments, Quizzes, Independent Study

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WEEKLY SCHEDULE

WEEK	LECTURE TOPICS	NOTES
Week 1 04/09/16 – 08/09/16	Further Transcendental Functions: Inverse trigonometric functions, hyperbolic functions and its inverse in logarithmic form. Solving equations related to the functions.	
Week 2 11/09/16 – 15/09/16	Differentiation: Differentiation of functions involving inverse trigonometric functions, hyperbolic functions and inverse hyperbolic functions.	12-09-16 (Mon) Eid Al-Adha
Week 3 – 4 18/09/16 – 29/09/16	Integration: Review on integration techniques – standard integral table, substitution, by parts, and partial fractions. Integration of expressions involving inverse trigonometric functions, hyperbolic functions, inverse hyperbolic functions. Using table of integrals to integrate related functions.	16-09-16 (Fri) Malaysia Day *replace Sunday
Week 5 02/10/16 – 06/10/16	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.	02-10-16 (Sun) Maal Hijrah 1438
Week 6 – 7 09/10/16 – 20/10/16	Series: Expansion of finite series, infinite series, power series, and the summations of r , r^2 and r^3 . Test of convergence – divergence test, ratio test and integral test. Taylor's and Maclaurin's series of standard functions including applications to finding limits and approximating definite integral.	TEST 1 (Tues) 11-10-2016 (8.15pm-9.30pm)
Week 8 23/10/16 – 27/10/16	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	
28/10/16 – 05/11/16	SEMESTER BREAK	29-10-16 (Sat) Deepavali
Week 9 06/11/16 – 10/11/16	Vectors: Intersection of two planes. Shortest distance from a point to a line, a point to a plane. Angle between two planes, and angle between a line and a plane.	06-11-16 (Sun) Hol Day Almarhum Sultan of Johor
Week 10 – 11 13/11/16 – 24/11/16	Matrix Algebra: Minors, cofactors, adjoints, and determinants. Properties of determinants including interchanging rows or columns, multiplying by a scalar. Solve system of linear equations using Cramer's rule and inverse matrix. Elementary row operations (ERO). Use ERO to obtain inverse matrix and solve system of linear equations using Gauss elimination. Eigen value and eigen vector.	TEST 2 (Tues) 22-11-2016 (8.15pm-9.30pm)
Week 12 27/11/16 – 01/12/16	Polar Coordinates: Point representation in polar coordinates, relationship between polar and Cartesian coordinates. Graph sketching including tests of symmetries. Intersection of curves.	

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Week 13 – 14 04/12/16 – 15/12/16	Complex Numbers: Definition of imaginary number and complex number. Algebraic operations and solving equations involving complex numbers. Modulus and argument. Euler's formula and de Moivre's theorem to show some trigonometric identities, to find power and roots of complex numbers.	12-12-16 (Mon) Birthday of Prophet Muhammad S.A.W.
16/12/16 – 24/12/16	REVISION WEEK	
26/12/16 – 12/01/17	FINAL EXAMINATION	25-12-16 (Sun) Christmas Day

REFERENCES

Course Texts:

1. Abd Wahid Md Raji et.al (2011). *Engineering Mathematics I*
2. Glynn James, (2010). *Modern Engineering Mathematics*, Prentice Hall.
3. Glynn James, (2004). *Advanced Modern Engineering Mathematics*, Prentice Hall

Supplementary Texts:

1. Stroud K.A (1996). *Advanced Engineering Mathematics*; MacMillan Ltd.
2. Alan Jeffrey (2002). *Advanced Engineering Mathematics*, Academic Press.
3. Bradley, G.L and Smith (1998), *Calculus*, Prentice Hall International Inc.
4. Finey, R., Weir, M and Giordano, F. (2001), Thomas' *Calculus*, Addison-Wesley Pub.

GRADING

No	Type of Assessment	Materials	% each	% total	Date
1	Project/Assignment	Weeks 1 - 14	5	10	Continuous
2	Quiz	Weeks 1 - 14	5	10	Continuous
3	Test 1	Weeks 1 - 4	15	15	W6 : 11 Oct 2016
4	Test 2	Weeks 5 - 9	15	15	W11 : 22 Nov 2016
5	Final Examination	Weeks 1 - 14	50	50	
Total				100	