

## FACULTY OF ENGINEERING

No	Information on Course									
1	Name of the Course: ENGINEERING MATHEMATICS 2									
2	Course Code: DEE 4243									
3	Name(s) of Academic Staff									
4	Rationale for the inclusion of the course in the programme: The module's rationale is to enable the Learner to be able to find solutions for the differential equations and to interpret the solutions obtained.									
5	Semester and Year Offered: SEM2 YEAR 1									
6	Student Learning Time (SLT)	Face to Face				Independent Learning				Total Guided and Independent Learning
	L = Lecture T = Tutorial P = Practical O = Others	L	T	P	O	L	T	P	O	120
		20	12	-	6	40	12	-	30	
7	Credit Value: 3									
8	Course Learning Outcomes: At the end of this course, the student should be able to: CLO1: Explain the concept of statistics and the various distributions involved. (C2, A3, P2, PLO1) CLO2: Solve partial differentiation and integration problems. (C4, PLO3) CLO3: Prepare a written assignment on Laplace transforms and power series. (C3, A4, PLO7) CLO4: Present the different methodologies in Numerical methods. (C3, A2, PLO4)									
9	Transferable Skills:  Critical thinking and problem solving Communication skills. Information management and lifelong learning									
10	Teaching Learning Assessment Strategy:									
	PLO		Teaching and Learning Activities				Type of Assessment			
	Knowledge		Lectures				Written test			
	Problem solving and scientific skills		Tutorials				Written test			
	Communication skills		Presentation				Presentation			

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	Information management and Lifelong learning	Project				Assignment						
11	Synopsis This course introduces the ordinary differential equations, Laplace transformation, partial differentiation, Numerical methods, normal, binomial and Poisson distributions.											
12	Mode of Delivery: Lecture, Tutorial, Presentation & Project											
13	Assessment Methods and Types:											
	Type of Assessment		Assessment Method				Percentage					
	Written test		Presentation				15%					
Tests				15%								
Final Examination				50%								
	Assignment		Written Assignment				20%					
14	Mapping of course to Programme Aims:											
	PEO	PEO 1	PEO 2	PEO 3	PEO 4	PEO5						
	CLO											
	CLO 1	√										
	CLO 2		√									
	CLO 3					√						
	CLO 4			√								
15	Mapping of course to Programme Learning Outcomes (PLO):											
	PLO	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO7	PLO 8	PLO9		
	CLO											
	CLO 1	√										
	CLO 2			√								
	CLO 3						√					
	CLO 4				√							
16	Content outline of the course and the SLT per topic::											
	Content			Face to Face				Independent Learning				TLT
				L	T	P	O	L	T	P	O	
1	Power Series <ul style="list-style-type: none"><li>Maclaurin series, Taylor Series, Binomial Series standard series</li><li><math>\sin x, \cos x, e^x</math></li></ul>			2	1	-	-	4	1	-	-	8

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2	Integration <ul style="list-style-type: none"> <li>• Introduce <math>\sin x</math> and <math>\tan x</math></li> <li>• Integration by partial fractions.</li> <li>• Integration by parts</li> <li>• Simple reduction Formulae</li> <li>• Numerical Methods</li> <li>• Trapezoidal Rule, Simpson's Rule</li> </ul>	4	1	-	-	8	1	-	-	14
3	Indices and logarithms <ul style="list-style-type: none"> <li>• Rules of indices; standard form</li> <li>• Rules of logarithms Common</li> <li>• Logarithmic rules</li> <li>• Change of base</li> </ul>	2	1		-	4	1	-	-	8
4	Partial Differentiation <ul style="list-style-type: none"> <li>• Partial Differentiation</li> <li>• Small increment, Rates of change problems</li> </ul>	2	2		-	4	2	-	-	10
5	Ordinary Differential Equations <ul style="list-style-type: none"> <li>• Solutions of differential equations</li> <li>• Method 1-Direct Integration</li> <li>• Method 2- Separating Variables</li> <li>• Method 3- Homogenous equation by substituting <math>y=vx</math></li> <li>• Method 4-linear equations by integrating factor</li> <li>• Method 5-Bernoulli's Formula</li> </ul>	2	2		-	4	2	-	-	10
6	Laplace Transforms <ul style="list-style-type: none"> <li>• Laplace Transforms- Definition transform of standard functions.</li> <li>• First shifts theorem-multiplication and division by <math>t</math></li> <li>• Inverse transform table of standard inverse transforms.</li> <li>• Transforms of derivatives</li> <li>• Solution of first and second order differential equations by Laplace Transform.</li> </ul>	4	2		-	8	2	-	-	16

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7	Numerical Methods <ul style="list-style-type: none"><li>Newton's Method modified Newton's method.</li><li>Euler, Euler Cauchy Runge Kutta method for first and second order differential equations</li></ul>	4	1		-	8	1	-	-	14	
8	Statistics <ul style="list-style-type: none"><li>Frequency distributions, mean, mode, median, standard deviation, and variance.</li><li>Measures of location and dispersion. Probability, discrete and continuous distribution.</li><li>Normal, binomial and poison's distribution.</li></ul>	4	2		-	8	2	-	-	16	
	Total	24	12		-	48	12	-	-	96	
						Face to Face		Independent Learning			
	TOTAL GUIDED AND INDEPENDENT LEARNING	Lecture				24		48			
		Tutorial				12		12			
		Practical				-		-			
		Assignment ( 1000 words)				-		5			
		Presentation				1		3			
		Lab reports				-		-			
		Test				1		3			
		Final Examination				3		9			
		Total				41		80			
		Total Student Learning time (SLT)				121					
		Credit Hours				3					

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### Main References Supporting The Course:

- ☐ Basic Engineering Mathematics, 7th Edition, by John Bird (Author), May 20, 2017, ISBN-13: 978-1138673700.
- ☐ Introductory Engineering Mathematics by David Reeping, Kenneth Reid. Publisher: Momentum Press (November 21, 2016). ISBN-10: 1606509098
- ☐ Higher Engineering Mathematics, by John Bird Publisher: Routledge; 8 edition (April 30, 2017) ISBN-10: 0415662826
- ☐ Advanced Engineering Mathematics (Activate Learning with these NEW titles from Engineering) 8 Edition, Jan 1, 2017, by Peter V. O'Neil, ISBN-13: 978-1305635159
- ☐ Engineering Mathematics for science and Engineering students, Hamisan Rahmat, Mohamad Nor Mohamad, Ong Chee Tiong, Abd Wahid Md. Raji, Ismail Kamis, 2017, (ISBN: 978-983-52-1462-2).