

1.	Name of Course					Engineering Mathematics I					
2.	Course Code					JEMA1043					
	JEMA = the first alphabet identify the faculty within which the subject is offered., JEMA= the remaining three alphabet identify the course that offers the subject, 1043 = the first digit identify level of study; in this case undergraduate level, 1043 = the second and third digits identify subject identity and 1043 = the fourth digit identify credit value or credit hours										
3.	Name(s) of academic staff					To be Assigned					
4.	Rationale for the inclusion of the course/module in the programme					Fundamental subjects for Engineering					
5.	Semester and Year offered					1/1					
6.	Total Student Learning Time (SLT)			Face to Face			Total Guided and Independent Learning				
	L = Lecture T = Tutorial P = Practical S=Studio Works O= Others			L	T	P/S	O	Independent Study(IS)= 70 Total =126			
				42	14	-	-				
7.	Credit Value					3.0					
	Lecture (3 hours per week x 14 weeks) Tutorial (1 hour per week x 14 weeks)										
8.	Prerequisite (if any)					None					
9.	Course Objectives 1. The objective of this course is to equip the students with understanding of various mathematical concepts and analysis methods in the topic of function, complex number, vector and matrix algebra and basic differentiation and integration. Course Learning Outcomes (CLO) At the end of the semester students should be able to: CLO1: Formulate problem as mathematical expression CLO2: Obtain knowledge in the area of function, complex number, vector and matrix algebra and basic differentiation and integration CLO3: Critically analyse and solve some mathematical problems CLO4: Show logical thinking in problem solving.										
10.	Transferable Skills: This course is expected the development of the following transferable skills: a) Self-management – an ability to manage time and task b) Learning skills - An ability to learn both independently and co—operatively; - An ability to use library skills, to find and organize information ; - An ability to use a wide range of academic skills (research, analysis, synthesis etc.); - An ability to identify and evaluate personal learning strategies. c) Teamwork - An ability to take responsibility and carry out agreed task; - An ability to take initiative and lead other; - An ability to identify and evaluate personal learning strategy. d) Problem solving - An ability to analyse;										

	▪ An ability to think laterally about a problem; ▪ An ability to identify strategy options; ▪ An ability to solve the problems e) Information technologies ▪ An ability to use specialist software where relevant to the discipline.												
11.	Teaching-learning and assessment strategy A variety of teaching strategies are used throughout the course, including the following: • Classroom Lessons; Lecturer and power point presentations • Tutorial Session; • Student-Lecturer Discussion • Collaborative and Co-operative learn; • Independent study. Assessment: <table> <tr> <td>Coursework</td><td>40%</td></tr> <tr> <td>Assignment</td><td>10%</td></tr> <tr> <td>Tutorial/ Quizzes</td><td>10%</td></tr> <tr> <td>Test</td><td>20%</td></tr> <tr> <td>Examination</td><td>60%</td></tr> <tr> <td><u>Total</u></td><td><u>100%</u></td></tr> </table>	Coursework	40%	Assignment	10%	Tutorial/ Quizzes	10%	Test	20%	Examination	60%	<u>Total</u>	<u>100%</u>
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<u>Total</u>	<u>100%</u>												
12.	Synopsis: To provide understanding of various mathematical concepts and analysis methods in the topic of function, complex number, vector and matrix algebra and basic differentiation and integration												
13.	Mode of Delivery: Lectures, Tutorials												

14.	Performance Criteria :						
	CLO-PLO	Assessment Tool	1	2	3	4	5
	Marks		0-39	40-49	50-59	60-74	75-100
	Grade		(F)	(D,D+)	(C-,C,C+)	(B-,B,B+)	(A-,A,A+)
	CLO1: Formulate problem as mathematics expression	Assignment Tutorial Quizzes Test Examination	Fail to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Use wide range of academic skills (research, analysis, synthesis etc.)	Poor to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Use wide range of academic skills (research, analysis, synthesis etc.)	Satisfactory to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Use wide range of academic skills (research, analysis, synthesis etc.)	Good to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Use wide range of academic skills (research, analysis, synthesis etc.)	Excellent to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Use wide range of academic skills (research, analysis, synthesis etc.)
	CLO2: Obtain knowledge in the area of function, complex number, vector and matrix algebra and basic differentiation and integration.	Assignment Tutorial Quizzes Test Examination	Fail to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Use wide range of academic skills	Poor to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Use wide range of academic skills	Satisfactory to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Use wide range of academic skills	Good to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Use wide range of academic skills	Excellent to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Use wide range of academic skills

			(research, analysis, synthesis etc.)	(research, analysis, synthesis etc.)	(research, analysis, synthesis etc.)	of academic skills (research, analysis, synthesis etc.)	skills (research, analysis, synthesis etc.)
CLO3: Critically analyse and solve some mathematical problems	Assignment Tutorial Quizzes Test Examination	Fail to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Use wide range of academic skills (research, analysis, synthesis etc.)	Poor to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Use wide range of academic skills (research, analysis, synthesis etc.)	Satisfactory to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Use wide range of academic skills (research, analysis, synthesis etc.)	Good to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Use wide range of academic skills (research, analysis, synthesis etc.)	Excellent to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Use wide range of academic skills (research, analysis, synthesis etc.)	
CLO4: Show logical thinking in problem solving.	Assignment Tutorial Quizzes Test Examination	Fail to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Use wide range of academic skills (research, analysis, synthesis etc.)	Poor to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Use wide range of academic skills (research, analysis, synthesis etc.)	Satisfactory to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Use wide range of academic skills (research, analysis, synthesis etc.)	Good to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Use wide range of academic skills (research, analysis, synthesis etc.)	Excellent to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Use wide range of academic skills (research, analysis, synthesis etc.)	

15.	Mapping of the Programme Objectives to the Programme Learning Outcomes											
	Programme Learning Outcomes (PLO) Programme Objectives (PO)	PLO1: Ability to acquire and apply knowledge of science and engineering fundamentals;	PLO2: Acquired in-depth technical competence in civil engineering discipline;	PLO3: Ability to undertake problem identification, formulation and solution;	PLO4: Ability to utilize systems approach to design and evaluate operational performance;	PLO5: Understanding of the principles of design for sustainable development;	PLO6: Understanding of professional ethics, Islamic values, social, cultural, global and environmental responsibilities of a professional engineer and commitment to them;	PLO7: Ability to communicate effectively, not only with engineers but also with the community at large;	PLO8: ability to function effectively as an individual;	PLO9: Ability to function effectively in group with the capacity to be a leader or manager;	PLO10: Recognizing the need to undertake lifelong learning, and possessing /acquiring the capacity to do so;	PLO11: ability to become Entrepreneur;
	PEO1: To produce graduates with proficient knowledge and competency in various areas in Civil/ Electrical/ Mechanical Engineering	✓	✓	✓								
	PEO2: To produce graduates with professional, generic attributes to meet the present and future global demands.				✓	✓	✓			✓	✓	
	PEO3: To produce graduates with Islamic humanistic values and reinvention skills to meet the requirement of a dynamic environment. These skills include Civil Intelligence, Moral Intelligence, Self-Reliance and Communication Skills							✓	✓	✓		✓

16.	Mapping of the course Learning Outcome to the Programme Outcome											
	Programme Learning Outcomes (PLO) Course Learning Outcome (CLO)	PLO1: Ability to acquire and apply knowledge of science and engineering fundamentals;	PLO2: Acquired in-depth technical competence in civil engineering discipline;	PLO3: Ability to undertake problem identification, formulation and solution;	PLO4: Ability to utilise systems approach to design and evaluate operational performance;	PLO5: Understanding of the principles of design for sustainable development;	PLO6: Understanding of professional ethics, Islamic values, social, cultural, global and environmental responsibilities of a professional engineer and commitment to them;	PLO7: Ability to communicate effectively, not only with engineers but also with the community at large;	PLO8: ability to function effectively as an individual;	PLO9: Ability to function effectively in group with the capacity to be a leader or manager;	PLO10: Recognising the need to undertake lifelong learning, and possessing /acquiring the capacity to do so;	PLO11: ability to become Entrepreneur;
	CLO1: Formulate problem as mathematical expression	✓										
	CLO2: Obtain knowledge in the area of function, complex number, vector and matrix algebra and basic differentiation and integration	✓										
	CLO3: Critically analyse and solve some mathematical problems	✓	✓	✓								
	CLO4: Show logical thinking in	✓	✓	✓								

problem solving.											
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17.	Content outline of the course/module and the SLT per topic						
	Details	SLT (Hour)					
		L	T	P	IS	Total	
	Topic 1	Numbers, Algebra and Geometry Number and arithmetic, Algebra, Geometry, Numbers and accuracy	6	2	-	10	18
	Topic 2	Functions - Rational functions, Circular functions, Exponential, logarithmic and hyperbolic functions - Irrational functions, Numerical evaluation of functions, application	6	2	-	10	18
	Topic 3	Complex Numbers Properties of complex number, Powers of complex numbers, Loci in the complex plane, Functions of a complex variable, Engineering application: alternating currents in electrical networks	6	2	-	10	18
	Topic 4	Introduction to Vector Algebra Basic definitions, vector treatment of the geometry of lines and planes, application	8	2	-	10	20
	Topic 5	Introduction to Matrix AlgebraDefinitions and properties, Determinants, The inverse matrix, Linear equations, Rank, The eigenvalue problem, application	8	2	-	10	20
	Topic 6	Differentiation and Integration Differentiation, Techniques of differentiation, Higher derivatives, Applications of optimization problems, Numerical differentiation, Integration, Techniques of integration, Applications of integration, Numerical evaluation of integrals.	8	4	-	20	32
Total (Hour)		42	14	-	70	126	
18.	Main references supporting the course 1. Glyn James, Modern Engineering Mathematics, 4th edition, ISBN 978-0-1323-9144-3, Pearson Education Limited 2007						
	Additional references supporting the course 1. Calculus - 5th edition, James Stewart, Thomson Learning - Brooks/Cole, 2003. 2. Thomas' Calculus - 10th edition, Finney, Weir and Giordano, Addison-Wesley Publishing, 2001.						
19.	Other additional information						

	All materials will be available to the students in the library.
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