

1.	Name of Course					Finite Element Method						
2.	Course Code					JFEM4363						
	JFEM = the first alphabet identify the faculty within which the subject is offered., JFEM= the remaining three alphabet identify the course that offers the subject, 4363 = the first digit identify level of study; in this case undergraduate level, 4363 = the second and third digits identify subject identity and 4363= 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					Equip students with powerful tool of finite element method in solving Civil engineering problems.						
5.	Semester and Year offered					1/4						
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)					Structural Analysis III (JSTA3223)						
9.	Course Objectives 1. Enable students to understand the fundamental and principle of finite element analysis. Course Learning Outcomes (CLO) At the end of the semester students should be able to: CLO1: To understand the fundamentals of the formulation and application of Finite Element analysis. CLO2: To use readily available Finite element packages with appreciation of the principals involved.											
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: This course is being introduced to familiarise the students with the modern techniques developed in analysing continuous mechanics using the finite Element Analysis.												
13.	Mode of Delivery: Lectures												

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: To understand the fundamentals of the formulation and application of Finite Element analysis.	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: To use readily available Finite element packages with appreciation of the principals involved.	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,	Poor to: - Learn both independent and cooperatively - Use library skills, to find and organize information - Use wide range of academic skills (research,	Satisfactory to: - Learn both independent and cooperatively - Use library skills, to find and organize information - Use wide range of academic skills (research,	Good to: - Learn both independent and cooperatively - Use library skills, to find and organize information - Use wide range of academic	Excellent to: - Learn both independent and cooperatively - Use library skills, to find and organize information - Use wide range of academic skills (research,

Bachelor of Civil Engineering (Hons)

			analysis, synthesis etc.)	analysis, synthesis etc.)	analysis, synthesis etc.)	skills (research, analysis, synthesis etc.)	analysis, synthesis etc.)
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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										
Course Learning Outcome (CLO) Programme Learning Outcomes (PLO)	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: To understand the fundamentals of the formulation and application of Finite Element analysis.	✓				✓					
	CLO2: To use readily available Finite element packages with appreciation of the principals involved.	✓									

17.	Content outline of the course/module and the SLT per topic						
		Details	SLT (Hour)				
			L	T	P	IS	Total
	Topic 1	Introduction to finite element	2	1	-	4	7
	Topic 2	Basic concepts of stiffness method	4	1	-	6	12
	Topic 3	Truss elements local axes element stiffness matrix	9	3	-	12	25
	Topic 4	Assembly of global equation and solution	9	3	-	13	26
	Topic 5	Finite element analysis of plane stress and strain problem	9	3	-	15	28
	Topic 6	Application to problems in Civil Engineering. Application of finite Element Method to problem in structures (pin jointed frame works, shear walls etc.,) hydraulics (seepage networks, flow net etc.,), soil mechanics (stresses in soil, consolidation etc.,)	9	3	-	20	28
Total (Hour)		42	14	-	70	126	
18.	Main references supporting the course						
	1. Fundamental Finite Element Analysis and Applications: with Mathematica and Matlab Computations by M. AsgharBhatti (Feb 4, 2005)						
	2. The Finite Element Method: Its Fundamentals and Applications in Engineering by Zhangxin Chen (Oct 2011)						
19.	Additional references supporting the course						
	1. O.C. Zienkiewics, The Finite Element Method, Mc. Graw Hill, London. Concrete ASCE Publication, Finite Element Analysis of R.C.						
19.	Other additional information						
	All materials will be available to the students in the library.						