

1.	Name of Course					Structural Analysis III							
2.	Course Code					JSTA3223							
	JSTA= the first alphabet identify the faculty within which the subject is offered., JSTA= the remaining three alphabet identify the course that offers the subject, 3223 = the first digit identify level of study; in this case undergraduate level, 3223 = the second and third digits identify subject identity and 3223 = 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					Core civil engineering subject, students must understand and able to carry out structural analysis							
5.	Semester and Year offered					1/3							
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)= 58 Total =126				
					42	14	12	-					
7.	Credit Value					3.0							
	Lecture: 3 Hours per week for 14 weeks Tutorial: 1 Hour per week for 14 weeks Practical: 2 Hours fortnightly for 6 weeks												
8.	Prerequisite (if any)					Structural Analysis II (JSTA2153)							
9.	Course Objectives												
	1. The aim of this course is to equip the students with advanced knowledge of structure analysis using column analogy, collapse theory and further in depth study on influence functions. Course Learning Outcomes (CLO) At the end of the semester students should be able to: CLO1: To analyse method of column analogy CLO2: To analyse collapse theory in designing structures. CLO3: To analyse influence functions on rigid and pin jointed indeterminate structures. CLO4: To analyse vibration of SDOF System CLO5: To analyse buckling of struts												
10.	Transferable Skills: This course is expected the development of the following transferable skills: 1. Self-management – an ability to manage time and task 2. An ability to learn both independently and co—operatively; 3. An ability to use library skills, to find and organize information ; 4. An ability to use a wide range of academic skills (research, analysis, synthesis etc.); 5. .An ability to take responsibility and carry out agreed task; 6. An ability to analyse; 7. An ability to think laterally about a problem; 8. An ability to solve the problems 9. An ability to use specialist software where relevant to the discipline.												

11.	Teaching-learning and assessment strategy A variety of leaching 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>Course Work</td><td></td><td>40%</td></tr><tr><td>Assignment</td><td>5%</td><td></td></tr><tr><td>Project /Quizzes</td><td>5%</td><td></td></tr><tr><td>Laboratory Works</td><td>10%</td><td></td></tr><tr><td>Test</td><td>20%</td><td></td></tr><tr><td>Examination</td><td></td><td>60%</td></tr><tr><td colspan="3"> </td></tr><tr><td><u>Total</u></td><td></td><td><u>100%</u></td></tr></table>	Course Work		40%	Assignment	5%		Project /Quizzes	5%		Laboratory Works	10%		Test	20%		Examination		60%				<u>Total</u>		<u>100%</u>
Course Work		40%																							
Assignment	5%																								
Project /Quizzes	5%																								
Laboratory Works	10%																								
Test	20%																								
Examination		60%																							
<u>Total</u>		<u>100%</u>																							
12.	Synopsis: Further analyses on structures are carried out. This includes column analogy, plask theory and further in depth study on determinate structure.																								
13.	Mode of Delivery: Lectures ; Practical.																								

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 analyse method of column analogy	Assignment Project Quizzes Laboratory work Test Examination	Fail to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Take responsibility and carry out laboratory test • Manage time and task	Poor to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Take responsibility and carry out laboratory test • Manage time and task	Satisfactory to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Take responsibility and carry out laboratory test • Manage time and task	Good to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Take responsibility and carry out laboratory test • Manage time and task	Excellent to: • To: Learn both independent and cooperatively • Use library skills, to find and organize information • Take responsibility and carry out laboratory test • Manage time and task
	CLO2: To analyse collapse theory in designing structures.	Assignment Project Quizzes Laboratory work Test Examination	Fail to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Take responsibility and carry out laboratory test • Manage time	Poor to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Take responsibility and carry out laboratory test • Manage time	Satisfactory to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Take responsibility and carry out laboratory test • Manage time and	Good to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Take responsibility and carry out laboratory test	Excellent to: • To: Learn both independent and cooperatively • Use library skills, to find and organize information • Take responsibility and carry out laboratory test • Manage time and

			and task	and task	task	• Manage time and task	task
	CLO3: To analyse influence functions on rigid and pin jointed indeterminate structures.	Assignment Project Quizzes Laboratory work Test Examination	Fail to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Take responsibility and carry out laboratory test • Manage time and task	Poor to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Take responsibility and carry out laboratory test • Manage time and task	Satisfactory to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Take responsibility and carry out laboratory test • Manage time and task	Good to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Take responsibility and carry out laboratory test • Manage time and task	Excellent to: • To: Learn both independent and cooperatively • Use library skills, to find and organize information • Take responsibility and carry out laboratory test • Manage time and task
	CLO4: To analyse vibration of SDOF System.	Assignment Project Quizzes Laboratory work Test Examination	Fail to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Take responsibility and carry out laboratory test • Manage time and task	Poor to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Take responsibility and carry out laboratory test • Manage time and task	Satisfactory to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Take responsibility and carry out laboratory test • Manage time and task	Good to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Take responsibility and carry out laboratory test • Manage time and task	Excellent to: • To: Learn both independent and cooperatively • Use library skills, to find and organize information • Take responsibility and carry out laboratory test • Manage time and task

	CLO5: To analyse buckling of struts.	Assignment Project Quizzes Laboratory work Test Examination	Fail to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Take responsibility and carry out laboratory test • Manage time and task	Poor to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Take responsibility and carry out laboratory test • Manage time and task	Satisfactory to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Take responsibility and carry out laboratory test • Manage time and task	Good to: • Learn both independent and cooperatively • Use library skills, to find and organize information • Take responsibility and carry out laboratory test • Manage time and task	Excellent to: • To: Learn both independent and cooperatively • Use library skills, to find and organize information • Take responsibility and carry out laboratory test • Manage time and task
--	--	--	---	---	---	---	--

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)	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;
	Course Learning Outcome (CLO)											
	CLO1: To analyse method of column analogy	✓										
	CLO2: To analyse collapse theory in designing structures.	✓										
	CLO3: To analyse influence functions on rigid and pin jointed indeterminate structures.	✓	✓	✓								
	CLO4: To analyse vibration of SDOF System	✓	✓	✓								
	CLO5: To analyse buckling of struts	✓	✓	✓								

17.	Content outline of the course/module and the SLT per topic						
		Details	SLT (Hours)				
			L	T	P	IS	Total
	Topic 1	Column Analogy - Derivation of column - analogy equation - Procedure for method of column analogy - Basic applications to structures e.g. with - Hinged connections.	8	4	-	10	22
	Topic 2	Introduction to Plastic Theory - Review of basic - Plasticity in steel - Plasticity in concrete	8	2	-	10	20
	Topic 3	Statistically Indeterminate Problems - Statistically indeterminate, redundancies - Thermal stress, lack of fit, foundation statistically, steam energy and Castiglione’s method	8	2	-	10	20
	Topic 4	Virtual Work - Principle of virtual displacement and virtual work - Calculation of deflections in structures	8	2	-	10	20
	Topic 5	Vibration od SDOF system Undamped system and damped free vibrations	4	2	-	8	14
	Topic 6	buckling of struts - Consent of buckling - Euler buckling for end condition other than ended - Perry-Robastan formula	6	2	-	10	18
	Practical - Shear force application - Demec mechanical strain gauge and Electrical strain Gauge apparatus - Begg’s deformeter - Continuous beam apparatus - Deflection of beam apparatus - Plain truss	-	-	12	-	12	
Total(Hours)			42	14	12	58	126
18.	Main references supporting the course - Structural Analysis (7th Edition) by R. C. Hibbeler (May 15, 2008) - Matrix Analysis of Structures by Aslam Kassimali (Jan 1, 2011) - Elementary Behaviour of Composite Steel and Concrete Structural Members by Deric Oehlers and Mark A. Bradford (Feb 28, 2000) - Analysis of Structures: Strength and Behaviour by T. S. Thandavamoorthy (Apr 21, 2005) - The Behaviour and Design of Steel Structures to EC3 by N.S. Trahair, M.A. Bradford, David Nethercot and Leroy Gardner (Jan 31, 2008)						
	Additional references supporting the course						

	1. . F.Arbabi, Structural Analysis & Behaviour, Mc Graw Hill, International Edition, 1991. 2. P. Bhat, H.M. Nelson, Structures, 3rd. edition, ELBS, Longman Group UK, Ltd., 1990. 3. Tung Au & Paul Christiano, Fundamentals of Structural Analysis, Prentice Hall, 1993. 4. BS 4466 : 'Specification for Bending Dimensions & Scheduling of Reinforcement for Concrete', 1981. 6. Seminar paper, 'Design Analysis to BS 5950 : 1985', K.L. May 1986. 7. M.I. Mantell & J.F. Marron, Structural Analysis, Mnemosyne Publishing Company Inc., 1980. 8. Y.Y. Hsieh, Elementary Theory of Structures, Prentice Hall, 1995. 5. Mario Paz, Structural Dynamics, VNR, 2nd Edition, 1985.
19.	Other additional information All materials will be available to the students in the library.