



Semester:	I/II	Course Type:	IESC		
Course Title: Engineering Mechanics					
Course Code:	25CVI14/24		Credits:		4
Teaching Hours/Week (L:T:P:S)			3:0:2:1	Total Hours:	40 hrs + 12 lab slots
CIE Marks:	50	SEE Marks:	50	Total Marks:	100
SEE Type:	Theory			Exam Hours:	3
I. Course Objectives: This course aims to					
<ul style="list-style-type: none">• Make students understand Scope of various fields of Civil Engineering and properties of Basic Materials of Construction.• Equip students with the fundamental principles of mechanics and apply them to solve real-world engineering problems.• Locate centroid and to calculate moment of inertia of plane areas.					
II. Teaching-Learning Process (General Instructions)					
Chalk and Talk using writing boards, PPT and videos.					
III (a). Theory Course Content					
Module-1:					8 Hours
Scope of various fields of Civil Engineering: Surveying, Structural Engineering, Geotechnical Engineering, Water Resources Engineering, Transportation Engineering, Environmental Engineering, Construction Planning and Project Management. Introduction to Building Materials: Properties of Cement, Aggregates, Structural Steel, Bricks, and CC Blocks. RBT Levels: L1, L2, L3					
Module-2:					8 Hours
Introduction to Engineering Mechanics: Basic dimensions and units, Idealisation, Force, Classification of force system, principle of transmissibility of a force, Composition and resolution of forces, of coplanar concurrent force system, Moment, Couple and Characteristics of couple, Varignon’s theorem: Resultant of non-concurrent force system: Numerical Examples. RBT Levels: L1, L2, L3					
Module-3:					8 Hours
Equilibrium of Bodies: Forces on bodies in Equilibrium, Free Body Diagrams. Conditions of Equilibrium, Lami’s theorem. Equilibrium of coplanar concurrent force systems, Numerical examples. Support Reactions in Beams: Types of supports, loads and beams, Statically determinate and indeterminate beams. Support reactions for statically determinate beams subjected to combined loads: Numerical examples. RBT Levels: L1, L2, L3					
Module-4:					8 Hours
Centroid of Plane areas: Introduction, Definitions of centroid and centre of gravity. Axes of symmetry, Locating the centroid of square, rectangle, triangle, circle, semicircle and quadrant using method of integration, Centroid of composite areas and simple built-up sections: Numerical examples. RBT Levels: L1, L2, L3					

Module-5:													8 Hours			
Moment of Inertia of Plane areas: Introduction, Moment of inertia about an axis, Parallel axes theorem, Perpendicular axes theorem, Polar moment of inertia, Radius of gyration. Moment of inertia of square, rectangular, triangular and circular areas from the method of integration, Moment of inertia of composite areas and simple built-up sections: Numerical Examples. RBT Levels: L1, L2, L3																
III (b). Practical Part																
Sl. No.		Experiments														
1.		Visual classification of bricks, stones, tiles, M- sand, Fly ash, GGBS, Steel bars														
2.		Dimensionality of Bricks and Water absorption test														
3.		Compressive strength tests on building blocks (bricks, solid blocks and hollow blocks)														
4.		Specific gravity of fine aggregate														
5.		Specific gravity of coarse aggregate														
6.		Specific gravity of Cement														
7.		Determination of resultant for Concurrent force systems and Nonconcurrent Force systems using MATLAB.														
8.		Determination of support reactions of beam under various loadings and support conditions using MATLAB.														
IV.COURSE OUTCOMES: At the end of the course the student will be able to																
CO1		Describe Scope of various fields of Civil Engineering and properties of Basic Materials of Construction.														
CO2		Explain the fundamentals of forces and determine the resultant of force systems.														
CO3		Analyze the bodies in equilibrium.														
CO4		Locate the centroid of plane areas and compute moment of inertia of plane areas.														
V.CO-PO-PSO MAPPING (High = 3; Medium = 2; Low = 1)																
PO/PSO	1	2	3	4	5	6	7	8	9	10	11	12	S1	S2	S3	S4
CO1	3	2					2						2			
CO2	3	2	2										2			
CO3	3	2	2										2			
CO4	3	2	2										2			
VI. Assessment Details (CIE & SEE)																
General Rules: Refer Annexure Section 2																
Continuous Internal Evaluation (CIE): Refer Annexure Section 2																
Semester End Examination (SEE): Refer Annexure Section 2																
VII. Learning Resources																
VII (a). Text Books:																
1	Building Construction			Rangwala				33 rd Edition, 2016		Chariot Publishing House Pvt. Ltd						
2	Basic Civil Engineering and Engineering Mechanics			Bansal R. K., Rakesh Ranjan Beohar and Ahmad Ali Khan				3 rd Edition, 2015		Laxmi Publications, ISBN: 9789380856674.						
3	Elements of Civil Engineering and Engineering Mechanics			Kolhapure B K,				11 th Edition, 2018		Eastern Book Promoters Belgaum [EBPB], ISBN: 5551234003896						

VII (b): Reference Books:				
1	Mechanics for Engineers: Statics and Dynamics	Beer F.P. and Johnston E. R	4th Edition, 1987	McGraw Hill, ISBN: 9780070045842
2	Engineering Mechanics- Statics	Meriam J. L. and Kraige L. G	Vol I-6 th Edition, 2008	Wiley publication
3	Engineering Mechanics- Statics and Dynamics	Irving H. Shames	4 th Edition, 2002	Prentice-Hall of India (PHI)
4	Engineering Mechanics: Principles of Statics and Dynamics	Hibbler R. C.	2017	Pearson Press, New Delhi
5	Engineering Mechanics	Timoshenko S, Young D. H., Rao J. V., Sukumar Patil	2017	McGraw Hill Publisher,
6	Engineering Mechanics	Bhavikatti S S	4 th Edition, 2018	New Age International.
VII(c): Web links and Video Lectures (e-Resources):				
<ul style="list-style-type: none"> • https://www.youtube.com/watch?v=nkg7VNW9UCc&list=PLOSWwFV98rfKXq2KBphJz95rao7q8PpwT&index=2 • https://www.youtube.com/watch?v=ljDIIMvxeg&list=PLOSWwFV98rfKXq2KBphJz95rao7q8PpwT&index=5 • https://www.youtube.com/watch?v=3YBXteL-qY4 • https://www.youtube.com/watch?v=z95UW4wwzSc&list=PLOSWwFV98rfKXq2KBphJz95rao7q8PpwT&index=10 • https://www.youtube.com/watch?v=ksmsp90zAsI • https://www.youtube.com/watch?v=x1ef048b3CE • https://www.youtube.com/watch?v=l_Nck-X49qc • https://www.youtube.com/watch?v=R8wKV0UQtlo • https://www.youtube.com/watch?v=0RZHHgL8m_A • https://www.youtube.com/watch?v=Bls5KnQOWkY 				
VIII: Activity Based Learning / Practical Based Learning/Experiential learning:				
<ul style="list-style-type: none"> • https://www.youtube.com/watch?v=Zrc_gB1YYS0 • https://www.youtube.com/watch?v=Hn_iozUo9m4 				