18CVJJCECV

ELEMENTS OF CIVIL ENGINEERING & ENGINEERING MECHANICS

Subject Code	: 17CV11CECV/17CV21CECV	Credits	: 3
L:P:T:S	: 2:0:2:0	CIE Marks	: 50
Exam Hours	: 03	SEE Marks	: 50
Hours/Week	: 04	Total hours	: 50

Course Objectives: In this course, the student will be able to
1) Identify various branches of Civil Engineering and its role in infrastructural development of Nation.
2) Identify the structural components of buildings and materials used for construction.
3) Apply principles of mechanics for solving engineering problems.
4) Analyse the objects subjected to various force systems.
5) Determine the centroid and analyse the moment of Inertia of simple plane sections.

Course Outcomes: At the end of the course the students will be able to:

	Course Outcome
CO 1	Describe the various branches of Civil Engineering and their role in development of Infrastructure.
CO 2	Identify and describe the various components of buildings and materials used for construction
CO 3	Construct Free Body Diagrams for the systems and inspect for its conditions
CO 4	Determine the beam reactions for different load conditions
CO 5	Determine the Centroid and compute moment of Inertia of Plane Lamina
CO 6	Analyze frictional effects on horizontal and inclined surfaces

Mapping of Course outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3				1	1						
CO 2	3				2	1						
CO 3	3	3		2								
CO 4	3	3										
CO 5	3	3										
CO 6	3	3										

Module	Content of the Module	Hours	CO's
1	**Introduction to Civil Engineering**	8	CO1

	Scope of different fields of Civil Engineering, Role of Civil Engineer in development of Infrastructure. Building materials and components – Properties and Engineering applications of Stones, Bricks, Cement, Concrete, concept of Reinforced Cement Concrete (RCC). Concept of Sub Structure Components- Masonry Foundation; Isolated RCC footing; End bearing piles and friction piles. Concept of Super structure components– Components and types of walls, Roofs, Flooring. *Self-Study:* Raft Foundation, Doors, Windows, stairs		CO2 CO3
2	**Introduction to Engineering Mechanics:** Force and its characteristics, Classification of force systems, Laws of mechanics. Couple, Moment of a force, Equivalent force - couple system. Numerical problems. **Concurrent & Non-Concurrent force system:** Definitions, Composition and resolution of forces, Resultant, Composition of coplanar concurrent & non-concurrent force system. Varignon's principle of moments. Numerical problems. *Self Study:* Force system concept in 3D	8	CO2 CO3
3	**Equilibrium of forces** **Equilibrium of concurrent and non-concurrent forces:** Definition of Equilibrant; Conditions of static equilibrium for different force systems, Free Body Diagrams, Lami's theorem; Numerical problems **Support Reactions:** Beams, Types of Loads and Supports, support reactions for statically determinate beams with point loads and uniformly distributed loads. *Self-Study:* Numerical Problems on moving loads.	8	CO2 CO3 CO4
4	**Centroids and Moments of Inertia** Centroid of triangle, semi-circle, sector of a circle, computing centroid for I, T, L and composite sections Numerical problems. **Moment of Inertia:** Parallel axis theorem, Perpendicular axis theorem, Moment of Inertia of simple and compound sections. Radius of gyration, Numerical problems. *Self-Study:* Centroid and moment of inertia for punched out sections,	8	CO5
5	**Friction, stress and strain:** Definitions, Types of friction, Laws of static friction, Limiting friction, Angle of friction, Angle of repose; Impending motion on horizontal and inclined planes, Ladder friction; Numerical Problems on single planes. Hooke's law, Stress Strain behaviour of mild steel and concrete; Analysis of bars of uniform and varying cross sections, Elastic constants and their Interrelationships, Volumetric strain.- Numerical problems. *Self-Study:* Friction on two inclined planes. Analysis of bars Tapering and stepped bars	8	CO6

NOTE: 1. Questions for CIE and SEE not to be set from self-study component.
2. Assignment Questions should be from self-study component only.

Text Books

1. Ferdinand P.Beer and E.Russel Johnston Jr, "Mechanics for Engineers – Statics", McGraw Hill book Inc., U.S.A, 4th Edition, 2009, ISBN- 007100135.
2. Engineering Mechanics-Statics and Dynamics by A Nelson, Tata McGraw Hill Education Private Ltd, New Delhi, 1st Edition, 2010. ISBN-10-0-07-014614-4, ISBN-13: 978-0-07-014614-3.
3. Sushil Kumar, "Building Construction", Standard Publishers ,20th Edition, 2016, ISBN: 9788180141683

References

1. Engineering Mechanics by S.Timoshenko,D.H.Young, and J.V.Rao, TATA McGraw-Hill Book Company, New Delhi.
2. Shames IH, "Engineering Mechanics – Statics & Dynamics"- PHI – 2009.

Assessment Pattern:

CIE: Continuous Internal Evaluation Pattern for theory: (50 Marks)

Blooms Category	Tests	Assignments	AAT1	AAT2
Marks (out of 50)	30	10	05	05
Remembrance		02		
Understand		02	02	
Apply	10	02	02	03
Analyze	10	04	01	02
Evaluate	10			
Create				

*AAT 1– Alternate Assessment Tool 1: Quiz
AAT 2 - Alternate Assessment Tool 2: Project, seminar, case study, etc.

SEE – SEM End Examination Theory (50 Marks)

Blooms Category	Theory Marks (50)
Remembrance	
Understand	10
Apply	10
Analyze	20
Evaluate	10
Create	

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