AR-125 STRUCTURAL MECHANICS :: C-16

Subject Title :**Structural Mechanics**
Subject Code :**AR-125**
Periods / Week :**4**
Periods / Semester :**72**
Credits :**4**
Internal Assignments & Mids :**50 Marks**
External Examinations :**50 Marks**
Total Marks :**100 Marks**
Duration of Exam :**3 Hrs (University Exam)**

TIME SCHEDULE

Sl. No	Major Topics	No. of periods	Weightage of Marks	Short Ans Questions	Essay Ans Questions
			End Exam	End Exam	End Exam
1.	Unit – I (Simple stress & strain)	6	10	1	1
2.	Unit – II (Moment of inertia)	10	10	1	1
3.	Unit–III (S.F& B.M for SSD)	16	16		2
4.	Unit–IV (Shear Stress - Beams)	10	8	-	1
5.	Unit–V (Columns and struts)	10	10	1	1
6.	Unit–VI (Deflection- beams)	10	10	1	1
7.	Unit – VII (Arch & Dome)	10	10	1	1
	Total:	**72**	**74**	**5**	**8**

Final exam question paper consists of PART-A for 10 marks which consists 5 short questions all 5 to answer no choice and each one carries 2 marks & PART-B for 40 marks which consists 8 essay questions out of which 5 to answer (3 are choice) and each carries 8 marks.

Course Overview:

Gives an in-depth understanding of the concepts associated with different Elements of Structures.

Objectives of the Course:

To provide knowledge of different forces, force systems, Beams types sectional Properties behavior of different members due to applied forces.

Expected Skills / Knowledge Transferred: Basic principles of mechanics and behavior of elements of structures.

Course Contents:

Unit – I

Simple stress and strain: Introduction Forces, system of forces, Stress, Strain, type of stresses, stress-strain cure ,Hooke's law, elastic constants, relationship between the elastic constants

Unit – II

Centroid &Moment of inertia: center of gravity for simple figures M.I for various structural shapes like rectangle, triangle, and circle.

Unit – III

Shear force and Bending moment : bending equation M/I=F/Y=E/R types of beams and loads, shear force and bending moment for cantilever and simply supported beam for static loads(analytical methods),Applications of different beams

Unit – IV

Shear Stress in Beams: Derivation of basic torsion equation T/J=G/I=Fs/R shear stress distribution for various shapes like rectangle, triangle, circle,

Unit – V

Columns and struts:

Buckling and curshing failures, types offend condition, Euler's theory of long columns for different end conditions, Euler's theory of long columns for different end conditions and equivalent length , rankles equations application of basic formulas.

Unit – VI

Deflection of beams: slope deflection for cantilever and SSB with standard loading, slope deflection for cantilever and SSB with standard loading using double integration method, Macaulay's method and moment area method.

Unit –VII

Execution of structural concepts in post and lintel constructions and arch, Dome, live study report of construction site and possible difficulties during constructions.

Reference Books

- **Khurmi. R.S.** Engineering Mechanics, S. Chand and Co. Ltd., New Delhi, 1999.
- **Ramamrutham. S.** Engineering Mechanics, 7th ed. Dhanpat Rai Pub. Co. Ltd., Delhi, 2004.
- **Timoshenko. S. and Young, D.H.** Engineering Mechanics, McGraw-Hill International Editions