PC/CE/1-T STRUCTURAL ANALYSIS-I

Week	Lecture Day	Theory	
		Topic (Including assignment / Test)	
1st	1	**Introduction:** Concept of Equilibrium, General Equilibrium equations, concept of free body diagrams,	
	2	Concept of stress and strain, Hooke's law,	
	3	Stress-strain curve of steel and concrete, compound and composite bars, thermal stresses.	
2nd	4	**Centroid:** Introduction and significance, Centroid of regular shapes	
	5	Symmetrical sections,	
	6	Unsymmetrical sections, hollow sections.	
3rd	7	**Moment of Inertia:** Parallel axis theorem, Perpendicular axis theorem,	
	8	Mass moment of inertia, Area moment of inertia of regular shapes: L-sections	
	9	Mass moment of inertia, Area moment of inertia of regular shapes: T-sections, I-sections,	
4th	10	Moment of inertia of unsymmetrical sections, hollow sections.	
	11	**Analysis of stresses and strains:-** Analysis of simple states of stresses and strains, Elastic constraints, bending stresses	
	12	Theory of simple bending, Flexure formula, combined stresses in beams,	
5th	13	Shear stresses, Mohr's circle, Principle stresses and strains	
	14	Torsion in shafts and closed thin walled sections,	
	15	Stresses and strains in cylindrical shells	
6th	16	Spheres under internal pressure	
	17	**Bending moment and shear force in determinate beams and frames:**	
	18	Types of load on beam and frames, classification of beams,	
7th		**1st Minor Test**	
8th	19	shear force and bending moment diagrams: simply supported, subjected to any combination of point loads, uniformly distributed and varying load and moment	
	20	shear force and bending moment diagrams: simply supported, subjected to any combination of point loads, uniformly distributed and varying load and moment	
	21	shear force and bending moment diagrams: overhang beams subjected to any combination of point loads, uniformly distributed and varying load and moment	
9th	22	shear force and bending moment diagrams: overhang beams subjected to any combination of point loads, uniformly distributed and varying load and moment	
	23	shear force and bending moment diagrams: cantilever beams subjected to any combination of point loads, uniformly distributed and varying load and moment	
	24	shear force and bending moment diagrams: cantilever beams subjected to any combination of point loads, uniformly distributed and varying load and moment	
10th	25	Relationship between load, shear force and bending moment.	
	26	**Three hinged arches:** Arch subjected to any combination of point loads, uniformly distributed and varying load and moment,	
	27	Horizontal thrust, radial shear force and bending moment diagrams.	
11th	28	**Deflections in beams:** Introduction	
	29	Slope and deflections in beams by differential equations	
	30	Moment area methodExamples	
12th	31	Conjugate beam method, Examples	
	32	Unit load method, Principle of virtual work	
	33	Maxwell's Law of Reciprocal Deflections.	
13th	34	**Theory of Columns:** Slenderness ratio, End connections, short columns, Euler's critical buckling loads	
	35	Eccentrically loaded short columns, Cylinder columns subjected to axial and eccentric loading.	
	36	Cylinder columns subjected to axial and eccentric loading.	

14th		**2nd Minor test**	
15th	37	**Analysis of statically determinate trusses:** Introduction, Various types ,stability, Analysis of plane trusses by method of joints and method of sections, Examples	
	38	Analysis of space trusses using tension coefficient method.	
	39	Analysis of space trusses using tension coefficient method, Examples	

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