

## Lesson Plan

Name of the Faculty:

Discipline: CIVIL ENGINEERING

Semester: 3<sup>rd</sup> SEM

Subject: STRUCTURAL MECHANICS

Work Load (Lecture/Practical) per week (in hours): Lectures- , Practicals-

Week	Theory		Practical	
	Lecture day	Topic (including assignment/test)	Practical day	Topic
1 <sup>st</sup>	1 <sup>st</sup>	About subject	1 <sup>st</sup>	
	2 <sup>nd</sup>	Properties of Materials		
	3 <sup>rd</sup>	Classification of materials, elastic materials, plastic materials, ductile Materials, brittle materials.		
	4 <sup>th</sup>	Introduction to tensile test, compressive test, impact test, fatigue test, torsion test on metals.		
2 <sup>nd</sup>	5 <sup>th</sup>	Concept of stress, normal and shear stresses,	2 <sup>nd</sup>	
	6 <sup>th</sup>	Concept of strain and deformation, longitudinal and transverse strain, poisson's ratio, volumetric strain		
	7 <sup>th</sup>	Hooke's law, moduli of elasticity and rigidity, Bulk modulus of elasticity, relationship between the elastic constants.		
	8 <sup>th</sup>	Stresses and strains in bars subjected to tension and compression. Extension of uniform bar under its own weight,		
3 <sup>rd</sup>	9 <sup>th</sup>	stress produced in compound bars (two or three) due to axial load.	3 <sup>rd</sup>	
	10 <sup>th</sup>	Stress-strain diagram for mild steel and HYSD steel, mechanical properties, factor of safety.		
	11 <sup>th</sup>	Temperature stresses and strains		
	12 <sup>th</sup>	Concept of a beam and supports (Hinges, Roller and Fixed), types of beams: simply supported, cantilever		
4 <sup>th</sup>	13 <sup>th</sup>	propped, over hang, cantilever and continuous beams (only concept).	4 <sup>th</sup>	

	14 <sup>th</sup>	Types of loads (dead load, live load, snow load, wind load seismic load as per IS Codes etc) and types of loading (point, uniformly distributed and uniformly varying loads)		
	15 <sup>th</sup>	Concept of bending moment and shear force, sign conventions		
	16 <sup>th</sup>	Bending Moment and shear force diagrams for cantilever, simply supported		
5 <sup>th</sup>	17 <sup>th</sup>	Relationship between load, shear force and bending moment, point of maximum bending moment, and point of contra flexure.	5 <sup>th</sup>	
	18 <sup>th</sup>	overhanging beams subjected to concentrated, uniformly distributed		
	19 <sup>th</sup>	CH. 1,2,3 TEST		
	20 <sup>th</sup>	Concept of moment of inertia and second moment of area and radius of gyration, theorems of parallel and perpendicular axis		
6 <sup>th</sup>	21 <sup>st</sup>	second moment of area of common Geometrical sections: rectangle, triangle, circle. Second Moment of area for L, T and I sections, section modulus.	6 <sup>th</sup>	
	22 <sup>nd</sup>	Concept of pure/simple bending		
	23 <sup>rd</sup>	Assumptions made in the theory of simple bending, derivation and application of bending equation to circular cross-section, I section, T&L sections only		
	24 <sup>th</sup>	Moment of resistance Calculations of bending stresses in simply supported beam		
7 <sup>th</sup>	25 <sup>th</sup>	Concentric and eccentric loads single axis eccentricity only	7 <sup>th</sup>	
	26 <sup>th</sup>	Effect of eccentric load on the section stresses due to eccentric loads, Numerical in the case of short columns.		
	27 <sup>th</sup>	Simple problems on stability of masonry dams and retaining walls		

	28 <sup>th</sup>	numerical problems)		
8 <sup>th</sup>	29 <sup>th</sup>	Concept of shear stresses in beams, shear stress distribution in rectangular	8 <sup>th</sup>	
	30 <sup>th</sup>	circular I, T, L sections (Formula to be stated, no derivation)		
	31 <sup>st</sup>			
	32 <sup>nd</sup>	Slope and Deflection:		
9 <sup>th</sup>	33 <sup>rd</sup>	Necessity for determination of slope and deflection	9 <sup>th</sup>	
	34 <sup>th</sup>	numerical problems)		
	35 <sup>th</sup>	numerical problems)		
	36 <sup>th</sup>	Moment area theorem		
10 <sup>th</sup>	37 <sup>th</sup>	Theory of columns	10 <sup>th</sup>	
	38 <sup>th</sup>	Eulers and Rankine Formula		
	39 <sup>th</sup>	Concept of a perfect, redundant and deficient frames		
	40 <sup>th</sup>	Concept of a perfect, redundant and deficient frames		
11 <sup>th</sup>	41 <sup>st</sup>	Assumptions and analysis of trusses	11 <sup>th</sup>	
	42 <sup>nd</sup>	numerical problems)		
	43 <sup>rd</sup>	Method of joints		
	44 <sup>th</sup>	Method of sections		
12 <sup>th</sup>	45 <sup>th</sup>	Graphical method	12 <sup>th</sup>	
	46 <sup>th</sup>	numerical problems		
	47 <sup>th</sup>	numerical problems		
	48 <sup>th</sup>	numerical problems		
13 <sup>th</sup>	49 <sup>th</sup>	Slope and Deflection:	13 <sup>th</sup>	
	50 <sup>th</sup>	Numerical Problems		
	51 <sup>st</sup>	Slope and Deflection:		
	52 <sup>nd</sup>	Numerical Problems		
14 <sup>th</sup>	53 <sup>rd</sup>	Graphical method	14 <sup>th</sup>	
	54 <sup>th</sup>	Method of sections		
	55 <sup>th</sup>	Numerical Problems		
	56 <sup>th</sup>	CH. 7,8,9 TEST		
15 <sup>th</sup>	57 <sup>th</sup>	Numerical Problems	15 <sup>th</sup>	
	58 <sup>th</sup>	1 <sup>ST</sup> SESIONAL REVISION		
	59 <sup>th</sup>	2 <sup>ND</sup> SESIONAL REVISION		
	60 <sup>th</sup>	3 <sup>RD</sup> SESIONAL REVISION		