

LESSON PLAN			
Department: Civil Engineering	Semester : 5TH SEC- A	Name of the Teaching faculty: PRAVABATI JENA	
Subject :- Th2 Structural Design-II	No.of Days/ week class allotted : 04	Semester from date: 14/07/2025 to 15/11/2025 No. of Weeks :18 Topics to be covered:-	
Week	Class Day	Topics	Remarks
9th week		chapter 1:Introduction:	
	1st	1.1Common steel structures, Advantages & disadvantages of steel structures.	5
		1.2Types of steel, properties of structural steel	
	2nd	1.3Rolled steel sections, special considerations in steel design.	
	3rd	1.4Loads and load combination,Structural analysis and design philosophy	
10th week		1.5Brief review of Principles of Limit State design.	
	1st	chapter:2Structural Steel Fasteners and Connections.	10
		2.1Bolted Connections	
	2nd	2.1.1,Classification of bolts, advantages and disadvantages of bolted connections	
	3rd	2.1.2 Different terminology, spacing and edge distance of bolt holes.	
11th week	1st	2.1.3Types of bolted connections.2.1.4Types of action of fasteners, assumptions and principles of design	
	2nd	2.1.5Strength of plates in a joint, strength of bearing type bolts (shear capacity& bearing capacity), reduction factors, and shear capacity of HSFG bolts.	
	3rd	2.1.6Analysis & design of Joints using bearing type and HSFG bolts (except eccentric load and prying forces), 2.1.7Efficiency of a joint.	
13th week	2nd	2.2 Welded Connections,2.2.1 Advantages and Disadvantages of welded connection	
	3rd	2.2.2 Types of welded joints and specifications for welding	
14h week	1st	2.2.3 Design stresses in welds.	
		2.2.4 Strength of welded joints.	
	2nd	chapter:3 Design of Steel tension Members	10
	3rd	3.1 Common shapes of tension members	
15th week	2nd	3.2 Maximum values of effective slenderness ratio.	
	3rd	3.2Maximum values of effective slenderness ratio.	
16th week	1st	3.3Analysis and Design of tension members.(Considering strength only and concept of block shear failure	
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	2nd	3.3Analysis and Design of tension members.(Considering strength only and concept of block shear failure	
	3rd	3.3 Analysis and Design of tension members.(Considering strength only and concept of block shear failure	

17th week	1st	chapter:4 Design of Steel Compression members.	10
		4.1 Common shapes of compression members.	
		4.1 Common shapes of compression members.	
	3rd	4.2 Buckling class of cross sections, slenderness ratio	
18th week	1st	4.2 Buckling class of cross sections, slenderness ratio	
		Design compressive stress and strength of compression members.	
	2nd	Design compressive stress and strength of compression members.	
	3rd	Analysis and Design of compression members (axial load only).	
	extra classes	Analysis and Design of compression members (axial load only).	
		Analysis and Design of compression members (axial load only).	
		chapter:6 Design of Tubular Steel Structures:	
		6.1 Round Tubular Sections, Permissible Stresses	
		6.2 Tubular Compression & Tension Members	
		6.3 Joints in Tubular trusses	10
		Common cross sections and their classification	
		Common cross sections and their classification	
		Common cross sections and their classification	
		Deflection limits, web buckling and web crippling	
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		Deflection limits, web buckling and web crippling	
		Design of laterally supported beams against bending and shear.	
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		Design of laterally supported beams against bending and shear.	
		Design of Tubular Steel Structures: 6.1 Round Tubular Sections, Permissible Stresses 6.2 Tubular Compression & Tension Members 6.3 Joints in Tubular trusses	
		chapter:7 Design of Masonry Structures: 7.1 Design considerations for Masonry walls & Columns, Load Bearing & Non-Load Bearing walls, Permissible stresses, Slenderness Ratio, Effective Length, Height & Thickness.	

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LESSON PLAN

Department: Civil Engineering	Semester : 3rd SEC- A	Name of the Teaching faculty: PRAVABATI JENA	
Subject :- Th4. GEOTECHNICAL ENGINEERING	No. of Days/ week class allotted : 03	Semester from date: 14/07/2025 to 15/11/2025 No. of Weeks : 18 Topics to be covered:-	
Week	Class Day	Topics	Remarks
9th WEEK	1st	UNIT-I Overview of Geology and Geotechnical Engineering Introduction of Geology, Branches of Geology Importance of Geology for civil engineering structure and composition of earth,	5
	2nd	Definition of a rock: Classification based on their genesis (mode of origin), formation. Classification and engineering uses of igneous, sedimentary and metamorphic rocks. (Concepts only)	
	3rd	Importance of soil as construction material in Civil engineering structures and as foundation bed for structures. (Concepts only)	
10th WEEK	1st	Field application of geotechnical engineering for foundation design, pavement design,	
	2nd	design of earth retaining structures, design of earthen dam. (Concepts only)	
	3rd	UNIT-II Physical and Index Properties of Soil ♦ Soil as a three phase system, water content, determination of water content by oven drying method as per BIS code,	8
11th WEEK	1st	void ratio, porosity and degree of saturation, density index., air Content, Percentage of air voids, Relation between the parameters.	
	2nd	Unit weight of soil mass – bulk unit weight, dry unitweight, unit weight of solids, saturated unit weight, submerged unit weight.	
12th WEEK	3rd	Determination of bulk unitweight and dry unit weight by core cutter and sandreplacement method, Determination of specific gravity by pycnometer.	
13th WEEK	1st	Consistency of soil, Atterberg limits of consistency: Liquid limit, plastic limit and shrinkage limit. Plasticity index.	
14th WEEK	1st	Particle size distribution test and plotting of curve, Determination of effective diameter of soil,	
	2nd	well graded and uniformly graded soils	
	3rd	BIS classification of soil	
15th WEEK	1st	UNIT-III Permeability and Seepage Definition of permeability, Darcy's law of permeability	8
16th WEEK	1st	coefficient of permeability, factors affecting permeability,	
	2nd	determination of coefficient of permeability by constant head tests,	
	3rd	determination of coefficient of permeability by falling head tests,	
17th WEEK	1st	simple problems to determine coefficient of permeability.	

	2nd	Seepage through earthen structures, seepage velocity, seepage pressure,	
18th WEEK	1st	phreatic line, flow lines, application of flow net, (Concepts only No numerical problems).	
	2nd	Effective stress, quick Sand	
	3rd	UNIT-IV Compaction Standard and Modified proctor test as per IS code	8
Extra classes		Plotting of Compaction curve for determining: Optimum moisture content (OMC), maximum dry density (MDD), Zero air voids line.	
		consolidation and stabilization of soil Concept of compaction, Factors affecting compaction, field methods of compaction – <u>rolling, ramming and vibration</u> .	
		Consolidation, Difference between compaction and consolidation. Terzaghi's Model analogy of compression/springs showing the process of consolidation, Field implications	
		concept of soil stabilization, necessity of soil stabilization, different methods of soil stabilization.	
		California bearing ratio (CBR) test - Meaning and Utilization in Pavement Construction	
		Necessity of site investigation and soil exploration: Types of exploration, criteria for deciding the location and number of test	
		Field identification of soil – dry ♦ strength test, dilatancy test and toughness test.	
		UNIT-V Shear Strength of Soil ♦	8
		Shear failure of soil-General, local and punching shear, concept of shear strength of soil.	
		♦ Components of shearing resistance of soil – cohesion, internal friction.	
		Mohr-Coulomb failure theory,	
		strength envelope	
		strength equation for purely cohesive and cohesion less soils.	
		Direct shear test	
		triaxial and vane shear test laboratory methods.	
		UNIT-VI Bearing Capacity of Soil and Foundation ♦ Bearing capacity and theory of earth pressure. Concept of bearing capacity, ultimate bearing capacity, safe bearing capacity and allowable bearing pressure. Introduction to Terzaghi's analysis and assumptions, effect of water table on bearing capacity. ♦ Field methods for determination of bearing capacity – Plate load and Standard Penetration Test. Test procedures as per IS:1888 & IS:2131. Definition of earth pressure, Active and Passive earth pressure for no surcharge condition, coefficient of earth pressure, Rankine's theory and assumptions made for non-cohesive Soils. ③ Type of foundations-shallow, deep foundation	8

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