LESSON PLAN OF Th1. STRUCTURAL MECHANICS

ORISSA SCHOOL OF ENGINEERING POLYTECHNIC, BERHAMPUR

Discipline: civil engineering	**Semester: 3rd**	**Faculty Name:**
Subject: Th1. STRUCTURAL MECHANICS	**No. of days/ per week class allotted: 5**	**No. of Weeks: 15**
Week	**Class Day**	**Theory**
		1.0 Review Of Basic Concepts
1st	1st	1.1 Basic Principle of Mechanics: Force, Moment, support conditions
	2nd	Conditions of equilibrium, C.G & MI, Free body diagram
	3rd	1.2 Review of CG of different sections
	4th	Review of MI of different sections
		2.0 Simple And Complex Stress, Strain
	5th	2.1 Simple Stresses and StrainsIntroduction to stresses and strains: Mechanical properties of materials – Rigidity, Elasticity, Plasticity, Compressibility, Hardness, Toughness, Stiffness, Brittleness, Ductility, Malleability, Creep, Fatigue, Tenacity, Durability,
2nd	1st	Types of stresses -Tensile, Compressive and Shear stresses, Types of strains - Tensile, Compressive and Shear strains
	2nd	Complimentary shear stress - Diagonal tensile / compressive Stresses due to shear, Elongation and Contraction, Longitudinal and Lateral strains, Poisson's Ratio, Volumetric strain
	3rd	computation of stress, strain, Poisson's ratio, change in dimensions and volume etc,
	4th	Hooke's law - Elastic Constants, Derivation of relationship between the elastic constants.
	5th	2.2 Application of simple stress and strain in engineering field:Behaviour of ductile and brittle materials under direct loads, Stress Strain curve of a ductile material
3rd	1st	Limit of proportionality, Elastic limit, Yield stress, Ultimate stress, Breaking stress, Percentage elongation, Percentage reduction in area,
	2nd	Significance of percentage elongation and reduction in area of cross section,
	3rd	Deformation of prismatic bars due to uniaxial load
	4th	Deformation of prismatic bars due to its self weight
	5th	2.3 Complex stress and strainPrincipal stresses and strains: Occurrence of normal and tangential stresses
4th	1st	Concept of Principal stress and Principal Planes,
	2nd	major and minor principal stresses and their orientations,
	3rd	Mohr's Circle and its application
	4th	application to solve problems of complex stresses Using Mohr's Circle
		3.0 Stresses In Beams and Shafts
	5th	3.1 Stresses in beams due to bending: Bending stress in beams – Theory of simple bending – Assumptions – Moment of resistance – Equation for Flexure
5th	1st	Flexural stress distribution – Curvature of beam – Position of N.A. and Centroidal Axis
	2nd	Flexural rigidity – Significance of Section modulus 3.2 Shear stresses in beams: Shear stress distribution in beams of rectangular
	3rd	Shear stress distribution in beams of circular section
	4th	Shear stress distribution in beams of circular section and standard sections symmetrical about vertical axis. 3.3 Stresses in shafts due to torsion: Concept of torsion, basic assumptions of pure torsion,
	5th	torsion of solid and hollow circular sections, polar moment of inertia, torsional shearing stresses, angle of twist
6th	1st	torsional rigidity, equation of torsion 3.4 Combined bending and direct stresses: Combination of stresses, Combined direct and bending stresses,
	2nd	Maximum and Minimum stresses in Sections, Conditions for no tension,
	3rd	Limit of eccentricity, Middle third/fourth rule, Core or Kern for square
	4th	rectangular and circular sections, chimneys, dams and retaining walls
		4.0 Columns and Struts

	5th	4.1 Columns and Struts, Definition, Short and Long columns,
7th	1st	End conditions, Equivalent length / Effective length, Slenderness ratio,
	2nd	Axially loaded short and long column, Euler's theory of long columns,
	3rd	Critical load for Columns with different end conditions
		5.0 Shear Force and Bending Moment
	4th	5.1 Types of loads and beams: Types of Loads: Concentrated (or) Point load, Uniformly Distributed load (UDL)
	5th	Types of Supports: Simple support, Roller support, Hinged support, Fixed support
8th	1st	Types of Reactions: Vertical reaction, Horizontal reaction, Moment reaction
	2nd	Types of Beams based on support conditions:
	3rd	Calculation of support reactions using equations of static equilibrium.
	4th	Calculation of support reactions using equations of static equilibrium.
	5th	5.2 Shear force and bending moment in beams:Shear Force and Bending Moment: Signs Convention for S.F. and B.M,
9th	1st	S.F and B.M of general cases of determinate beams with concentrated loads and udl only
	2nd	S.F and B.M diagrams for Cantilevers, Simply supported beams and
	3rd	S.F and B.M diagrams for Over hanging beams
	4th	Position of maximum BM, Point of contra flexure
	5th	Relation between intensity of load, S.F and B.M.
		6.0 Slope and Deflection
10th	1st	6.1 Introduction: Shape and nature of elastic curve (deflection curve);
	2nd	Relationship between slope, deflection and curvature (No derivation),
	3rd	Relationship between slope, deflection and curvature (No derivation),
	4th	Importance of slope and deflection
	5th	6.2 Slope and deflection of cantilever
11th	1st	and simply supported beams under concentrated and uniformly distributed load
	2nd	Double Integration method
	3rd	Double Integration method
	4th	Macaulay's method
		7.0 Indeterminate Beams
	5th	7.1 Indeterminacy in beams,
12th	1st	Principle of consistent deformation/compatibility
	2nd	Principle of consistent deformation/compatibility
	3rd	Principle of consistent deformation/compatibility
	4th	Analysis of propped cantilever, fixed and two span continuous beams by principle of superposition
	5th	Analysis of propped cantilever, fixed and two span continuous beams by principle of superposition
13th	1st	Analysis of propped cantilever, fixed and two span continuous beams by principle of superposition
	2nd	SF and BM diagrams (point load and udl covering full span)
	3rd	SF and BM diagrams (point load and udl covering full span)
	4th	SF and BM diagrams (point load and udl covering full span)
		8.0 Trusses
	5th	8.1 Introduction: Types of trusses, statically determinate and indeterminate trusses
	1st	statically determinate and indeterminate trusses
14th	2nd	statically determinate and indeterminate trusses
	3rd	degree of indeterminacy, stable and unstable trusses, advantages of trusses.
	4th	degree of indeterminacy, stable and unstable trusses, advantages of trusses.
	5th	8.2 Analysis of trusses: Analytical method
	1st	Method of joints
15th	2nd	Method of joints
	3rd	method of Section
	4th	method of Section
	5th	problem solving

LESSON PLAN Th.3 Building materials & Construction Technology		
Discipline: Civil Engineering	Semester: 3rd	Name of the Teaching Faculty:
Subject: Th.3 Building materials & Construction Technology	No. of days/ per week class allotted: 5	Semester From Date : to Date: No. of Weeks: 15
Week	Class Day	Theory/ Practical Topics
		1.Stone
1st	1st	1.1 Classification of rock, uses of stone, natural bed of stone,
	2nd	1.2Qualities of good building stone,
	3rd	1.3 Dressing of stone
	4th	question answer discussion
	5th	1.4 Characteristics of different types of stone and their uses
2nd	1st	1.4 Characteristics of different types of stone and their uses
	2nd	Brick earth – its composition
	3rd	2.1Brick making – Preparation of brick earth
	4th	question answer discussion
	5th	3.2Brick making – Preparation of brick earth
3rd	1st	2.3Moulding, Drying, Burning in kilns (continuous Process)
	2nd	2.4Classification of bricks, size of traditional and modular bricks
	3rd	qualities of good building bricks
	4th	3.1 Cement: Types of cements, Properties of cements, Manufacturing of cement
	5th	3.2Importance and application of blended cement with fly ash and blast furnace slag.
4th	1st	question answer discussion
	2nd	3.3 Mortar: Definition and types of mortar
	3rd	3.4 Sources and classification of sand, Bulking of sand
	4th	3.5 Use of gravel, morrum and fly ash as different building material
	5th	question answer discussion
5th	1st	3.6Concrete: Definition and composition- Water cement ratio- Workability, mechanical properties and grading of aggregates,
	2nd	mixing, placing, compacting and curing of concrete.
	3rd	question answer discussion
	4th	4.1 Timber: Classification and Structure of timber.
	5th	4.2 Seasoning of timber – Importance.

6th	1st	4.3 Characteristics of good timber.
	2nd	4.3 Clay products and refractory materials – Definition and Classification.
	3rd	question answer discussion
	4th	4.4 Properties and uses of refractory materials- tiles,
	5th	terracotta, porcelain glazing
7th	1st	4.5 Iron and Steel: Uses of cast iron, wrought iron, mild steel and tor steel
	2nd	5.1 Composition of Paints, enamels, varnishes.
	3rd	5.2 Types and uses of surface protective materials like Paints
	4th	question answer discussion
	5th	5.2 Types and uses of surface protective materials like Paints
8th	1st	Enamels, Varnishes, Distempers, Emulsion, French polish and Wax Polish.
	2nd	Enamels, Varnishes, Distempers, Emulsion, French polish and Wax Polish.
	3rd	1.1 Buildings and classification of buildings based on occupancy
	4th	1.2 Different components of a building. 1.3 Site investigation – objectives, site reconnaissance and explorations.
	5th	question answer discussion
9th	1st	2.1 Concept of foundation and its purpose 2.2 Types of foundations – shallow and deep
	2nd	2.3 Shallow foundation-constructional details of : Spread foundations for walls, thumb rules for depth and width of foundation and thickness of concrete block
	3rd	2.4 Deep foundations: Pile foundations-their suitability
	4th	classification of piles based on materials, function and method of installation.
	5th	3.1 Purpose of walls 3.2 Classification of walls – load bearing, non-load bearing walls, retaining walls.
10th	1st	3.3 Classification of walls as per materials of construction: brick, stone, reinforced brick, reinforced concrete, precast, hollow and solid concrete block and composite masonry walls (Concept Only).
	2nd	question answer discussion
	3rd	3.4 Partition Walls : Suitability and uses of brick and wooden partition walls

	4th	3.5 Brick masonry : Definition of different terms 3.6 Bond – meaning and necessity: English bond for 1and 1-1/2 Brick thick walls. T, X and right angled corner junctions. Thickness for 1and 1-1/2 brick square pillars in English bond
	5th	3.7 Stone Masonry :
11th	1st	3.8 Glossary of terms –String course, corbel, cornice, block-in-course, grouting, mouldings, templates, throating, through stones, parapet, coping, pilaster and buttress
	2nd	question answer discussion
	3rd	4.1 Glossary of terms used in doors and windows
	4th	4.2 Doors – different types of doors
	5th	4.3 Windows – different types of windows
12th	1st	4.4 Purpose of use of arches and lintels
	2nd	5.1 Floors: Glossary of terms ,Types of floor finishes – cast-in-situ, concrete flooring(monolithic, bonded), terrazzo tile flooring, cast in situ Terrazzo flooring, timber flooring (Concept only)
	3rd	5.2 Roofs: Glossary of terms, Types of roofs, concept and function of flat, pitched, hipped and Sloped roofs
	4th	question answer discussion
	5th	5.3 Stairs: Glossary of terms; Stair case, winder, landing, stringer, newel, baluster, rise, tread, width of stair case, hand rail, nosing, head room, mumty room.
13th	1st	5.4 Various types of stair case – straight flight, dog legged, open well, quarter turn
	2nd	half turn (newel and geometrical stairs), bifurcated stair, spiral stair, cantilever stair, tread riser stair.
	3rd	6.1 Plastering – purpose – Types of plastering, Types of plaster finishes – Grit finish, rough cast, smooth cast, sand faced, pebble dash, acoustic plastering and plain plaster etc.
	4th	6.2 Proportion of mortars used for different plasters, preparation of mortars, techniques of plastering and curing 6.3 Pointing – purpose –Types of pointing
	5th	question answer discussion
14th	1st	6.4 Painting – objectives – method of painting new and old wall surfaces, wood surface and metal surfaces – powder coating and spray painting on metal surfaces.
	2nd	6.5 White washing – Colour washing – Distempering – internal and external walls.
	3rd	6.6 Damp and Termite proofing – Materials and Methods.

	4th	8.1 Concept of green building 8.2 Introduction to Energy Management and Energy Audit of Buildings.
	5th	question answer discussion
15th	1st	8.3 Aims of energy management of buildings.
	2nd	8.4 Types of energy audit, Response energy audit questionnaire
	3rd	question answer discussion
	4th	8.5 Energy surveying and audit report.
	5th	question answer discussion

LESSON PLAN OF Th-3 (GEOTECHNICAL ENGINEERING)

ORISSA SCHOOL OF ENGINEERING & POLYTECHNIC,

Discipline: civil engineering	**Semester: 3rd**	**Faculty Name:**
Subject: Th2. GEOTECHNICAL ENGINEERING	**No. of days/ per week class allotted: 4**	**No. of Weeks: 15**
Week	**Class Day**	**Theory**
	D. Course Contents	
1st	1st	1 Introduction
	1st	1.1 Soil and Soil Engineering
	1st	1.2 Scope of Soil Mechanics
	2nd	1.3 Origin and formation of soil
		2 Preliminary Definitions and Relationship
	3rd/4th	2.1 Soil as a three Phase system.
2nd	1st/2nd	2.2 Water Content, Density, Specific gravity, Voids ratio, Porosity, Percentage of air voids,
	3rd/4th	air content, degree of saturation, density Index, Bulk/Saturated/dry/submerged density, Interrelationship of various soil parameters
3rd		Index Properties of Soil
	1st	3.1 Water Content
	2nd	3.2 Specific Gravity
	3rd	3.3 Particle size distribution: Sieve analysis, wet mechanical analysis, particle size distribution curve and its uses
	4th	3.4 Consistency of Soils, Atterberg's Limits, Plasticity Index, Consistency Index, Liquidity Index
4th		Classification of Soil
	1st/2nd	4.1 General
	3rd/4th	4.2 I.S. Classification, Plasticity chart Permeability
5th	1st/2nd	4.2 I.S. Classification Seepage
	3rd/4th	5.1 Concept of Permeability, Darcy's Law, Co-efficient of Permeability,
	1st	5.2 Factors affecting Permeability.
	2nd/3rd	5.3 Constant head permeability and falling head permeability Test.

	4th	5.4 Seepage pressure, effective stress, phenomenon of quick sand
6th	1st	5.4 Seepage pressure, effective stress, phenomenon of quick sand
		Compaction and Consolidation
	2nd/3rd	6.1 Compaction: Compaction, Light and heavy compaction Test, Optimum Moisture Content of Soil, Maximum dry density, Zero air void line, Factors affecting Compaction, Field compaction methods and their suitability
	4th	6.1 Compaction: Compaction, Light and heavy compaction Test, Optimum Moisture Content of Soil, Maximum dry density, Zero air void line, Factors affecting Compaction, Field compaction methods and their suitability
7th	1st/2nd	6.2 Consolidation: Consolidation, distinction between compaction and consolidation. Terzaghi‘s model analogy of compression/ springs showing the process of consolidation – field implications
	3rd/4th	6.2 Consolidation: Consolidation, distinction between compaction and consolidation. Terzaghi‘s model analogy of compression/ springs showing the process of consolidation – field implications
8th	1st	6.2 Consolidation: Consolidation, distinction between compaction and consolidation. Terzaghi‘s model analogy of compression/ springs showing the process of consolidation – field implications
		Shear Strength
	2nd	7.1 Concept of shear strength, Mohr- Coulomb failure theory, Cohesion, Angle of internal friction, strength envelope for different type of soil, ,
	3rd/4th	Measurement of shear strength;- Direct shear test
	1st	Measurement of shear strength;triaxial shear test
	2nd/3rd	Measurement of shear strength; unconfined compression test and vane-shear test
9th		Earth Pressure on Retaining Structures
	1st	8.1 Active earth pressure, Passive earth pressure, Earth pressure at rest

	2nd/3rd	8.2 Use of Rankine's formula for the following cases (cohesion-less soil only)
	4th	(i) Backfill with no surcharge,
10th	1st/2nd	(ii) backfill with uniform surcharge
		Foundation Engineering
	3rd/4th	9.1 Functions of foundations, shallow and deep foundation, different type of shallow and deep foundations with sketches. Types of failure (General shear, Local shear & punching shear)
11th	1st/2nd	9.1 Functions of foundations, shallow and deep foundation, different type of shallow and deep foundations with sketches. Types of failure (General shear, Local shear & punching shear)
	3rd/4th	9.1 Functions of foundations, shallow and deep foundation, different type of shallow and deep foundations with sketches. Types of failure (General shear, Local shear & punching shear)
12th	1st/2nd	9.2 Bearing capacity of soil, bearing capacity of soils using Terzaghi's formulae & IS Code formulae for strip, Circular and square footings, Effect water table on bearing capacity of soil
	3rd/4th	9.2 Bearing capacity of soil, bearing capacity of soils using Terzaghi's formulae & IS Code formulae for strip, Circular and square footings, Effect water table on bearing capacity of soil
13th	1st/2nd	9.2 Bearing capacity of soil, bearing capacity of soils using Terzaghi's formulae & IS Code formulae for strip, Circular and square footings, Effect water table on bearing capacity of soil
	3rd/4th	9.3 Plate load test and standard penetration test
14th	1st/2nd	9.3 Plate load test and standard penetration test
	3rd/4th	9.3 Plate load test and standard penetration test
15th	1st	9.3 Plate load test and standard penetration test
	2nd/3rd	problem disscuss previous chapter
	4th	problem disscuss previous chapter

LESSON PLAN:ESTIMATION & COST EVALUATION-I (TH-4)		
Discipline: Civil Engineering	Semester: 3RD	Name of the Teaching Faculty:
Subject: ESTIMATION & COST EVALUATION-I (TH-4)	No. of days/ per week class allotted: 4	No. of Weeks: 15
Week	Class Day	Theory/ Practical Topics
1st	1st	1.1 Types of estimates – Plinth area, floor area / carpet area
	2nd	1.1 Types of estimates – Plinth area, floor area / carpet area
	3rd	1.1 Types of estimates – Plinth area, floor area / carpet area
	4th	1.2 Units and modes of measurements as per IS 1200
2nd	1st	1.2 Units and modes of measurements as per IS 1200
	2nd	1.2 Units and modes of measurements as per IS 1200
	3rd	1.3 Accuracy of measurement for different item of work
	4TH	1.3 Accuracy of measurement for different item of work
3rd	1st	2.1 Short wall long wall method and centre line method
	2nd	2.1 Short wall long wall method and centre line method
	3rd	2.1 Short wall long wall method and centre line method
	4th	deductions in masonry
4th	1st	deductions in masonry
	2nd	plastering,
	3rd	plastering,
	4th	plastering,
5th	1st	white washing
	2nd	white washing
	3rd	white washing
	4th	painting etc., multiplying factor (paint coefficients) for painting of doors and windows (paneled/glazed), grills etc.
6th	1st	painting etc., multiplying factor (paint coefficients) for painting of doors and windows (paneled/glazed), grills etc.

	2nd	painting etc., multiplying factor (paint coefficients) for painting of doors and windows (paneled/glazed), grills etc.
	3rd	painting etc., multiplying factor (paint coefficients) for painting of doors and windows (paneled/glazed), grills etc.
	4th	2.2 Detailed estimate of single storied flat roof building with shallow foundation and RCC roof slab with leak proof treatment over it including staircase and mumty room.
7th	1st	2.2 Detailed estimate of single storied flat roof building with shallow foundation and RCC roof slab with leak proof treatment over it including staircase and mumty room.
	2nd	2.2 Detailed estimate of single storied flat roof building with shallow foundation and RCC roof slab with leak proof treatment over it including staircase and mumty room.
	3rd	2.2 Detailed estimate of single storied flat roof building with shallow foundation and RCC roof slab with leak proof treatment over it including staircase and mumty room.
	4th	2.2 Detailed estimate of single storied flat roof building with shallow foundation and RCC roof slab with leak proof treatment over it including staircase and mumty room.
8th	1st	2.2 Detailed estimate of single storied flat roof building with shallow foundation and RCC roof slab with leak proof treatment over it including staircase and mumty room.
	2nd	2.2 Detailed estimate of single storied flat roof building with shallow foundation and RCC roof slab with leak proof treatment over it including staircase and mumty room.
	3rd	2.2 Detailed estimate of single storied flat roof building with shallow foundation and RCC roof slab with leak proof treatment over it including staircase and mumty room.
	4th	2.2 Detailed estimate of single storied flat roof building with shallow foundation and RCC roof slab with leak proof treatment over it including staircase and mumty room.

9th	1st	2.2 Detailed estimate of single storied flat roof building with shallow foundation and RCC roof slab with leak proof treatment over it including staircase and mumty room.
		Analysis of Rates and Valuation
	2nd	3.1 Analysis of rates for cement concrete, brick masonry in Cement Mortar, laterite stone masonry in Cement Mortar, cement plaster, white washing, Artificial Stone flooring, Tile flooring, concrete flooring, R.C.C. with centering and shuttering, reinforcing steel, Painting of doors and windows etc. as per OPWD
	3rd	3.1 Analysis of rates for cement concrete, brick masonry in Cement Mortar, laterite stone masonry in Cement Mortar, cement plaster, white washing, Artificial Stone flooring, Tile flooring, concrete flooring, R.C.C. with centering and shuttering, reinforcing steel, Painting of doors and windows etc. as per OPWD
	4th	3.1 Analysis of rates for cement concrete, brick masonry in Cement Mortar, laterite stone masonry in Cement Mortar, cement plaster, white washing, Artificial Stone flooring, Tile flooring, concrete flooring, R.C.C. with centering and shuttering, reinforcing steel, Painting of doors and windows etc. as per OPWD
10th	1st	3.1 Analysis of rates for cement concrete, brick masonry in Cement Mortar, laterite stone masonry in Cement Mortar, cement plaster, white washing, Artificial Stone flooring, Tile flooring, concrete flooring, R.C.C. with centering and shuttering, reinforcing steel, Painting of doors and windows etc. as per OPWD
	2nd	3.1 Analysis of rates for cement concrete, brick masonry in Cement Mortar, laterite stone masonry in Cement Mortar, cement plaster, white washing, Artificial Stone flooring, Tile flooring, concrete flooring, R.C.C. with centering and shuttering, reinforcing steel, Painting of doors and windows etc. as per OPWD

	3rd	3.2 Calculation of lead, lift, conveyance charges, royalty of materials, etc. as per Orissa P.W.D. system (Concept of C.P.W.D./Railways provisions)
	4th	3.2 Calculation of lead, lift, conveyance charges, royalty of materials, etc. as per Orissa P.W.D. system (Concept of C.P.W.D./Railways provisions)
11th	1st	3.2 Calculation of lead, lift, conveyance charges, royalty of materials, etc. as per Orissa P.W.D. system (Concept of C.P.W.D./Railways provisions)
	2nd	3.2 Calculation of lead, lift, conveyance charges, royalty of materials, etc. as per Orissa P.W.D. system (Concept of C.P.W.D./Railways provisions)
	3rd	3.2 Calculation of lead, lift, conveyance charges, royalty of materials, etc. as per Orissa P.W.D. system (Concept of C.P.W.D./Railways provisions)
	4th	3.3 Abstract of cost of estimate.
12th	1st	3.3 Abstract of cost of estimate.
	2nd	3.3 Abstract of cost of estimate.
	3rd	3.3 Abstract of cost of estimate.
	4th	3.3 Abstract of cost of estimate.
13th	1st	3.3 Abstract of cost of estimate.
	2nd	3.4 Valuation- Value and cost, scrap value, salvage value, assessed value, sinking fund, depreciation and obsolesce, methods of valuation.
	3rd	3.4 Valuation- Value and cost, scrap value, salvage value, assessed value, sinking fund, depreciation and obsolesce, methods of valuation.
	4th	3.4 Valuation- Value and cost, scrap value, salvage value, assessed value, sinking fund, depreciation and obsolesce, methods of valuation.
14th	1st	3.4 Valuation- Value and cost, scrap value, salvage value, assessed value, sinking fund, depreciation and obsolesce, methods of valuation.

	2nd	3.4 Valuation- Value and cost, scrap value, salvage value, assessed value, sinking fund, depreciation and obsolesce, methods of valuation.
	3rd	3.4 Valuation- Value and cost, scrap value, salvage value, assessed value, sinking fund, depreciation and obsolesce, methods of valuation.
		Administrative Set-Up of Engineering Organisations:
	4th	4.1 Administrative set-up and hierarchy of Engineering department in State Govt./Central Govt./PSUs/Private Sectors etc. Duties and responsibilities of Engineers at different positions /levels.
15th	1st	4.1 Administrative set-up and hierarchy of Engineering department in State Govt./Central Govt./PSUs/Private Sectors etc. Duties and responsibilities of Engineers at different positions /levels.
	2nd	4.1 Administrative set-up and hierarchy of Engineering department in State Govt./Central Govt./PSUs/Private Sectors etc. Duties and responsibilities of Engineers at different positions /levels.
	3rd	4.1 Administrative set-up and hierarchy of Engineering department in State Govt./Central Govt./PSUs/Private Sectors etc. Duties and responsibilities of Engineers at different positions /levels.
	4th	4.1 Administrative set-up and hierarchy of Engineering department in State Govt./Central Govt./PSUs/Private Sectors etc. Duties and responsibilities of Engineers at different positions /levels.