R.G.Government Polytechnic Banikhet,Distt. Chamba H.P-176303

Department of Civil Engineering

Lesson Plan

Name of Faculty	Er. Amandeep Singh
Discipline	Civil Engineering
Semester	3rd
Subject	Construction Materials (L-3Hrs./Week)
Lesson Plan Duration	August – December 2023

Week	Topic	Theory
1st (10 Aug. – 18 Aug.)	**Unit – I: Overview of Construction Materials**	Scope of construction materials in Building Construction, Transportation Engineering, Environmental Engineering, Irrigation Engineering (applications only). Selection of materials for different civil engineering structures based on strength, durability, Eco friendly and economy.
2nd (19 Aug. – 25 Aug.)	**Unit – I: Overview of Construction Materials** **Unit – II: Natural Construction Materials**	Broad classification of materials – Natural, Artificial, special, finishing and recycled. Requirements of good building stone; general characteristics of stone; quarrying and dressing methods and tools for stone.
3rd (26 Aug. – 01 Sept.)	**Unit – II: Natural Construction Materials**	Structure of timber, general properties and uses of good timber, different methods of seasoning for preservation of timber, defects in timber, use of bamboo in construction. Asphalt, bitumen, and tar used in construction, properties and uses.
4th (02 Sept. – 11 Sept.)	**Unit – II: Natural Construction Materials**	Properties of lime, its types and uses. Types of soil and its suitability in construction.
5th (12Sept. –18 Sept.)	**Unit – II: Natural Construction Materials**	Properties of sand and uses Classification of coarse aggregate according to size
6th (19 Sept. – 25 Sept.)	**Unit- III: Artificial Construction Materials**	Constituents of brick earth, Conventional / Traditional bricks, Modular and Standard bricks, Special bricks –fly ash bricks, Characteristics of good brick, Field tests on Bricks, Classification of burnt clay bricks and their suitability, Manufacturing process of burnt clay brick, fly ash bricks, Aerated concrete blocks.
Class Test – 1		**In Fourth Week of September 2023.**
7th (26 Sept. – 03 Oct.)	**Unit- III: Artificial Construction Materials**	Flooring tiles – Types, uses Manufacturing process of Cement - dry and wet (only flow chart), types of cement and its uses. Field tests on cement.
8th (04 Oct. – 10 Oct.)	**Unit- III: Artificial Construction Materials**	Pre-cast concrete blocks- hollow, solid, pavement blocks, and their uses. Plywood, particle board, Veneers, laminated board and their uses.

9th (11 Oct. – 18 Oct.)	**Unit- III: Artificial Construction Materials**	Types of glass: soda lime glass, lead glass and borosilicate glass and their uses. Ferrous and non-ferrous metals and their uses.
10th (19 Oct. – 26 Oct.)	**Unit– IV: Special Construction Materials**	Types of material and suitability in construction works of following materials: Water proofing, Termite proofing; Thermal and sound insulating materials.
Class Test – 2		**In Fourth Week of October 2023.**
11th (27 Oct. – 03 Nov.)	**Unit– IV: Special Construction Materials**	Fibers – Types –Jute, Glass, Plastic Asbestos Fibers, (only uses). Geo polymer cement: Geo-cement: properties, uses.
12th (04 Nov. – 10 Nov.)	**Unit– V: Processed Construction Materials**	Constituents and uses of POP (Plaster of Paris), POP finishing boards, sizes, and uses. Paints- whitewash, cement paint, Distempers, Oil Paints and Varnishes with their uses. (Situations where used).
House Test		**In Second Week of November 2023.**
13th (13Nov. – 18Nov.)	**Unit– V: Processed Construction Materials**	Constituents and uses of POP (Plaster of Paris), POP finishing boards, sizes, and uses. Paints- whitewash, cement paint, Distempers, Oil Paints and Varnishes with their uses. (Situations where used).
14th (20 Nov. – 25 Nov.)	**Unit– V: Processed Construction Materials**	Industrial waste materials- Fly ash, Blast furnace slag, Granite and marble polishing waste and their uses. Agro waste materials - Rice husk, Bagasse, coir fibers and their uses.
15th (28 Nov.- 04 Dec.)	**Unit– V: Processed Construction Materials Revision & Doubt Clearance Session**	Special processed construction materials; Geo synthetic, Ferro Crete, Artificial timber, Artificial sand, and their uses. Revision and Doubt Clearance Session.

NOTE: Lesson Plan is Tentative, subject to availability of Time, Students & Faculty.

Signature of Teacher/Prepared by
(Er. Amandeep Singh)

Signature of HOD/OIC
(Er. Amandeep Singh)

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Department of Civil Engineering

Lesson Plan

Name of Faculty	Er. Saibal Bharti
Discipline	Civil Engineering
Semester	3rd
Subject	Basic Surveying (L-3 Hrs./Week)
Lesson Plan Duration	August – December 2023

Week	Topic	Theory
1st (10 Aug. – 18 Aug.)	Unit –1 Overview and Classification of Survey	• Survey- Purpose and Use. • Types of surveying- Primary and Secondary, Classification: Plane, Geodetic, Cadastral, Hydrographic, Photogrammetry and Aerial. • Principles of Surveying.
2nd (19 Aug. – 25 Aug.)	Unit –1 Overview and Classification of Survey Unit– 2 Chain Surveying	Scales: Engineer's scale, Representative Fraction (RF) and diagonal scale. • Instruments used in chain survey: Metric Chain, Tapes, Arrow, ranging rod, Line ranger, Offset rod, Open cross staff, Optical square.
3rd (26 Aug. – 01 Sept.)	Unit– 2 Chain Surveying	• Chain survey Station, Base line, Check line, Tie line, Offset, Tie station. Ranging: Direct and Indirect Ranging.
4th (02 Sept. – 11 Sept.)	Unit– 2 Chain Surveying	• Methods of Chaining, obstacles in chaining. • Errors in length: Instrumental error, personal error, error due to natural cause, random error. • Principles of triangulation.
5th (12 Sept. –18 Sept.)	Unit– 2 Chain Surveying	• . Types of offsets: Perpendicular and Oblique. • Conventional Signs, Recording of measurements in a field book.
6th (19 Sept. – 25 Sept.)	Unit– 3 Compass Traverse Survey	• Compass Traversing- open, closed. • Technical Terms: Geographic/ True Magnetic Meridians and Bearings,
Class Test – 1		In Fourth Week of September 2023.

7th (26 Sept. – 03 Sept.)	Unit– 3 Compass Traverse Survey	Technical Terms: Whole Circle Bearing system and Reduced Bearing system and examples on conversion of given bearing to another bearing (from one form to another), Fore Bearing and Back Bearing, Calculation of internal and external angles from bearings at a station, Dip of Magnetic needle, Magnetic Declination.
8th (04 Oct. – 910 Oct.)	Unit– 3 Compass Traverse Survey	• Components of Prismatic Compass and their Functions, Methods of using Prismatic Compass- Temporary adjustments and observing bearings.
9th (11 Oct. – 18 Oct.)	Unit– 3 Compass Traverse Survey Unit– 4 Leveling and Contouring	. Local attraction, Methods of correction of observed bearings - Correction at station and correction to included angles Basic terminologies: Level surfaces, Horizontal and vertical surfaces, Datum, Benchmarks- GTS
10th (19 Oct. – 26 Oct.)	Unit– 4 Leveling and Contouring	• Basic terminologies: Permanent, Arbitrary and Temporary, Reduced Level, Rise, Fall, Line of collimation, Station, Back sight, Fore sight, Intermediate sight, Change point, Height of instruments. • Types of levels: Dumpy, Tilting, Auto level, Digital level, Components of Dumpy Level and its fundamental axes, Temporary adjustments of Level.
Class Test – 2		In Fourth Week of October 2023.
11th (27 Oct. – 03 Nov.)	Unit– 4 Leveling and Contouring	• Types of Levelling Staff: Self-reading staff and Target staff. Reduction of level by Line of collimation and Rise and Fall Method. Levelling Types: Simple, Differential, Fly, Profile and Reciprocal Levelling
12th (04 Nov. – 10 Nov.)	Unit– 4 Leveling and Contouring	• Contour, contour intervals, horizontal equivalent. Uses of contour maps, Characteristics of contours, Methods of Contouring: Direct
House Test		In Second Week of November 2023.
13th (13Nov. – 18Nov.)	Unit– 4 Leveling and Contouring Unit– 5 Measurement of Area and Volume	Methods of Contouring: Indirect Components and use of Digital planimeter

14th (20 Nov. – 25 Nov.)	Unit– 5 Measurement of Area and Volume	• Measurement of area using digital planimeter. Measurement of volume of reservoir from contour map
15th (28 Nov.- 04 Dec.)	Revision and Doubt Clearance	Revision and Doubt Clearance Session.

NOTE: Lesson Plan is Tentative, subject to availability of Time, Students & Faculty.

Saibal Bharti

Signature of Teacher/Prepared by
(Er. Saibal Bharti)

Signature of HOD/OIC
(Er. Amandeep Singh)

R.G.Government Polytechnic Banikhet,Distt. Chamba H.P-176303

Department of Civil Engineering

Lesson Plan

Name of Faculty	Er. Saibal Bharti
Discipline	Civil Engineering
Semester	3rd
Subject	Mechanics of Materials (L-4 Hrs./Week)
Lesson Plan Duration	August – December 2023

Week	Topic	Theory
1st (10 Aug. – 18 Aug.)	**Unit – 1 Moment of Inertia**	Definition, M.I. of plane lamina, Radius of gyration, section modulus, Parallel and Perpendicular axes theorems (without derivations), M.I. of rectangle, square, circle, semi-circle, quarter circle and triangle section (without derivations)..
2nd (19 Aug. – 25 Aug.)	**Unit – 1 Moment of Inertia**	M.I. of symmetrical and unsymmetrical I-section, Channel section, T-section, Angle section, Hollow sections about centroidal axes
3rd (26 Aug. – 01 Sept.)	**Unit – 1 Moment of Inertia** **Unit– 2 Simple Stresses and Strains**	Polar Moment of Inertia of solid circular sections Definition of rigid, elastic and plastic bodies
4th (02 Sept. – 11 Sept.)	**Unit– 2 Simple Stresses and Strains**	Definition of stress, strain, elasticity, Hook's law, Elastic limit, Modulus of elasticity. Type of Stresses-Normal, Direct, Bending and Shear and nature of stresses i.e., Tensile and Compressive stresses..
5th (12Sept. –18 Sept.)	**Unit– 2 Simple Stresses and Strains**	Standard stress strain curve for tor steel bar under tension, Yield stress, Proof stress, Ultimate stress, Strain at various critical points, Percentage elongation and Factor of safety. Deformation of body due to axial force, forces applied at intermediate sections, Maximum and minimum stress induced, Composite section under axial loading
6th (19 Sept. – 25 Sept.)	**Unit– 2 Simple Stresses and Strains**	Concept of temperature stresses and strain, Stress and strain developed due to temperature variation in homogeneous simple bar (no composite section) Longitudinal and lateral strain, Modulus of Rigidity, Poisson's ratio, volumetric strain, change in volume, Bulk modulus (Introduction only). Relation between modulus of elasticity, modulus of rigidity and bulk modulus (without derivation).

Class Test – 1		In Fourth Week of September 2023.
7th (26 Sept. – 03 Oct.)	Unit– 3 Shear Force and Bending Moment	. Types of supports, beams, and loads
8th (04 Oct. – 10 Oct.)	Unit– 3 Shear Force and Bending Moment	. Concept and definition of shear force and bending moment, Relation between load, shear force and bending moment (without derivation).
9th (11 Oct. – 18 Oct.)	Unit– 3 Shear Force and Bending Moment	Shear force and bending moment diagram for cantilever and simply supported beams subjected to point loads
10th (19 Oct. – 26 Oct.)	Unit– 3 Shear Force and Bending Moment	Shear force and bending moment diagram for cantilever and simply supported beams subjected to uniformly distributed loads (combination of any two types of loading), point of contra flexure.
Class Test – 2		In Fourth Week of October 2023.
11th (27 Oct. – 03 Nov.)	Unit– 4 Bending and Shear Stresses in beams	Concept and theory of pure bending, assumptions, flexural equation (without derivation),
12th (04 Nov. – 10 Nov.)	Unit– 4 Bending and Shear Stresses in beams	bending stresses and their nature, bending stress distribution diagram. Concept of moment of resistance and simple numerical problems using flexural equation.
House Test		In Second Week of November 2023.
13th (13Nov. – 18Nov.)	Unit– 4 Bending and Shear Stresses in beams	Shear stress equation (without derivation), relation between maximum and average shear stress for rectangular and circular section, shear stress distribution diagram. Shear stress distribution for square, rectangular, circle, hollow, angle sections, channel section, I-section, T section. Simple numerical problems based on shear equation

14th (20 Nov. – 25 Nov.)	**Unit– 5 Columns**	. Concept of compression member, short and long column, Effective length, Radius of gyration, Slenderness ratio, Types of end condition for columns, Buckling of axially loaded columns
15th (28 Nov.- 04 Dec.)	**Unit– 5 Columns**	Euler's theory, assumptions made in Euler's theory and its limitations, Application of Euler's equation to calculate buckling load. Rankine' s formula and its application to calculate crippling load. Concept of working load/safe load, design load and factor of safety.

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Saibal Bharti

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(Er. Saibal Bharti)

Signature of HOD/OIC
(Er. Amandeep Singh)

R.G.Government Polytechnic Banikhet,Distt. Chamba H.P-176303
Department of Civil Engineering
Lesson Plan

Name of Faculty	Er. Saibal Bharti
Discipline	Civil Engineering
Semester	3rd BUILDING CONSTRUCTION
Subject	(L-3Hrs./Week)
Lesson Plan Duration	August – December 2023

Week	Topic	Theory
1st (10 Aug. – 18 Aug.)	**Unit – I: Overview of Building Components**	Classification of Buildings as per National Building Code Group A to I, as per Types of Constructions- Load Bearing Structure, Framed Structure, Composite Structure
2nd (19 Aug. – 25 Aug.)	**Unit – I: Overview of Building Components**	Building Components - Functions of Building Components, Substructure – Foundation, Plinth. Superstructure – Walls, Partition wall, Cavity wall, Sill, Lintel
3rd (26 Aug. – 01 Sept.)	**Unit – I: Overview of Building Components** **Unit – II: Construction of Substructure**	. Doors and Windows, Floor, Roof, Columns, Beams, Parapet • Job Layout: Site Clearance, Layout for Load Bearing Structure and Framed Structure by Center Line and Face Line Method, Precautions.
4th (02 Sept. – 11 Sept.)	**Unit – II: Construction of Substructure**	Earthwork: Excavation for Foundation, Timbering and Strutting, Earthwork for embankment, Material for plinth Filling, Tools and plants used for earthwork.
5th (12 Sept. –18 Sept.)	**Unit – II: Construction of Substructure**	Foundation: Functions of foundation, Types of foundation – Shallow Foundation, Stepped Footing, Wall Footing, Column Footing, Isolated and Combined Column Footing, Raft Foundation, Grillage Foundation. Deep Foundation - Pile Foundation, Well foundation
6th (19 Sept. – 25 Sept.)	**Unit- III: Construction of Superstructure**	Stone Masonry: Terms used in stone masonry- facing, backing, hearting, through stone, corner stone, cornice. Types of stone masonry: Rubble masonry, Ashlar Masonry, and their types. Joints in stone masonry and their purpose. Selection of Stone Masonry, Precautions to be taken in Stone Masonry Construction.

Class Test – 1		**In Fourth Week of September 2023.**
7th (26 Sept. – 03 Oct.)	**Unit- III: Construction of Superstructure**	Brick masonry: Terms used in brick masonry- header, stretcher, closer, quoins, course, face, back, hearting, bat bond, joints, lap, frog line, level and plumb. Bonds in brick masonry- header bond, stretcher bond, English bond and Flemish bond. Requirements of good brick masonry. Junctions in brick masonry and their purpose and procedure. Precautions to be observed in Brick Masonry Construction. Comparison between stone and Brick Masonry. Tools and plants required for construction of stone and brick masonry. Hollow concrete block masonry and composite masonry. Scaffolding and Shoring: Purpose, Types of Scaffolding, Process of Erection and Dismantling. Purpose and Types of Shoring, Underpinning.
8th (04 Oct. – 10 Oct.)	**Unit- III: Construction of Superstructure**	Formwork: Definition of Formwork, Requirements of Formwork, Materials used in Formwork, Types of Formworks, Removal of formwork.
9th (11 Oct. – 18 Oct.)	**Unit- III: Construction of Superstructure** **Unit– IV: Building Communication and Ventilation**	• Horizontal Communication: Doors – Horizontal Communication: Doors – Components of Doors, Full Panelled Doors, Partly Panelled and Glazed Doors, Flush Doors, Collapsible Doors, Rolling Shutters, Revolving Doors, Glazed Doors. Sizes of Door recommended by BIS.
10th (19 Oct. – 26 Oct.)	**Unit– IV: Building Communication and Ventilation**	Windows: Component of windows, Types of Windows - Full Panelled, Partly Panelled and Glazed, wooden, Steel, Aluminium windows, Sliding Windows, Louvered Window, Bay window, Corner window, clear-storey window, Gable and Dormer window, Skylight. Sizes of Windows recommended by BIS. Ventilators.
Class Test – 2		**In Fourth Week of October 2023.**
11th (27 Oct. – 03 Nov.)	**Unit– IV: Building Communication and Ventilation**	Vertical Communication: Means of Vertical Communication- Stair Case, Terms used in staircase-steps, tread, riser, nosing, soffit, waist slab, baluster, balustrade, scotia, handrails, newel post, landing, headroom, winder.
12th (04 Nov. – 10 Nov.)	**Unit– IV: Building Communication and Ventilation**	Types of staircases (On the basis of shape): Straight, dog-legged, open well, Spiral, quarter turn, bifurcated, three quarter turn and Half turn, (On the basis of Material): Stone, Brick, R.C.C., wooden and

		Metal
House Test		**In Second Week of November 2023.**
13th (13 Nov. – 18 Nov.)	**Unit– V: Building Finishes**	Floors and Roofs: Types of Floor Finishes and its suitability- Kota, Marble, Granite, Ceramic Tiles, Vitrified, Concrete Floors, wooden Flooring, Skirting and Dado. Process of Laying and Construction, Finishing and Polishing of Floors, Roofing Materials- RCC, Mangalore Tiles, AC Sheets, G.I. sheets, Corrugated G.I. Sheets, Plastic and Fibre Sheets.
14th (20 Nov. – 25 Nov.)	**Unit– V: Building Finishes**	Types of Roofs: Flat roof, Pitched Roof-King Post truss, Queen Post Truss, terms used in roofs. Wall Finishes: Plastering – Necessity of Plastering, Procedure of Plastering, Single Coat Plaster, Double Coat Plaster, Rough finish, Neeru Finishing and Plaster of Paris (POP). Special Plasters- Stucco plaster, sponge finish, pebble finish. Plaster. Precautions to be taken in plastering, defects in plastering
15th (28 Nov.- 04 Dec.)	**Unit– V: Building Finishes** **Revision and Doubt Clearance**	Pointing – Necessity, Types of pointing and procedure of Pointing. Painting –Necessity, Surface Preparation for painting, Methods of Application. Revision and Doubt Clearance Session.

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Signature of Teacher/Prepared by
(Er.Saibal Bharti)

Signature of HOD/OIC
(Er. Amandeep Singh)

R.G.Government Polytechnic Banikhet,Distt. Chamba H.P-176303

Department of Civil Engineering

Lesson Plan

Name of Faculty	Er. Abhishek Patial
Discipline	Civil Engineering
Semester	3rd
Subject	Concrete Technology (L-3 Hrs./Week)
Lesson Plan Duration	August – December 2023

Week	Topic	Theory
1st (10 Aug. – 18 Aug.)	**Unit – I Cement, Aggregates and Water**	Physical properties of OPC and PPC: fineness, standard consistency, setting time, soundness, compressive strength. Different grades of OPC and relevant BIS codes. Storage of cement and effect of storage on properties of cement.
2nd (19 Aug. – 25 Aug.)	**Unit – I Cement, Aggregates and Water**	BIS Specifications and field applications of different types of cements: Rapid hardening, Low heat, Portland pozzolana, Sulphate resisting, Blast furnace slag, High Alumina and White cement. Aggregates: Requirements of good aggregate, Classification according to size and shape
3rd (26 Aug. – 01 Sept.)	**Unit – I Cement, Aggregates and Water**	Fine aggregates: Properties, size, specific gravity, bulk density, water absorption and bulking, fineness modulus and grading zone of sand, silt content and their specification as per IS 383. Concept of crushed Sand. Coarse aggregates: Properties, size, shape, surface texture, water absorption, soundness, specific gravity and bulk density, fineness modulus of coarse aggregate, grading of coarse aggregates, crushing value, impact value and abrasion value of coarse aggregates with specifications
4th (02 Sept. – 11 Sept.)	**Unit – I Cement, Aggregates and Water** **Unit– II Concrete**	Water: Quality of water, impurities in mixing water and permissible limits for solids as per IS: 456 Concrete: Different grades of concrete, provisions of IS 456.
5th (12 Sept. –18 Sept.)	**Unit– II Concrete**	Duff Abraham water cement (w/c) ratio law, significance of w/c ratio, selection of w/c ratio for different grades, maximum w/c ratio for different grades of concrete for different exposure conditions as per IS 456.
6th (19 Sept. – 25 Sept.)	**Unit– II Concrete**	Properties of fresh concrete: Workability: Factors affecting workability of concrete. Determination of workability of concrete by slump cone, compaction factor, Vee-Bee Consistometer. Value of workability requirement for different types of concrete works. Segregation, bleeding, and preventive measures. Properties of Hardened concrete: Strength, Durability, Impermeability.
Class Test – 1		**In Fourth Week of September 2023.**

7th (26 Sept. – 03 Sept.)	**Unit– III Concrete Mix Design and Testing of Concrete**	Concrete mix design: Objectives, methods of mix design, study of mix design as per IS 10262 (only procedural steps). Testing of concrete, determination of compressive strength of concrete cubes at different ages, interpretation, and co-relation of test results.
8th (04 Oct. – 910 Oct.)	**Unit– III Concrete Mix Design and Testing of Concrete**	Non- destructive testing of concrete: Rebound hammer test, working principle of rebound hammer and factors affecting the rebound index, Ultrasonic pulse velocity test as per IS 13311 (part 1 and 2), Importance of NDT tests
9th (11 Oct. – 18 Oct.)	**Unit– IV Quality Control of Concrete**	Concreting Operations: Batching, Mixing, Transportation, Placing, Compaction, Curing and Finishing of concrete.
10th (19 Oct. – 26 Oct.)	**Unit– IV Quality Control of Concrete**	Forms for concreting: Different types of form works for beams, slabs, columns, materials used for formwork, requirement of good form work. Stripping time for removal of form works per IS 456.
Class Test – 2		**In Fourth Week of October 2023.**
11th (27 Oct. – 03 Nov.)	**Unit– IV Quality Control of Concrete**	Waterproofing: Importance and need of waterproofing, methods of waterproofing and materials used for waterproofing. Joints in concrete construction: Types of joints, methods for joining old and new concrete, materials used for filling joints.
12th (04 Nov. – 10 Nov.)	**Unit– V Chemical Admixture, Special Concrete and Extreme Weather concreting**	Admixtures in concrete: Purpose, properties and application for different types of admixtures such as accelerating admixtures, retarding admixtures, water reducing admixtures, air entraining admixtures and super plasticizers.
House Test		**In Second Week of November 2023.**
13th (13Nov. – 18Nov.)	**Unit– V Chemical Admixture, Special Concrete and Extreme Weather concreting**	Special Concrete: Properties, advantages and limitation of following types of Special concrete: Ready mix Concrete, Fibre Reinforced Concrete, High performance Concrete Self-compacting concrete and light weight concrete
14th (20 Nov. – 25 Nov.)	**Unit– V Chemical Admixture, Special Concrete and Extreme Weather concreting**	Cold weather concreting: effect of cold weather on concrete, precautions to be taken while concreting in cold weather condition. Hot weather concreting: effect of hot weather on concrete, precautions to be taken while concreting in hot weather condition
15th (28 Nov.- 04 Dec.)	**Revision and Doubt Clearance**	Revision and Doubt Clearance Session.

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Department of Civil Engineering

Lesson Plan

Name of Faculty	Er. Abhishek Patial
Discipline	Civil Engineering
Semester	3rd
Subject	Geotechnical Engineering (L-4Hrs./Week)
Lesson Plan Duration	August – December 2023

Week	Topic	Theory
1st (10 Aug. – 18 Aug.)	**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, Definition of a rock: Classification based on their genesis (mode of origin), formation, Classification, and engineering uses of igneous, sedimentary, and metamorphic rocks.
2nd (19 Aug. – 25 Aug.)	**Unit – I Overview of Geology and Geotechnical Engineering**	Importance of soil as construction material in Civil engineering structures and as foundation bed for structures. Field application of geotechnical engineering for foundation design, pavement design, design of earth retaining structures, design of earthen dam.
3rd (26 Aug. – 01 Sept.)	**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, void ratio, porosity and degree of saturation, density index. Unit weight of soil mass – bulk unit weight, dry unit weight, unit weight of solids, saturated unit weight, submerged unit weight. Determination of bulk unit weight and dry unit weight by core cutter and sand replacement method.
4th (02 Sept. – 11 Sept.)	**Unit– II Physical and Index Properties of Soil**	Consistency of soil, Atterberg limits of consistency: Liquid limit, plastic limit and shrinkage limit. Plasticity index.
5th (12 Sept. –18 Sept.)	**Unit– II Physical and Index Properties of Soil**	Particle size distribution test and plotting of curve, Determination of effective diameter of soil, well graded and uniformly graded soils, BIS classification of soil.
6th (19 Sept. – 25 Sept.)	**Unit– III Permeability and Shear Strength of Soil**	Definition of permeability, Darcy's law of permeability, coefficient of permeability, factors affecting permeability, determination of coefficient of permeability by constant head and falling head tests, simple problems to determine coefficient of permeability. Seepage through earthen structures, seepage velocity, seepage pressure, phreatic line, flow lines, application of flow net, (No numerical problems).
Class Test – 1		**In Fourth Week of September 2023.**

7th (26 Sept. – 03 Oct.)	**Unit– III Permeability and Shear Strength of Soil**	Definition of permeability, Darcy's law of permeability, coefficient of permeability, factors affecting permeability, determination of coefficient of permeability by constant head and falling head tests, simple problems to determine coefficient of permeability. Seepage through earthen structures, seepage velocity, seepage pressure, phreatic line, flow lines, application of flow net, (No numerical problems).
8th (04 Oct. – 10 Oct.)	**Unit– III Permeability and Shear Strength of Soil**	Shear failure of soil, 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 and vane shear test – laboratory methods.
9th (11 Oct. – 18 Oct.)	**Unit– III Permeability and Shear Strength of Soil**	Shear failure of soil, 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 and vane shear test – laboratory methods.
10th (19 Oct. – 26 Oct.)	**Unit– IV Bearing Capacity of Soil**	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.
Class Test – 2		**In Fourth Week of October 2023.**
11th (27 Oct. – 03 Nov.)	**Unit– IV Bearing Capacity of Soil**	Field methods for determination of bearing capacity – Plate load and Standard Penetration Test. Test procedures as per IS:1888 & IS:2131.
12th (04 Nov. – 10 Nov.)	**Unit– IV Bearing Capacity of Soil**	Definition of earth pressure, Active and Passive earth pressure for no surcharge condition, coefficient of earth pressure.
House Test		**In Second Week of November 2023.**
13th (13 Nov. – 18 Nov.)	**Unit– V Compaction and stabilization of soil**	Concept of compaction, Standard and Modified proctor test as per IS code, Plotting of Compaction curve for determining: Optimum moisture content (OMC), maximum dry density (MDD), Zero air voids line. Factors affecting compaction, field methods of compaction – rolling, ramming and vibration. Suitability of various compaction equipment - smooth wheel roller, sheep foot roller, pneumatic tyre roller, Rammer and Vibrator, Difference between compaction and consolidation.
14th (20 Nov. – 25 Nov.)	**Unit– V Compaction and stabilization of soil**	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 pits and bores. Field identification of soil – dry strength test, dilatancy test and toughness test.
15th (28 Nov.- 04 Dec.)	**Unit– V Compaction and stabilization of soil Revision and Doubt Clearance**	Necessity of site investigation and soil exploration: Types of exploration, criteria for deciding the location and number of test pits and bores. Field identification of soil – dry strength test, dilatancy test and toughness test. Revision and doubt clearance Session.

NOTE: Lesson Plan is Tentative, subject to availability of Time, Students & Faculty.

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