

**Govt. Polytechnic Rajpur Sadhuara**  
**Civil Engg. Department**

<b>Name of the Faculty</b>	<b>ABHISHEK KUMAR MISHRA</b>
<b>Discipline</b>	<b>Civil Engineering</b>
<b>Semester</b>	<b>6<sup>th</sup> Semester</b>
<b>Subject</b>	<b>Steel Structure Design and Drawing</b>
<b>Lesson Plan Duration</b>	<b>16 Weeks (15.01.26 to 30.04.26)</b>

**Details**

<b>Week</b>	<b>Theory Day</b>	<b>Topic</b>	<b>Practical Day</b>	<b>Practical Name</b>
1 <sup>st</sup>	1 <sup>st</sup>	Properties of structural steel as per IS Code	1 <sup>st</sup>	Drawing of Fink roof truss with details of joints,
	2 <sup>nd</sup>	Designation of structural steel sections as per IS handbook and IS:800	2 <sup>nd</sup>	fixing details of purlins and roof sheets
	3 <sup>rd</sup>	-do-	3 <sup>rd</sup>	Revision
	4 <sup>th</sup>	Riveted Connection: types of rivet		
2 <sup>nd</sup>	1 <sup>st</sup>	Permissible stresses in rivets, types of riveted joints,	1 <sup>st</sup>	Drawing of slicing of steel columns
	2 <sup>nd</sup>	Specification as per IS800,	2 <sup>nd</sup>	Drawings of slab base , gusseted base and grillage
	3 <sup>rd</sup>	Failure of riveted joint, strength and efficiency of riveted joint	3 <sup>rd</sup>	Base for single section steel column
	4 <sup>th</sup>	Design of Riveted Connection only axially loaded member (No staggered riveting)		
3 <sup>rd</sup>	1 <sup>st</sup>	Numerical Problems on design of riveted connection.	1 <sup>st</sup>	Column beam connection : a) sealed and framed beam to beam connection
	2 <sup>nd</sup>	Bolt Connection: Types of bolt, permissible stresses in bolt,	2 <sup>nd</sup>	Revision
	3 <sup>rd</sup>	types of bolted joints	3 <sup>rd</sup>	Revision
	4 <sup>th</sup>	Specifications for bolted joints as per IS 800.		
4 <sup>th</sup>	1 <sup>st</sup>	Failure of a bolted joint. Assumptions in the theory of bolted joints.	1 <sup>st</sup>	Column beam connection : a) sealed and framed beam to beam connection

	2 <sup>nd</sup>	Strength and efficiency of a bolted joint.	2 <sup>nd</sup>	Revision
	3 <sup>rd</sup>	Design of bolted joints for axially loaded members (No Staggered bolts).	3 <sup>rd</sup>	Revision
	4 <sup>th</sup>	Numerical Problems on design of bolted connection.		
5 <sup>th</sup>	1 <sup>st</sup>	Welded Connection: Types of welds and welded joints,	1 <sup>st</sup>	Column beam connection : b) sealed and framed beam to column connection
	2 <sup>nd</sup>	advantages and disadvantages of welded joints	2 <sup>nd</sup>	Revision
	3 <sup>rd</sup>	Design of fillet and butt weld for axially loaded members	3 <sup>rd</sup>	Revision
	4 <sup>th</sup>	Numerical Problems on design of fillet and butt weld		
6 <sup>th</sup>	1 <sup>st</sup>	-do-	1 <sup>st</sup>	Revision of Roof Truss Drawing
	2 <sup>nd</sup>	Tension Members: Analysis and design of single section tension members and their rivetted and welded connections with gusset plate as per IS:800-2007	2 <sup>nd</sup>	Revision of Roof Truss Drawing
	3 <sup>rd</sup>	-do-	3 <sup>rd</sup>	Revision of Roof Truss Drawing
	4 <sup>th</sup>	Numerical Problems on design of single section tension member		
7 <sup>th</sup>	1 <sup>st</sup>	Numerical Problems on design of single section tension member	1 <sup>st</sup>	Revision of splicing of steel column Drawing
	2 <sup>nd</sup>	Numerical Problems on design of single section tension member	2 <sup>nd</sup>	Revision of splicing of steel column Drawing
	3 <sup>rd</sup>	Analysis and design of double section tension members and their rivetted and welded connections with gusset plate as per IS:800-2007	3 <sup>rd</sup>	Revision of splicing of steel column Drawing
	4 <sup>th</sup>	-do-		
8 <sup>th</sup>	1 <sup>st</sup>	Numerical Problems on design of double section tension member	1 <sup>st</sup>	Revision of base, gusseted base and grillage base

	2 <sup>nd</sup>	Numerical Problems on design of double section tension member	2 <sup>nd</sup>	Revision of base, gusseted base and grillage base
	3 <sup>rd</sup>	Numerical Problems on design of double section tension member	3 <sup>rd</sup>	Revision of base, gusseted base and grillage base
	4 <sup>th</sup>	Analysis and design of single and double angle sections compression members subjected to axial load		
9 <sup>th</sup>	1 <sup>st</sup>	-do-	1 <sup>st</sup>	Revision of column beam connection
	2 <sup>nd</sup>	Numerical Problems on design of single section compression member	2 <sup>nd</sup>	Revision of column beam connection
	3 <sup>rd</sup>	Numerical Problems on design of single section compression member	3 <sup>rd</sup>	Revision of column beam connection
	4 <sup>th</sup>	Numerical Problems on design of double section compression member		
10 <sup>th</sup>	1 <sup>st</sup>	Numerical Problems on design of double section compression member	1 <sup>st</sup>	Revision of sealed and framed beam to column connection
	2 <sup>nd</sup>	Roof Trusses: Form of trusses, pitch of roof truss,	2 <sup>nd</sup>	Revision of sealed and framed beam to column connection
	3 <sup>rd</sup>	spacing of trusses, spacing of purlins	3 <sup>rd</sup>	Revision of sealed and framed beam to column connection
	4 <sup>th</sup>	Connection between purlin and roof covering		
11 <sup>th</sup>	1 <sup>st</sup>	Connection between purlin and principal rafter (no design, only concept)	1 <sup>st</sup>	Plan and elevation of plate girder with details of supports and connection of stiffness
	2 <sup>nd</sup>	Column Bases: Types of column bases i.e. slab base	2 <sup>nd</sup>	flange angles and cover plates with web highlighting
	3 <sup>rd</sup>	Types of column bases i.e. gusseted base	3 <sup>rd</sup>	curtailment of plates
	4 <sup>th</sup>	Concept of buckling, effective Length, slenderness ratio,		
12 <sup>th</sup>	1 <sup>st</sup>	Analysis and Design of axially loaded single section column	1 <sup>st</sup>	Revision of Plate Girder Drawing
	2 <sup>nd</sup>	Numerical problem on axially loaded single section column	2 <sup>nd</sup>	Revision of Plate Girder Drawing
	3 <sup>rd</sup>	Numerical problem on axially loaded single section column	3 <sup>rd</sup>	Revision of Plate Girder Drawing

	4 <sup>th</sup>	Numerical problem on axially loaded single section column		
13 <sup>th</sup>	1 <sup>st</sup>	Analysis and design of single section simply supported laterally restrained steel beams.	1 <sup>st</sup>	Revision of Plate Girder Drawing
	2 <sup>nd</sup>	-do-	2 <sup>nd</sup>	Revision of Plate Girder Drawing
	3 <sup>rd</sup>	Numerical problem on single section simply supported laterally restrained beams	3 <sup>rd</sup>	Revision of Plate Girder Drawing
	4 <sup>th</sup>	-do-		
14 <sup>th</sup>	1 <sup>st</sup>	-do-	1 <sup>st</sup>	Draw a sheet using CAD software
	2 <sup>nd</sup>	Introduction to plate girder and functions of various elements of a plate girder	2 <sup>nd</sup>	Revision of CAD Drawing
	3 <sup>rd</sup>	-do-	3 <sup>rd</sup>	Revision of CAD Drawing
	4 <sup>th</sup>	Fabrication and erection of steel structures like trusses, columns and girders		
15 <sup>th</sup>	1 <sup>st</sup>	-do-	1 <sup>st</sup>	Revision of CAD Drawing
	2 <sup>nd</sup>	Revision	2 <sup>nd</sup>	Revision of all completed drawings
	3 <sup>rd</sup>	Revision	3 <sup>rd</sup>	Revision of all completed drawings
	4 <sup>th</sup>	Revision		
16 <sup>th</sup>	1 <sup>st</sup>	Revision	1 <sup>st</sup>	Revision of all completed drawings
	2 <sup>nd</sup>	Revision	2 <sup>nd</sup>	Revision of all completed drawings
	3 <sup>rd</sup>	Revision	3 <sup>rd</sup>	Revision of all completed drawings
	4 <sup>th</sup>	Revision		

**Name of the Faculty :** Rajat Thapliyal  
**Discipline :** Civil Engineering  
**Semester :** 6<sup>th</sup>  
**Subject :** Earthquake Resistant Building  
**Construction**

**Lesson Plan Duration :** 15 Weeks (from Jan. 2026 to April-2026)

Week	Theory	
	Lecture Day	Topic (including assignment / test)
1 <sup>st</sup>	1	<b>Introduction to the Subject and its necessity</b>
	2	<b>1. Elements of Engineering Seismology :</b> General features of tectonic of seismic regions.
	3	Causes of earthquakes, Seismic waves,
2 <sup>nd</sup>	1	Earthquake size (magnitude and intensity),
	2	Epicentre, Seismograph,
	3	Classification of earthquakes,
3 <sup>rd</sup>	1	Seismic zoning map of India,
	2	Static and Dynamic Loading, Fundamental period.
	3	<b>2. Seismic Behaviour of Traditionally-Built Constructions of India :</b> Performance of building during earthquakes
4 <sup>th</sup>	1	Mode of failure: Out-of-plane failure, in-plane failure,
	2	Mode of failure: Diaphragm failure, Connection failure,
	3	Mode of failure: Non-structural components failure
5 <sup>th</sup>	1	<b>Revision/Assignment-I</b>
	2	<b>Sessional Test -I</b>
	3	<b>3. Special construction method :</b> Special construction methods
6 <sup>th</sup>	1	Special construction methods
	2	Tips and Precautions to be observed while planning,
	3	Designing and Construction of earthquake resistant building.
7 <sup>th</sup>	1	Designing and Construction of earthquake resistant building.

	2	Designing and Construction of earthquake resistant building.
	3	<b>4. Introduction to various Seismic IS codes :</b> IS: 4326, IS: 13828,
8 <sup>th</sup>	1	IS: 1893(Part 1),
	2	IS: 154326 and
	3	IS: 13920 (latest edition)
9 <sup>th</sup>	1	<b>Revision/Assignment-II</b>
	2	<b>5. Seismic Provision of Strengthening and Retrofitting :</b> Seismic Provision of Strengthening and Retrofitting
	3	Seismic Provision of Strengthening and Retrofitting
10 <sup>th</sup>	1	Measures for Traditionally-Built Constructions,
	2	Brick and RCC Structures
	3	Brick and RCC Structures
11 <sup>th</sup>	1	Revision/Quarries
	2	<b>Sessional Test -II</b>
	3	<b>6. Provision of reinforcement detailing in masonry and RC constructions :</b>

12 <sup>th</sup>	1	Provision of reinforcement detailing in masonry constructions
	2	Provision of reinforcement detailing in RC constructions
	3	Provision of reinforcement detailing in RC constructions
13 <sup>th</sup>	1	Provision of reinforcement detailing in RC constructions
	2	<b>7. Disaster Management :</b> Disaster rescue, Psychology of rescue,
	3	Rescue workers, Rescue plan,
14 <sup>th</sup>	1	Rescue by steps,
	2	Rescue equipment,
	3	Safety in rescue operations,
15 <sup>th</sup>	1	Debris clearance
	2	Casualty management
	3	<b>Sessional Test -III</b>

	18	<b>4. Site Organization:</b> 4.1 Principle of storing and stacking materials at site
	19	4.2 Location of equipment
	20	4.3 Preparation of actual job layout for a building Practice of job lay-out
6 <sup>th</sup>	21	4.4 Organizing labour at site
	22	<b>Revision/Assignment-I</b>
	23	<b>Sessional Test -I</b>
	24	<b>5. Construction Labour:</b> 5.1 Conditions of construction workers in India, Wages paid to workers
7 <sup>th</sup>	25	5.2 Important provisions of the following Acts: - Labour Welfare Fund Act 1936 (as amended)
	26	- Payment of Wages Act 1936 (as amended)
	27	- Minimum Wages Act 1948 (as amended)
	28	<b>Revision/Quarries</b> <b>6. Control of Progress:</b> 6.1 Methods of recording progress
8 <sup>th</sup>	29	6.2 Analysis of progress 6.3 Taking corrective actions keeping head office informed
	30	6.4 Cost time optimization for simple jobs - Direct and indirect cost,
	31	variation with time, cost optimization
	32	Practice of Cost Optimization <b>7. Inspection and Quality Control:</b> 7.1 Need for inspection and quality control
9 <sup>th</sup>	33	7.2 Principles of inspection
	34	7.3 Stages of inspection and quality control for - Earth work
	35	- Masonry
	36	- RCC
	37	- Sanitary and water supply services <b>Revision</b>
10 <sup>th</sup>	38	<b>8. Accidents and Safety in Construction:</b> 8.1 Accidents – causes and remedies
	39	8.2 Safety measures for - Excavation work
	40	- Drilling and blasting - Hot bituminous works
11 <sup>th</sup>	41	- Scaffolding, ladders, form work - Demolitions
	42	8.3 Safety campaign and safety devices
	43	<b>Revision/Assignment-II, Sessional Test -II</b>

	44	<b>9. Public Work Accounts:</b> Introduction, technical sanction, administrative approval, allotment of funds, re-appropriation of funds bill,
12th	45	Contractor ledger, measurement book,
	46	Preparation of bill of quantities (BOQ),

	47	Practice: Preparation of bill of quantities (BOQ),
	48	Running and final account bills complete, Practice: MB/running bill/final bill
13th	49	Completion certificate & report,
	50	<b>Revision</b>
	51	Hand receipt, acquittance roll. Muster Roll labour,
	52 53	Casual labour roll-duties and responsibility of different cadres, Budget-stores, returns, account of stock, misc. P.W. advances, T & P – verification, survey report
14th	54	Road metal material charged direct to works,
	55	Account - expenditure & revenue head, remittance and deposit head,
	56 57	Definition of cash, precaution in custody of cash book, Imprest account, temporary advance, treasury challan, Preparation of final bills.
15th	58	Preparation of accounts register, stock register.
	59	Practice of preparation of: Bills/Accounts Register/Stock Register
	60	<b>Assignment-III</b>

<b>LESSON PLAN</b>		
<b>Name of the faculty- Mrs. Neetu Deswal</b>		
<b>Semester-6th</b>		
<b>Subject-Repair Maintenance of building</b>		
<b>Lesson Plan- 16 Week (from Jan. 2026 to April 2026)</b>		
<b>Work load- 3 lectures per week(in hours)</b>		
<b>Week</b>	<b>Theory</b>	
	<b>Lecture Day</b>	<b>Topic</b>
1	1.	1.1 Importance and significance of repair and maintenance of buildings
	2	Meaning of maintenance
	3	Objectives of maintenance
2.	4.	Factors influencing the repair and maintenance
	5.	Classification of Maintenance Work
	6	Discuss Special Maintenance
3.	7.	2. Definition of deterioration/decay
	8.	Factors causing deterioration, their classification, Human factors causing deterioration
	9	Chemical factors causing deterioration
4.	10.	Environmental conditions causing deterioration
	11.	Miscellaneous factors
	12	Effects of various agencies of deterioration on various building materials i.e. bricks, timber, concrete, paints, metals, plastics, stones
5.	13.	3. Introduction Investigation and Diagnosis of Defects
	14.	Systematic approach/procedure of investigation
	15	Sequence of detailed steps for diagnosis of building defects/problems
6.	16.	Equipment for Investigation of Defects
	17.	Visual Examination for Identification of problems.
	18	List non-destructive and other tests on structural elements and materials to evaluate the condition of the building and study of three most commonly used List non-destructive and others tests on structural elements and materials to evaluate the condition of the building and study of three most commonly used .
7.	19	4. Defined defects in buildings
	20.	Classification of defects
	21	Main Cause of Defects in Building
	22.	Main Defects and Various Elements components of Buildings
	23.	Foundations, basements and DPC, Walls, Column and Beams, Roof and Terraces

8	24	Joinery,Decorativeandprotectivefinishes,Services,Defectscasuedby dampness
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9.	25.	5. Compatibilityaspectsofrepair materials
	26.	TypesofRepairMaterials
	27.	AdvantageofCuringCompunds
10.	28.	Repair Concrete
	29.	Waterproofingmaterialsfor Roofs
	30.	Selection ofMaterialsforRepairs
11.	31.	6.Preventivemaintenanceconsiderations
	32.	Surfacepreparationtechniquesforrepair
	33.	Crackrepairmethods ,Epoxyinjection,Groovingand sealing, Stitching
12.	34.	Addingreinforcement andgrouting,Flexiblesealingbysealant
	35.	Repairofsurfacedefectsofconcrete,Bugholes Forntieholes,Honeycombandlargerveids
	36.	Repairof corrosion inRCCelements ,Steps in repairing
13.	37.	Preventionofcorrosioninreinforcement
	38.	Material placement techniqueswithsketches,Pneumaticallyapplied(The gunite techniques) , Open top placement , Pouring from the top to repair bottom face , Birds mouth
	39.	Opentopplacement ,Pouringfrom thetop torepairbottom face, Birds mouth
14.	40.	Drypacking,Formandpump,Preplaced–aggregateconcrete,Trowel applied method
	41.	RepairofDPCagainstRisingDampness,Physicalmethods,Electrical methods , Chemical methods
	42.	Repairofwalls,Repairofmortarjointsagainstleakage,Efflorescence removal
15.	43.	Waterproofingofwetareasandroofs,Waterproofingofwetareas
	44.	Waterproofingof flatRCC roofs
	45.	Variouswaterproofingsystemsandtheir characteristics

16	46	Types of sealing joints with different types of sealants
	47	Techniques for repair of joints
	48	Repair of overhead and underground water tanks

## LESSON PLAN

**Name Of Faculty** Mrs Neetu Deswal  
**Discipline** Civil Engineering  
**Semester** 4th  
**Subject** Water supply and Waste Water Engineering  
**Lesson Plan Duration** 15 Week ( from Jan 2026 to April 2026)  
**Work Load: Lectures-2**

WEEK	THEORY	
	LECTURE DAY	TOPIC
1	1	Necessity and brief description of water supply system, Sources of water – surface/sub-surface sources of water
		Quantity of Water
	2	Water requirement :-Rate of demand and variation in rate of demand
		Per capita consumption for domestic, industrial, public and fire fighting uses as per BIS standards (no numerical problems)
2	1	Population Forecasting
		Meaning of pure water and methods of analysis of water
	2	Physical, Chemical and bacteriological tests and their significance
		Standard of potable water as per Indian Standard, Maintenance of purity of water
		Water Treatment:- Sedimentation - purpose, types of sedimentation tanks

3	1	Coagulation/floculation - usual coagulation and their feeding, Filtration - significance, types of filters, their suitability
	2	Necessity of disinfection of water, forms of chlorination, break point chlorine, residual chlorine, application of chlorine
		Flow diagram of different treatment units, functions of (i) Aeration fountain (ii) mixer (iii) flocculator, (iv) classifier, (v) slow and rapid sand filters (vi) chlorination chamber.
4	1	Revision of covered syllabus Class test and assignment
	2	Conveyance of Water:- Different types of pipes - cast iron, PVC, steel, asbestos cement, concrete and lead pipes. suitability and uses,
		Sessional test 1 <sup>st</sup>
5	1	Problem discussion for
	2	
6	1	types of joints in different
		Appurtenances: Sluice, air, reflux valves, relief valves, scour valves
	2	bib cocks, stop cocks, fire hydrants, water meters their working and uses Laying of Pipes:-Setting out alignment of pipes, Excavation for laying of pipes and precautions to be taken

7	1	Handling, lowering and jointing of pipes, Testing of pipe lines, Back filling
		Building Water Supply :- Connections to water main (practical aspect only)
	2	Water supply fittings (with sketches) and terminology related to plumbing
		<b>Waste water engg.</b> ..Introduction:-Purpose of sanitation, Necessity of systematic collection and disposal of waste
8	1	Definition of terms in sanitary engineering, Collection and conveyance of sewage, Conservancy and water carriage systems, their advantages and Disadvantages
		Surface drains (only sketches) : various types, suitability, Types of sewage: Domestic, industrial, storm water and its seasonal variation
	2	Class test and assignment
		Sewerage System:-Types of sewerage systems, materials for sewers, their sizes and joints
9	1	Appurtenance: Location, function and construction
		catch basin, inverted siphon, flushing tanks grease and oil traps, storm regulators, ventilating shafts

	2	Revision of covered syllabus
		Doubt clear from students
10	1	Sessional test 2 <sup>nd</sup>
	2	
11	1	Laying and Construction of Sewers:-Setting out/alignment of sewers
		Excavations, checking the gradient with boning rods preparation of bedding, handling and jointing testing and back filling of sewers/pipes
	2	Construction of surface drains and different sections required
		Sewage Characteristics:- Properties of sewage and IS standards for analysis of sewage
12	1	Physical, chemical and bacteriological parameters
		Natural Methods of Sewerage Disposal:- General composition of sewage and disposal methods, Disposal by dilution
	2	Self purification of stream, Disposal by land treatment, Nuisance due to disposal
		Sewage Treatment:- Meaning and principle of primary treatment
		secondary treatment and activated sludge process their flow diagrams

13	1	Introduction and uses of screens, grit chambers, detritus tanks, skimming tanks, plain sedimentation tank.
	2	primary clarifiers, secondary clarifiers, filters, control beds, intermittent sand filters
		trickling filters, sludge treatment and disposal, oxidation ponds (Visit to a sewage treatment plant)
14	1	Building Drainage:- Aims of building drainage and its requirements
		Different sanitary fittings and installations, Traps
	2	Revision of covered syllabus
		Any doubt from students and copy check
15	1	Sessional 3 <sup>rd</sup>
	2	Problem discussion for Sessional test

LESSON PLAN				
NAME OF Faculty - Mr. Rajat Thapliyal				
Subject Name - Soil Mechanics & Foundation Engineering				
SEMESTER - 4TH (CIVIL ENGG.)				
Work Load: lectures -03 , Practical-02. Per week ( in hours)				
Lecture Day	Theory	Topic (including assignment / test)	Practical	Topic
			Day	
	1.	1. Introduction: Importance of soil studies in Civil Engineering, Scope of Soil Mechanics in Civil Engg.	1.	1. To determine THE MOISTURE CONTENT OF GIVEN SOIL SAMPLE
	2.	1.2 Geological origin of soils, soil profiles in India: residual and transported soil, alluvial deposits, lake deposits, local soil found in J&K, dunes and loess, glacial which above deposits are formed.		
	3.	1.3 Names of organizations dealing with soil engineering work in India, soil map of India, classification of Soil as per major deposits in India		
	1.	2.2 Definitions of void ratio, porosity, water content, degree of saturation, specific gravity, unit weight, bulk density/bulk unit weight, dry unit weight,	2	2. Auger Boring and Standard Penetration Test a) Identifying the equipment and accessories b) Conducting boring and SPT at a given location c) Collecting soil samples and their identification d) Preparation of boring log and SPT graphs e) Interpretation of test results
	2.	2.3 Simple numerical problems on phase diagrams		
	3.	3.3 Relative density and its use in describing cohesionless soils 3.4 Behaviour of cohesive soils with Dhanje in water content, Atterberg's limit - definitions, use and practical significance	3	3. Extraction of Disturbed and Undisturbed Samples a) Extracting a block sample b) Extracting a tube sample c) Extracting a disturbed sample for mechanical analysis. d) Field identification of samples
	2.	3.5 Field identification tests for soils 3.6 Soil classification system as per BIS 1498; basis, symbols, major divisions and sub divisions, groups, plasticity chart;		
	3.	4. Flow of Water Through Soils: (04 hrs) 4.1 Concept of permeability and its importance 4.2 Darcy's law, coefficient of permeability, seepage velocity and factors affecting permeability		
	1.	4.4 Measurement of permeability in the laboratory	4	4. Field Density Measurement (Sand Replacement and Core Cutter Method) a) Calibration of sand b) Conducting field density test at a given location c) Determination of water content d) Computation and interpretation of results
	2.	5. Effective Stress: (Concept only) 5.1 Stresses in subsoil 5.2 Definition and meaning of total stress, effective stress and neutral stress and their interrelationships.		
	3.	5.3 Principle of effective stress.		
		REVISION	5	5. Liquid Limit Determination: a) Identifying various grooving tools b) Preparation of sample c) Conducting the test d) Observing soil behaviour during tests c) Computation, plotting and interpretation of results
		FIRST SESSIONAL		
	3.	6. Deformation of Soils 6.1 Meaning, conditions/situations of occurrence with emphasis on practical significance of: a) Consolidation and settlement b) Creep c) Plastic flow		
		6.2 Definition and practical significance of compression index, coefficient of consolidation, degree of consolidation. 6.3 Meaning of total settlement, uniform settlement and differential settlement; rate of settlement and their effects	6	Plastic Limit Determination:
		6.4 Settlement due to construction operations and lowering of water table 6.5 Tolerable settlement for different structures as per BIS		
	3.	7. Shear Strength Characteristics of Soils:		
		SHEAR STRENGTH CONCEPT	7	Plastic Limit Determination:
		7.2 Factors contributing to shear strength of cohesive and cohesion less soils, Coulomb's law and application in soil mechanics.		
	3.	7.3 Examples of shear failure in soils		
	1.	Examples of shear failure in soils	8	6. Mechanical Analysis a) Preparation of sample b) Conducting sieve analysis
	2.	8. Compaction:		
	3.	8.2 Laboratory compaction test (standard and modified proctor test as per BIS) definition and importance of optimum water content, maximum dry density, moisture dry density		
	1.	9. Soil Exploration: 9.1 Purpose and necessity of soil exploration	9	7. Laboratory Compaction Tests (Standard Proctor Test) a) Preparation of sample b) Conducting the test c) Observing soil behaviour during test
	2.	necessity of soil exploration		
	3.	9.2 Reconnaissance, methods of soil exploration, Trial pits, borings (auger, wash, rotary, percussion to be briefly dealt)		
	1.	9.3 Sampling: undisturbed, disturbed and representative samples; selection of type of sample; thin wall and piston samples; area ratio,	10	d) Computation of results and plotting c) Determination of optimum moisture content and maximum dry density
	2.	recovery ratio of samples and their significance, number and quantity of samples, resetting,		
	3.	Sealing and preservation of samples, 9.4 Presentation of soil investigation results		
	1.	SECOND SESSIONAL	11	8. Demonstration of Unconfined Compression Test a) Specimen preparation b) Conducting the test
	2.	10 Bearing Capacity of soil 10.1 Concept of bearing capacity		
	3.	10.2 Definition and significance of ultimate bearing capacity, net safe bearing capacity and allowable bearing pressure		
	1.	10.4 Factors affecting bearing capacity	12	c) Plotting the graph d) Interpretation of results and finding/bearing capacity

	2.	10.5 Concept of vertical stress distribution in soils due to foundation loads, pressure bulb		
	3.	10.6 Applications of SPT, unconfined compression test and direct shear test in estimation of bearing capacity		
13.	1.	10.8 Improvement of bearing capacity by sand drain method, compaction, use of geo-synthetics.	13	9. Demonstration of: a) Direct Shear and Vane Shear Test on sandy soil samples
	2.	11. Foundation Engineering: Concept of shallow and deep foundation;		
	3.	types of shallow foundations:		
14.	1.	Factors affecting the depth of shallow foundations, deep foundations, type of piles and their suitability;	14	b) Permeability test apparatus
	2.	Pile classification on the basis of material, pile group and pile cap.		
	3.	REVISION		
15.	1.	PREPARATION FOR FINAL EXAM	15	REVISION
	2.	DO		
	3.	REVISION		

## Govt. Polytechnic Rajpur Sadhaura

### LESSON PLAN

Name of the Faculty		ABHISHEK KUMAR MISHRA		
Discipline		Civil Engineering		
Semester		4th		
Subject		Surveying-II		
Lesson Plan Duration		16 Week ( from 15.02.2026 to 30.04.2026)		
WEEK	THEORY		PRACTICAL	
	LECTURE DAY	TOPIC	PRACTICAL	TOPIC
1	1	Electronic Digital Theodolite and Tachometric surveying 1.1 Concept/Difference of Transit Theodolite and Electronic Digital Theodolite	1	I. Digital Theodolite: i) Study of a transit vernier theodolite; temporary adjustments of theodolite
	2	Temporary adjustments of an Electronic Digital Theodolite, Concept of transiting, swinging, face left, face right and changing face.	2	Revision
2	3	Prolonging a line (forward and backward)	3	ii) Reading the Vernier and working out the least count, measurement of horizontal angles by repetition and reiteration methods
	4	Traversing by included angles and deflection angle method	4	Revision
3	5	Plotting a traverse; concept of coordinate and solution of omitted measurements (one side affected)	5	iii) Measurement of vertical angles and use of tachometric tables iv) Measurement of magnetic bearing of a line
	6	Errors in theodolite survey and precautions taken to minimize them : Height of objects with and without accessible bases	6	vi) Running a closed traverse with a theodolite (at least five sides) and its plotting
4	7	Concept, general principles of stadia tachometry and methods of tachometry and (with numerical problems) 1.9 Instruments to be used in tachometry	7	v) Height of objects with and without accessible bases
	8	Revision	8	Revision
5	9	Curves: (Horizontal, Vertical and Transition Curve) Definition and types of horizontal curve Elements of simple circular curve - Degree of the curve, radius of the curve, tangent length, point of intersection	9	Revision
	10	(Apex point) tangent point, length of curve, long chord deflection angle, Apex distance and Mid-ordinate. (With numerical problems)	10	Revision
6	11	Transition Curve: 2.2.1 Definition of transition curve 2.2.2 Requirements of transition curve	11	Revision
	12	Length of transition curve for roads; by cubic parabola 2.2.4 Need (centrifugal force and super elevation). 2.2.5 Calculation of offsets for a transition curve	12	Curves i) Setting out of a simple circular curve with given data by the following methods
7	13	Definition and types of vertical curve; Types of vertical curves Setting out of a vertical curve	13	b) One theodolite method
	14	Revision	14	Setting out of simple circular curve by tangential angles using a Digital Theodolite.
8	15	Introduction of Advanced Surveying Equipment and Techniques.3.1 Principle of EDM, its component parts and their functions 3.2 Uses of EDM 3.3 Distomat	15	Setting out of a transition curve by tangential offsets using a Digital Theodolite.
	16	3.4 Remote sensing system 3.5 Application of remote sensing system in civil engineering, land uses/land cover, mapping, and disaster management	16	Revision
		3.6 GPS, DGPS and GIS applications and software used		Revision

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9	17	(introduction only) 3.7 Planimeter (Digital)	17	Revision
	18	Introduction of Drones Survey	18	Revision
10	19	Revision	19	Revision
	20	Revision	20	Revision
11	21	Total Station (TS) 4.1 Concept and uses of TS 4.2 Uses of function keys, various parts of TS	21	Total Station i) Temporary adjustments of a TS
	22	4.3 Accessories used in TS survey 4.4 Applications of TS in various engineering area.	22	ii) Measurement of distance, horizontal angle and vertical angle.
12	23	4.5 Temporary adjustments of TS 4.6 Measurement of horizontal angle, vertical angle distance and coordinates using Total station, Traversing, profile survey and contouring with TS	23	iii) To plot an area with the help of Total Station
	24	Errors in TS 4.8 Layout of any building, school, college, factory etc. with total station showing topographic map also	24	iv) Layout of any building, school, college, factory etc. with total station showing topographic map also
13	25	Revision	25	DGPS (Differential Global Positioning System) i) Computation of earth work and reservoir capacity with DGPS ii) Layout of drain, canal, road with DGPS.
	26	Revision	26	iii) Demarcation of roads, plots, commercial spaces and agricultural land etc. with DGPS
14	27	DGPS (Differential Global Positioning System) 5.1 Concept of DGPS, various parts, applications and software used for DGPS 5.2 Comparison between DGPS and TS	27	iv) Periodic field visits to Survey of India and other government agencies.
	28	5.3 Temporary adjustments of a DGPS 5.4 How does DGPS work	28	Revision
15	29	5.5 Errors in DGPS 5.6 Periodic field visits to Survey of India and other government agencies. 5.7 Layout of drain, canal, road with DGPS.	29	Revision
	30	5.8 Demarcation of roads, plots, commercial spaces and agricultural land etc. with DGPS	30	Revision
16	31	Revision	31	Revision
	32	Revision	32	Revision

<b>LESSON PLAN</b>		
<b>Name of the Faculty</b>	<b>Mr. Animesh Tiwari</b>	
<b>Discipline</b>	<b>Civil Engineering</b>	
<b>Semester</b>	<b>4th</b>	
<b>Subject</b>	<b>Irrigation Engineering</b>	
<b>Lesson Plan Duration</b>	<b>16 Week ( from Jan. 2026 to April 2026)</b>	
<b>Work Load (Lectures/Practical) per week (in hours) : Lectures -02</b>		
		<b>THEORY</b>
<b>WEEK</b>	<b>Lecture Day</b>	<b>TOPIC</b>
<b>1st</b>	<b>1</b>	Introduction: Irrigation Engineering, Hydrological Cycle, Run-off and Catchment Area Definition and necessity of irrigation 1.2 Major, medium and minor irrigation projects
	<b>2</b>	1.3 Hydrology and hydrological cycle 1.4 Rain-gauges – automatic and non-automatic (Symons rain gauge) 1.5 Methods of estimating average rainfall (Arithmetic system)
<b>2nd</b>	<b>3</b>	1.6 Runoff and Factors affecting runoff, Catchment area 1.7 Hydrograph and basic concept of unit hydrograph
	<b>4</b>	2. Water Requirement of Crops 2.1 Principal crops in India and their water requirements 2.2 Crop seasons – Kharif and Rabi
<b>3rd</b>	<b>5</b>	Crop period, base period, Duty, Delta and their relationship. 2.4 Gross commanded area (GCA), culturable commanded area (CCA), Intensity of Irrigation, Irrigable area
	<b>6</b>	Revision
<b>4th</b>	<b>7</b>	Methods of Irrigation 3.1 Flow irrigation – Definition and its types (only description) 3.2 Lift Irrigation – Tube well, Types of tube wells (only description)
	<b>8</b>	Explanation of terms: water table, radius of influence, depression head, cone of depression, confined and unconfined aquifers, advantages and disadvantages of tube well irrigation.
<b>5th</b>	<b>9</b>	Sprinkler irrigation- Conditions favourable, Types and component parts, advantages and disadvantages of sprinkler irrigation.
	<b>10</b>	Drip irrigation- layout, component parts, advantages and disadvantages of drip irrigation.
<b>6th</b>	<b>11</b>	Canals, Canal Head Works, Regulatory Works and Cross Drainage Works 4.1 Definition and Classification of canal. (Visit to a Canal)
	<b>12</b>	Appurtenances of a canal and their functions. 4.3 Various types of canal lining - their related advantages and disadvantages,
<b>7th</b>	<b>13</b>	Revision
	<b>14</b>	Canal breaches and their control. 4.5 Maintenance of lined and unlined canals
<b>8th</b>	<b>15</b>	Definition, objectives and general layout of different parts of head works. 4.7 Difference between weir and barrage
	<b>16</b>	Definition and necessity of Cross Drainage Works (Visit to a Cross Drainage Works)
<b>9th</b>	<b>17</b>	Concept of Aqueduct, super passage, level crossing, inlet and outlet.
	<b>18</b>	Revision
<b>10th</b>	<b>19</b>	Dams and hydraulic Structures 5.1 Dam and its Classification
	<b>20</b>	Earth dams - types, causes of failure; cross-section of zoned earth dam, method of construction

<b>11th</b>	<b>21</b>	Gravity dams – types, cross-sections of a dam, method of construction
	<b>22</b>	Concept of spillways and energy dissipators
<b>12th</b>	<b>23</b>	Revision
	<b>24</b>	River Training Works 6.1 Definition, function of river training works.
<b>13th</b>	<b>25</b>	Types of river training- Embankments or levees
	<b>26</b>	Concept of Guide bank, Groynes or spurs, Pitched island, Cut-off
<b>14th</b>	<b>27</b>	Water Logging and Drainage and Ground Water Re-charge 7.1 Definition of water logging – its causes and effects.
	<b>28</b>	Revision
<b>15th</b>	<b>29</b>	Detection, prevention and remedies
	<b>30</b>	Surface and sub-surface drains and their layout (only description)
<b>16th</b>	<b>31</b>	Water Harvesting Techniques: Need and requirement. Various methods of rain water harvesting.
	<b>32</b>	Revision
		<b>Teacher Signature</b>