

Name of the Faculty : Ms. Chhavi Goyal  
 Discipline : Civil Engineering  
 Semester : 4th  
 Subject : Irrigation Engineering  
 Lesson Plan Duration : 17 weeks (from Feb, 2024 to June, 2024)  
 Work Load: Lectures-02

Week	Theory	
	Lecture Day	Topic including assignment/Test
1st	1	<b>Unit:- 1 Introduction:</b> Definition and Necessity of irrigation; Major, medium and minor irrigation projects
	2	Hydrology & Hydrological Cycle; Rain- gauges- automatic and non-automatic (Symons rain gauge)
2nd	3	Methods of estimating average rainfall (Arithmetic system); Catchment area runoff, factors affecting runoff
	4	Hydrograph, basic concept of unit hydrograph.
3rd	5	<b>Unit:- 2 Water Requirement of Crops:</b> Principal crops in India and their water requirements; Crop seasons – Kharif and Rabi
	6	Crop period, base period, Duty, Delta and their relationship.
4th	7	Gross commanded area (GCA), culturable commanded area (CCA), intensity of irrigation, irrigable area;
	8	Numericals
5th	9	Revision and sessional test-1
	10	Revision and sessional test-1
6th	11	<b>Methods of Irrigation:-</b> Flow irrigation – Definition and its types (only description), Lift Irrigation – Tube well, Types of tube wells (only description)
	12	Explanation of terms: water table, radius of influence, depression head, cone of depression, confined and unconfined aquifers, advantages and disadvantages of tube well irrigation.
7th	13	Sprinkler irrigation- Conditions favourable, Types and component parts, advantages and disadvantages of sprinkler irrigation; Drip irrigation- layout, component parts, advantages and disadvantages of drip irrigation.
	14	<b>Unit III Canals, Canal Head Works, Regulatory Works and Cross Drainage Works:</b> Definition and Classification of canal. (Visit to a Canal), Apurtenances of a canal and their functions
8th	15	Various types of canal lining - their related advantages and disadvantages
	16	Canal Breaches and their control; Maintenance of lined and unlined canals
9th	17	Definition, objectives and general layout of different parts of head works; Difference between weir and barrage

	18	Definition and necessity of Cross Drainage Works (Visit to a Cross Drainage Works); Concept of Aqueduct, super passage, level crossing, inlet and outlet.
10th	19	Revision and sessional test-II
	20	Revision and sessional test-II
11th	21	<b>Unit IV Dams and hydraulic Structures:-</b> Dam and its Classification
	22	Earthen dams- types, causes of failure; Cross section of zoned earthen dams, method of construction
12th	23	Gravity dams – types, cross-sections of a dam; method of construction
	24	Concept of spillways and energy dissipators
13th	25	Concept of Canal Falls, Outlets and Escapes.
	26	<b>Unit V River Training Works:-</b> Definition, function of river training works; Types of river training- Embankments or levees.
14th	27	Concept of Guide bank, Groynes or spurs, Pitched island, Cut-off ; <b>Water Logging and Drainage and Ground Water Re-charge:-</b> Definition of water logging – its causes and effects; Detection, prevention and remedies
	28	Surface and sub-surface drains and their layout (only description); Water Harvesting Techniques: Need and requirement; Various methods of rain water harvesting.
15th	29	Revision and sessional test-III
	30	Revision and sessional test-III
16th	31	Revision & Doubts
	32	Revision & Doubts
17th	33	Revision & Doubts
	34	Revision & Doubts

# Lesson Plan

**Name of the Faculty :** Chhavi Goyal  
**Discipline :** Civil Engineering  
**Semester :** 4th  
**Subject :** Soil and foundation Engineering  
**Lesson Plan Duration :** 17 weeks (from Feb, 2024 to june,2024)  
**Work Load:** Lectures-03/ Practical - 02

Week	Theory		Practical
	Lecture Day	Topic including assignment/Test	Name of experiment
1st	1	<b>Introduction:</b> Importance of Soil Studies in Civil Engineering; Geological origin of soils with special reference to soil profiles in India:	To determine the moisture content of a given sample of soil.
	2	Residual and transported soil, alluvial deposits, lake deposits, local soil found in Punjab, dunes and loess, glacial deposits	
	3	Black cotton soils, conditions in which above deposits are formed and their engineering characteristics. Names of organizations dealing with soil engineering work in India, soil map of India	
2nd	4	<b>Physical Properties of Soils:</b> Constituents of soil and representation by a phase diagram; Definitions of void ratio, porosity, degree of saturation,	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
	5	water content, specific gravity, unit weight, bulk density/bulk unit weight, dry unit weight, saturated unit weight and submerged unit weight.	
	6	<b>Classification and Identification of Soils:</b> Particle size, shape and their effect on engineering properties of soil.	
3rd	7	Particle size classification of soils Gradation and its influence on engineering	<b>Repeat</b>

		properties	
	8	Relative density and its use in describing cohesionless soils	
	9	Behaviour of cohesive soils with change in water content, Atterberg's limit - definitions, use and practical significance	
4th	10	Field identification tests for soils	Extraction of Disturbed and Undisturbed Samples
	11	Revision And Assignment	a) Extracting a block sample b) Extracting a tube sample c) Extracting a disturbed samples for mechanical analysis. d) Field identification of samples
	12	Revision And Assignment	
5th	13	Sessional test -I	
	14	Sessional test -I	
	15	Sessional test -I	
6th	16	<b>Flow of Water Through Soils:</b> Concept of permeability and its importance; Darcy's law, coefficient of permeability, seepage velocity	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
	17	factors affecting permeability; Comparison of permeability of different soils as per BIS	
	18	Measurement of permeability in the laboratory	
7th	19	<b>Effective Stress: (Concept only)</b> Stresses in subsoil; Definition and meaning of total stress, effective stress and neutral stress.	Liquid Limit and Plastic Limit Determination:
	20	Principle of effective stress; Importance of effective stress in engineering problems	a) Identifying various grooving tools b) Preparation of sample c) Conducting the test d) Observing soil behaviour during tests e) Computation, plotting and interpretation of results
	21	<b>Deformation of Soils:</b> Meaning, conditions/situations of occurrence with emphasis on practical significance of: a) Consolidation and settlement b) Creep c) Plastic flow d) Heaving e) Lateral movement f) Freeze and thaw of soil	

8th	22	Meaning of total settlement, uniform settlement and differential settlement; rate of settlement and their effects	
	23	Settlement due to construction operations and lowering of water table. Tolerable settlement for different structures as per BIS	
	24	<b>Shear Strength of Soil:</b> Concept and Significance of shear strength; Factors contributing to shear strength of cohesive and cohesion less soils, Coulomb's law	
9th	25	<b>Compaction:</b> Definition and necessity of compaction; Laboratory compaction test (standard and modified proctor test as per IS)	Mechanical Analysis a) Preparation of sample b) Conducting sieve analysis c) Computation of results d) Plotting the grain size distribution curve e) Interpretation of the curve
	26	definition and importance of optimum water content, maximum dry density; moisture dry density relationship for typical soils with different compactive efforts	
	27	Compaction control; Density control, measurement of field density by core cutter method and sand replacement method; moisture control, Proctor's needle and its use, thickness control, jobs of an embankment supervisor in relation to compaction	
10th	28	Sessional test -II	
	29	Sessional test -II	
	30	Sessional test -II	
11th	31	<b>Soil Exploration:</b> Purpose and necessity of soil exploration; Reconnaissance, methods of soil exploration, Trial pits	Laboratory Compaction Tests (Standard Proctor test) a) Preparation of sample b) Conducting the test c) Observing soil behaviour during test d) Computation of results and plotting e) Determination of optimum moisture and maximum dry density
	32	Auger borings; Wash and rotary borings; Percussion boring;	
	33	Sampling; undisturbed, disturbed and representative samples; Selection of type of sample; thin wall and piston samples; area ratio, recovery ratio of samples and their significance	
12th	34	Number and quantity of samples, resetting, sealing and preservation of samples. Presentation of soil investigation results	Direct Shear Test
	35	<b>Bearing Capacity of soil:</b> Concept of bearing capacity	

	36	Definition and significance of ultimate bearing capacity, net safe bearing capacity and allowable bearing pressure	
13 nth	37	Factors affecting bearing capacity;	Permeability Test
	38	Improvement of bearing capacity by sand drain method, compaction, use of geo-synthetics.	
	39	<b>Foundation Engineering:</b> Concept of shallow and deep foundation	
14 nth	40	Types of shallow foundations: combined, isolated, strip, mat, and their suitability.	Demonstration of Unconfined Compression Test  a) Specimen preparation b) Conducting the test c) Plotting the graph d) Interpretation of results and finding/bearing capacity
	41	Factors affecting the depth of shallow foundations, deep foundations	
	42	Type of piles and their suitability; pile classification on the basis of material; pile group and pile cap.	
15 nth	43	Sessional test -III	Demonstration of Vane shear Test
	44	Sessional test -III	
	45	Sessional test -III	
16 nth	46	Revision & Doubts	
	47	Revision & Doubts	
	48	Revision & Doubts	
17 nth	49	Revision & Doubts	
	50	Revision & Doubts	
	51	Revision & Doubts	

## Lesson Plan of Surveying-II

Name of Faculty : Mr.Satish Kumar Jha (Theory & Practical)

Discipline : Civil Engineering

Semester : Fourth

Lesson Plan Duration: 15 Weeks (from 15/02/2024 to June 2024)

Work Load (Lecture/Practical) per week (in hours): Lecture-02, Practical-06

Week	Theory		Practical	
	Lecture Day	Topic (including assignment/test)	Practical Day	Topic
1 <sup>st</sup>	1 <sup>st</sup>	Concept/Difference of Transit Theodolite and Electronic Digital Theodolite	1 <sup>st</sup>	Study of a transit vernier theodolite; temporary adjustments of theodolite
	2 <sup>nd</sup>	Temporary adjustments of an Electronic Digital Theodolite, Concept of transiting, swinging, face left, face right and changing face.	2 <sup>nd</sup>	Reading the Vernier and working out the least count, measurement of horizontal angles by repetition and reiteration methods
2 <sup>nd</sup>	1 <sup>st</sup>	Prolonging a line (forward and backward)	1 <sup>st</sup>	Measurement of vertical angles and use of tachometric tables
	2 <sup>nd</sup>	Traversing by included angles and deflection angle method.	2 <sup>nd</sup>	Measurement of magnetic bearing of a line
3 <sup>rd</sup>	1 <sup>st</sup>	Plotting a traverse; concept of coordinate and solution of omitted measurements (one side affected)	1 <sup>st</sup>	Running a closed traverse with a theodolite (at least five sides) and its plotting
	2 <sup>nd</sup>	Errors in theodolite survey and precautions taken to minimize them	2 <sup>nd</sup>	Height of objects with and without accessible bases
4 <sup>th</sup>	1 <sup>st</sup>	Height of objects with and without accessible bases	1 <sup>st</sup>	Setting out of a simple circular curve with given data by the following methods
	2 <sup>nd</sup>	Concept, general principles of stadia tachometry and methods of tachometry and (with numerical problems)	2 <sup>nd</sup>	Offsets from the chords produced by Digital Theodolite
5 <sup>th</sup>	1 <sup>st</sup>	Instruments to be used in tachometry	1 <sup>st</sup>	One theodolite method
	2 <sup>nd</sup>	Definition and types of horizontal curve	2 <sup>nd</sup>	Setting out of simple circular curve by tangential angles using a Digital Theodolite. count
6 <sup>th</sup>	1 <sup>st</sup>	Elements of simple circular curve -	1 <sup>st</sup>	Setting out of a transition

		Degree of the curve, radius of the curve, tangent length, point of intersection (Apex point), tangent point, length of curve, long chord deflection angle, Apex distance and Mid- ordinate. (With numerical problems)		curve by tangential offsets using a Digital Theodolite
	2 <sup>nd</sup>	Definition of transition curve Requirements of transition curve	2 <sup>nd</sup>	Temporary adjustments of a Total station Measurement of distance, horizontal angle and vertical angle.
7 <sup>th</sup>	1 <sup>st</sup>	Length of transition curve for roads; by cubic parabola	1 <sup>st</sup>	To plot an area with the help of Total Station Layout of any building, school, college, factory etc. with total station
	2 <sup>nd</sup>	Need (centrifugal force and super elevation).	2 <sup>nd</sup>	Computation of earth work and reservoir capacity with DGPS
8 <sup>th</sup>	1 <sup>st</sup>	Calculation of offsets for a transition curve	1 <sup>st</sup>	Layout of drain, canal, road with DGPS.
	2 <sup>nd</sup>	Definition and types of vertical curve	2 <sup>nd</sup>	Demarcation of roads, plots, commercial spaces and agricultural land etc. with DGPS
9 <sup>th</sup>	1 <sup>st</sup>	Types of vertical curves	1 <sup>st</sup>	Periodic field visits to Survey of India and other government agencies.
	2 <sup>nd</sup>	Setting out of a vertical curve	2 <sup>nd</sup>	Periodic field visits to Survey of India and other government agencies.
10 <sup>th</sup>	1 <sup>st</sup>	Principle of EDM, its component parts and their functions	1 <sup>st</sup>	Study of a transit vernier theodolite; temporary adjustments of theodolite
	2 <sup>nd</sup>	Uses of EDM	2 <sup>nd</sup>	Reading the Vernier and working out the least count, measurement of horizontal angles by repetition and reiteration methods
11 <sup>th</sup>	1 <sup>st</sup>	Distomat Remote sensing system	1 <sup>st</sup>	Measurement of vertical angles and use of tachometric tables
	2 <sup>nd</sup>	Application of remote sensing system in civil engineering, land uses/land cover, mapping, and disaster management	2 <sup>nd</sup>	Measurement of magnetic bearing of a line
12 <sup>th</sup>	1 <sup>st</sup>	GPS, DGPS and GIS applications and	1 <sup>st</sup>	Running a closed traverse



		software used (introduction only)		with a theodolite (at least five sides) and its plotting
	2 <sup>nd</sup>	Planimeter (Digital) Introduction of Drones Survey	2 <sup>nd</sup>	Height of objects with and without accessible bases
13 <sup>th</sup>	1 <sup>st</sup>	Concept and uses of TS Uses of function keys, various parts of TS Accessories used in TS survey	1 <sup>st</sup>	Setting out of a simple circular curve with given data by the following methods
	2 <sup>nd</sup>	Applications of TS in various engineering area. Temporary adjustments of TS	2 <sup>nd</sup>	Offsets from the chords produced by Digital Theodolite
14 <sup>th</sup>	1 <sup>st</sup>	Measurement of horizontal angle, vertical angle distance and coordinates using Total station, Traversing, profile survey and contouring with TS Errors in TS Layout of any building, school, college, factory etc. with total station showing topographic map also	1 <sup>st</sup>	One theodolite method
	2 <sup>nd</sup>	Concept of DGPS, various parts, applications and software used for DGPS	2 <sup>nd</sup>	Setting out of simple circular curve by tangential angles using a Digital Theodolite. count
15 <sup>th</sup>	1 <sup>st</sup>	Comparison between DGPS and TS Temporary adjustments of a DGPS	1 <sup>st</sup>	Preparation of Drawing and reports
	2 <sup>nd</sup>	How does DGPS work Errors in DGPS	2 <sup>nd</sup>	Preparation of Drawing and reports

# Lesson Plan

**Name of the Faculty:** Vijinder Singh  
**Discipline:** Civil Engineering  
**Semester:** 6th  
**Subject:** WS&WWE  
**Lesson Plan Duration:** 15 weeks (from Feb, 2024 to June 2024)  
**Work Load:** Lectures-02

Week	Theory	
	Lecture Day	Topic including assignment/Test
1 <sup>st</sup>	1	Necessity and brief description of planned water supply system. Sources of water – surface/sub-surface sources (only description)
	2	Rate of demand and variation in rate of demand Water requirement, Per capita demand, Factors affecting per capita demand
2 <sup>nd</sup>	3	Population forecasting methods (with Numerical Problems)
	4	Physical, Chemical and bacteriological tests and their significance Design Period, Factors governing the design period, Design period values for different components of a water supply scheme
3 <sup>rd</sup>	4	Standard of potable water as per Indian Standard, water meter
	5	Sedimentation - Purpose, Types of sedimentation tanks Coagulation / Flocculation - usual coagulation and their feeding
4 <sup>th</sup>	6	Filtration - Slow and Rapid sand filters, their significance and suitability
	7	Necessity of disinfection of water, forms of chlorination, break point chlorine, residual chlorine, application of chlorine
5 <sup>th</sup>	8	Miscellaneous Treatments – Aeration, Aqua guard, Reverse Osmosis System
	9	Requirement of a good water distribution system Layout of distribution networks
6 <sup>th</sup>	10	Methods of distribution Distribution reservoirs – their functions and types

	11	Storage capacity of distribution reservoirs Stand Pipes
7 <sup>th</sup>	12	Sanitation – Purpose and necessity of sanitation Components of sewerage system - Manhole
	13	Types of sewage and types of sewerage system Properties of sewage and IS standards for analysis of sewage
8 <sup>th</sup>	14	Physical, chemical and bacteriological parameters of sewage Sewage disposal methods - Disposal by dilution and land treatment
	15	Self-purification of stream, Nuisance due to disposal
9 <sup>th</sup>	16	Primary and secondary treatment
	17	Screens, Grit chambers, Skimming tanks
10 <sup>th</sup>	18	Plain sedimentation tanks
	19	Filtration,
11 <sup>th</sup>	20	Sludge treatment and disposal
	21	<b>Revision</b>
12 <sup>th</sup>	22	Oxidation Ponds (Visit to a sewage treatment plant)
	23	3 <sup>rd</sup> sessional test
13 <sup>th</sup>	24	Trickling filter
	25	Revision
14 <sup>th</sup>	26	Revision

	27	
15 <sup>th</sup>	28	
	29	