

GOVERNMENT POLYTECHNIC JAIPUR

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DEPARTMENT OF CIVIL ENGINEERING

LESSON PLAN

Discipline: Civil Engg	Semester: 5Th	Name of the Teaching faculty: Ajit kumar behera
Subject: Water Supply & Waste Water Engineering Th-4	No of Days/Week class allotted: 5 days	Semester from Date: 01.08.2023 To Date: 30.11.2023 No of weeks: 15
Week	Class Day	Topics
1st	1st	Introduction to Water Supply, Quantity and Quality of water Necessity of treated water supply
	2nd	Per capita demand, variation in demand and factors affecting demand
	3rd	Methods of forecasting population
	4th	Numerical problems using different methods
	5th	Impurities in water – organic and inorganic, Harmful effects of impurities
2nd	1st	Analysis of water –physical, chemical and bacteriological
	2nd	Analysis of water –physical, chemical and bacteriological
	3rd	Analysis of water –physical
	4th	Analysis of water –physical
	5th	Water quality standards for different uses
3rd	1st	Sources and Conveyance of water Surface sources – Lake, stream, river and impounded reservoir
	2nd	Underground sources – aquifer type & occurrence – Infiltration gallery, infiltration well, springs, well
	3rd	Yield from well- method s of determination, Numerical problems using yield formulae (deduction excluded)
	4th	Yield from well- method s of determination, Numerical problems using yield formulae (deduction excluded)
	5th	Intakes – types, description of river intake, reservoir intake, canal intake
4th	1st	Pumps for conveyance & distribution – types, selection, installation.
	2nd	Pipe materials – necessity, suitability, merits & demerits of each type
	3rd	Pipe joints – necessity, types of joints, suitability, methods of jointing Laying of pipes – method
	4th	Treatment of water <i>Note:</i> <i>Design of treatment units excluded.</i>
	5th	<i>Students may be asked to prepare detailed sketches of units, preferably from working drawing, as home assignment</i> <i>Field visit to treatment plant, under practical should be arranged after covering this unit.</i>
5th	1st	Flow diagram of conventional water treatment system
	2nd	Treatment process / units : Aeration ; Necessity

	3rd	Plain Sedimentation : Necessity, working principles, Sedimentation
	4th	Sedimentation with coagulation: Necessity, principles of coagulation, types of coagulants, Flash Mixer, Flocculator, Clarifier (Definition and concept only)
	5th	Filtration : Necessity, principles, types of filters Slow Sand Filter, Rapid Sand Filter and Pressure Filter – essential features
6th	1st	Filtration : Necessity, principles, types of filters Slow Sand Filter, Rapid Sand Filter and Pressure Filter – essential features
	2nd	Filtration : Necessity, principles, types of filters Slow Sand Filter, Rapid Sand Filter and Pressure Filter – essential features
	3rd	Disinfection : Necessity, methods of disinfection Chlorination – free and combined chlorine demand, available chlorine
	4th	residual chlorine, pre-chlorination, break point chlorination, super-chlorination
	5th	Softening of water – Necessity, Methods of softening – Lime soda process and Ion exchange method
7th	1st	Distribution system And Appurtenance in distribution system: General requirements, types of distribution system-gravity, direct and combined
	2nd	General requirements, types of distribution system-gravity, direct and combined
	3 rd	Methods of supply – intermittent and continuous
	4 th	Distribution system layout – types, comparison, suitability
	5th	Valves-types, features, uses, purpose-slucie valves, check valves, air valves, scour valves, Fire hydrants, Water meters
8th	1st	Valves-types, features, uses, purpose-slucie valves, check valves, air valves, scour valves, Fire hydrants, Water meters
	2nd	Valves-types, features, uses, purpose-slucie valves, check valves, air valves, scour valves, Fire hydrants, Water meters
	3rd	Valves-types, features, uses, purpose-slucie valves, check valves, air valves, scour valves, Fire hydrants, Water meters
	4th	W/s plumbing in building : Method of connection from water mains to building supply
	5th	WASTE WATER ENGINEERING Introduction Aims and objectives of sanitary engineering
9th	1st	Definition of terms related to sanitary engineering
	2nd	Systems of collection of wastes– Conservancy and Water Carriage System – features, comparison, suitability
	3rd	Systems of collection of wastes– Conservancy and Water Carriage System – features, comparison, suitability
	4th	Systems of collection of wastes– Conservancy and Water Carriage System – features, comparison, suitability
	5th	Quantity and Quality of sewage Quantity of sanitary sewage – domestic & industrial sewage, variation in sewage flow
10th	1st	numerical problem on computation quantity of sanitary sewage.
	2nd	Computation of size of sewer, application of Chazy's formula, Limiting velocities of flow : self-cleaning and scouring

	3rd	General importance, strength of sewage, Characteristics of sewage-physical, chemical & biological
	4th	General importance, strength of sewage, Characteristics of sewage-physical, chemical & biological
		Concept of sewage-sampling, tests for – solids, pH, dissolved oxygen, BOD, COD
11th	1st	Concept of sewage-sampling, tests for – solids, pH, dissolved oxygen, BOD, COD
	2nd	Sewerage system Types of system-separate, combined, partially separate , features, comparison between the types, suitability
	3rd	Types of system-separate, combined, partially separate , features, comparison between the types, suitability
	4th	Shapes of sewer – rectangular, circular, avoid-features, suitability
	5th	Laying of sewer-setting out sewer alignment
12th	1st	Laying of sewer-setting out sewer alignment
	2nd	Sewer appurtenances and Sewage Disposal: Manholes and Lamp holes – types, features, location, function
	3rd	Inlets, Grease & oil trap – features, location, function
	4th	Storm regulator, inverted siphon – features, location, function
	5th	Disposal on land – sewage farming, sewage application and dosing, sewage sickness-causes and remedies
13th	1st	Disposal on land – sewage farming, sewage application and dosing, sewage sickness-causes and remedies
	2nd	Disposal by dilution – standards for disposal in different types of water bodies, self purification of stream
	3rd	Disposal by dilution – standards for disposal in different types of water bodies, self purification of stream
	4th	Sewage treatment : <i>(Note: 1.Design of treatment units excluded. 2.Students may be asked to prepare detailed sketches of units</i>
	5th	Principles of treatment, flow diagram of conventional treatment
14th	1st	Principles of treatment, flow diagram of conventional treatment
	2nd	Primary treatment – necessity, principles, essential features, functions
	3rd	Primary treatment – necessity, principles, essential features, functions
	4th	Primary treatment – necessity, principles, essential features, functions
	5th	Secondary treatment – necessity, principles, essential features, functions
15th	1st	Secondary treatment – necessity, principles, essential features, functions
	2nd	Sanitary plumbing for building : Requirements of building drainage, layout of lavatory blocks in residential buildings, layout of building drainage
	3rd	Plumbing arrangement of single storied & multi storied building as per I.S. code practice
	4th	Sanitary fixtures – features, function, and maintenance and fixing of the fixtures – water closets, flushing cisterns, urinals, inspection chambers, traps, anti-syphonage pipe
	5th	Sanitary fixtures – features, function, and maintenance and fixing of the fixtures – water closets, flushing cisterns, urinals, inspection chambers, traps, anti-syphonage pipe

LearningResources:

Sl No.	Author Name	Name of the Book
1	G.S.Birdie	Text book on water supply and sanitary engineering
2	S.K.Garg	Water Supply Engineering
3	S.K.Garg	Waste Water Disposal Engg

Ajit kumar behera
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