



NILASAILA INSTITUTE OF SCIENCE & TECHNOLOGY  
SERGARH-756060, BALASORE (ODISHA)  
(Approved by AICTE& affiliated to SCTE&VT, Odisha)



## **LESSON PLAN**

**SUBJECT : Th-4 (WATER SUPPLY AND WASTE WATER ENGINEERING)**

### **CHAPTER WISE DISTRIBUTION OF PERIODS**

Sl.No.	Name of the chapter as per the Syllabus	No. of Periods as per the Syllabus	No. of periods actually needed
	PART :A (WATER SUPPLY)		
1	Introduction to Water Supply, Quantity and Quality of water	10	11
2	Sources and Conveyance of water	8	8
3	Treatment of water	12	11
4	Distribution system and Appurtenance in distribution system	8	9
5	W/s plumbing in building	2	2
	PART :B (WASTE WATER ENGINEERING)		
6	Introduction	5	6
7	Quantity and Quality of sewage	7	7
8	Sewerage system	5	6
9	Sewer appurtenances and Sewage Disposal	7	7
10	Sewage treatment	8	8
11	Sanitary plumbing for building	3	4
	Total Period:	75	79

Discipline: CIVIL ENGINEERING	Semester: 5 <sup>th</sup>	Name of the Teaching Faculty: Er. Diptimayee Mohanty	
		SESSION : 2023-24	EXAMINATION : 2023 (W)
Week	Class Day	Topics to be Covered	
1 <sup>st</sup>	1 <sup>st</sup>	<b>Introduction to Water Supply, Quantity and Quality of water:</b> 1.1 Necessity of treated water supply	
	2 <sup>nd</sup>	1.2 Per capita demand, variation in demand and factors affecting demand	
	3 <sup>rd</sup>	1.2 Per capita demand, variation in demand and factors affecting demand	
	4 <sup>th</sup>	1.3 Methods of forecasting population, Numerical problems using different methods	
	5 <sup>th</sup>	1.3 Methods of forecasting population, Numerical problems using different methods	
2 <sup>nd</sup>	1 <sup>st</sup>	1.3 Methods of forecasting population, Numerical problems using different methods	
	2 <sup>nd</sup>	1.3 Methods of forecasting population, Numerical problems using different methods	
	3 <sup>rd</sup>	1.4 Impurities in water – organic and inorganic, Harmful effects of impurities	
	4 <sup>th</sup>	1.5 Analysis of water –physical, chemical and bacteriological	
	5 <sup>th</sup>	1.6 Water quality standards for different uses	
3 <sup>rd</sup>	1 <sup>st</sup>	1.6 Water quality standards for different uses	
	2 <sup>nd</sup>	<b>Sources and Conveyance of water:</b> 2.1 Surface sources – Lake, stream, river and impounded reservoir	
	3 <sup>rd</sup>	2.2 Underground sources – aquifer type & occurrence – Infiltration gallery, infiltration well, springs, well	
	4 <sup>th</sup>	2.2 Underground sources – aquifer type & occurrence – Infiltration gallery, infiltration well, springs, well	
	5 <sup>th</sup>	2.3 Yield from well- method s of determination, Numerical problems using yield formulae ( deduction excluded)	
4 <sup>th</sup>	1 <sup>st</sup>	2.4 Intakes – types, description of river intake, reservoir intake, canal intake	
	2 <sup>nd</sup>	2.5 Pumps for conveyance & distribution – types, selection, installation.	
	3 <sup>rd</sup>	2.6 Pipe materials – necessity, suitability, merits & demerits of each type	

4 <sup>th</sup>	4 <sup>th</sup>	2.7 Pipe joints – necessity, types of joints, suitability, methods of jointing Laying of pipes – method
	5 <sup>th</sup>	<b>Treatment of water:</b> 1. Design of treatment units excluded. 2. Students may be asked to prepare detailed sketches of units, preferably from working drawing, as home assignment 3. Field visit to treatment plant, under practical should be arranged after covering this unit. 3.1 Flow diagram of conventional water treatment system
5 <sup>th</sup>	1 <sup>st</sup>	3. Field visit to treatment plant, under practical should be arranged after covering this unit. 3.1 Flow diagram of conventional water treatment system
	2 <sup>nd</sup>	3.2 Treatment process / units : 3.2.1 Aeration ; Necessity
	3 <sup>rd</sup>	3.2 Treatment process / units : 3.2.1 Aeration ; Necessity
	4 <sup>th</sup>	3.2.2 Plain Sedimentation : Necessity, working principles, Sedimentation tanks – types, essential features, operation & maintenance
	5 <sup>th</sup>	3.2.2 Plain Sedimentation : Necessity, working principles, Sedimentation tanks – types, essential features, operation & maintenance
6 <sup>th</sup>	1 <sup>st</sup>	3.2.3 Sedimentation with coagulation: Necessity, principles of coagulation, types of coagulation ,Flash mixer,Flocculator,Clarifier (Defination and concept only)
	2 <sup>nd</sup>	3.2.4 Filtration : Necessity, principles, types of filters Slow Sand Filter, Rapid Sand Filter and Pressure Filter – essential features
	3 <sup>rd</sup>	Distribution system And Appurtenance in distribution system: 4.1 General requirements, types of distribution system-gravity, direct and combined
	4 <sup>th</sup>	3.2.6 Softening of water – Necessity, Methods of softening – Lime soda process and Ion exchange method (Concept Only)
	5 <sup>th</sup>	3.2.6 Softening of water – Necessity, Methods of softening – Lime soda process and Ion exchange method (Concept Only)
7 <sup>th</sup>	1 <sup>st</sup>	<b>Distribution system And Appurtenance in distribution system:</b> 4.1 General requirements, types of distribution system-gravity, direct and combined

7 <sup>th</sup>	2 <sup>nd</sup>	4.1 General requirements, types of distribution system-gravity, direct and combined
	3 <sup>rd</sup>	4.2 Methods of supply – intermittent and continuous
	4 <sup>th</sup>	4.2 Methods of supply – intermittent and continuous
	5 <sup>th</sup>	4.2 Methods of supply – intermittent and continuous
8 <sup>th</sup>	1 <sup>st</sup>	4.3 Distribution system layout – types, comparison, suitability
	2 <sup>nd</sup>	4.3 Distribution system layout – types, comparison, suitability
	3 <sup>rd</sup>	4.4 Valves-types, features, uses, purpose-slucice valves, check valves, air valves, scour valves, Fire hydrants, Water meters
	4 <sup>th</sup>	4.4 Valves-types, features, uses, purpose-slucice valves, check valves, air valves, scour valves, Fire hydrants, Water meters
	5 <sup>th</sup>	<b>W/s plumbing in building :</b> 5.1 Method of connection from water mains to building supply
9 <sup>th</sup>	1 <sup>st</sup>	5.2 General layout of plumbing arrangement for water supply in single storied and multi-storied building as per I.S. code.
	2 <sup>nd</sup>	Introduction 6.1 Aims and objectives of sanitary engineering
	3 <sup>rd</sup>	6.1 Aims and objectives of sanitary engineering
	4 <sup>th</sup>	6.2 Definition of terms related to sanitary engineering
	5 <sup>th</sup>	6.2 Definition of terms related to sanitary engineering
10 <sup>th</sup>	1 <sup>st</sup>	6.3 Systems of collection of wastes– Conservancy and Water Carriage System – features, comparison, suitability
	2 <sup>nd</sup>	6.3 Systems of collection of wastes– Conservancy and Water Carriage System – features, comparison, suitability
	3 <sup>rd</sup>	Quantity and Quality of sewage 7.1 Quantity of sanitary sewage – domestic & industrial sewage, variation in sewage flow, numerical problem on computation quantity of sanitary sewage
	4 <sup>th</sup>	7.2 Computation of size of sewer, application of Chazy's formula, Limiting velocities of flow : self-cleaning and scouring
	5 <sup>th</sup>	7.2 Computation of size of sewer, application of Chazy's formula, Limiting velocities of flow : self-cleaning and scouring
11 <sup>th</sup>	1 <sup>st</sup>	7.3 General importance, strength of sewage, Characteristics of sewage-physical, chemical & biological

11 <sup>th</sup>	2 <sup>nd</sup>	7.3 General importance, strength of sewage, Characteristics of sewage-physical, chemical & biological
	3 <sup>rd</sup>	7.4 Concept of sewage-sampling, tests for – solids, pH, dissolved oxygen, BOD, COD
	4 <sup>th</sup>	7.4 Concept of sewage-sampling, tests for – solids, pH, dissolved oxygen, BOD, COD
	5 <sup>th</sup>	<b>Sewerage system:</b> 8.1 Types of system-separate, combined, partially separate , features, comparison between the types, suitability
12 <sup>th</sup>	1 <sup>st</sup>	8.1 Types of system-separate, combined, partially separate , features, comparison between the types, suitability
	2 <sup>nd</sup>	8.2 Shapes of sewer – rectangular, circular, avoid-features, suitability
	3 <sup>rd</sup>	8.2 Shapes of sewer – rectangular, circular, avoid-features, suitability
	4 <sup>th</sup>	8.3 Laying of sewer-setting out sewer alignment
	5 <sup>th</sup>	8.3 Laying of sewer-setting out sewer alignment
13 <sup>th</sup>	1 <sup>st</sup>	REVISION
	2 <sup>nd</sup>	REVISION
	3 <sup>rd</sup>	<b>Sewer appurtenances and Sewage Disposal:</b> 9.1 Manholes and Lamp holes – types, features, location, function
	4 <sup>th</sup>	9.2 Inlets, Grease & oil trap – features, location, function
	5 <sup>th</sup>	9.2 Inlets, Grease & oil trap – features, location, function
14 <sup>th</sup>	1 <sup>st</sup>	9.3 Storm regulator, inverted siphon – features, location, function
	2 <sup>nd</sup>	9.3 Storm regulator, inverted siphon – features, location, function
	3 <sup>rd</sup>	9.4 Disposal on land – sewage farming, sewage application and dosing, sewage sickness-causes and remedies
	4 <sup>th</sup>	9.5 Disposal by dilution – standards for disposal in different types of water bodies, self purification of stream
	5 <sup>th</sup>	<b>Sewage treatment :</b> (Note: 1.Design of treatment units excluded. 2. Students may be asked to prepare detailed sketches of units, preferably from working drawing, as home assignment. 3. Field visit to treatment plant, under practical should be arranged after covering this unit.)

15 <sup>th</sup>	1 <sup>st</sup>	10.1 Principles of treatment, flow diagram of conventional treatment
	2 <sup>nd</sup>	10.1 Principles of treatment, flow diagram of conventional treatment
	3 <sup>rd</sup>	10.2 Primary treatment – necessity, principles, essential features, functions
	4 <sup>th</sup>	10.2 Primary treatment – necessity, principles, essential features, functions
	5 <sup>th</sup>	10.2 Primary treatment – necessity, principles, essential features, functions
16 <sup>th</sup>	1 <sup>st</sup>	10.3 Secondary treatment – necessity, principles, essential features, functions
	2 <sup>nd</sup>	10.3 Secondary treatment – necessity, principles, essential features, functions
	3 <sup>rd</sup>	<b>Sanitary plumbing for building :</b> 11.1 Requirements of building drainage, layout of lavatory blocks in residential buildings, layout of building drainage
	4 <sup>th</sup>	11.2 Plumbing arrangement of single storied & multi storied building as per I.S. code practice
	5 <sup>th</sup>	11.2 Plumbing arrangement of single storied & multi storied building as per I.S. code practice
17 <sup>th</sup>	1 <sup>st</sup>	11.3 Sanitary fixtures – features, function, and maintenance and fixing of the fixtures – water closets, flushing cisterns, urinals, inspection chambers, traps, anti-syphonage pipe
	2 <sup>nd</sup>	REVISION
	3 <sup>rd</sup>	REVISION
	4 <sup>th</sup>	REVISION
	5 <sup>th</sup>	REVISION

