



# **LESSON PLAN : TH.4-WATER SUPPLY & WASTE WATER ENGINEERING FOR THE SESSION 2024-25(WINTER-2024 ) BATCH-2022-25, GOVT. POLYTECHNIC,KANDHMAL,PHULABANI**

Discipline: civil engineering	Semester: 5TH	Name of the Teaching Faculty: SUBHASHREE DASH,GF In Civil Engg.
Subject: TH.4- WATER SUPPLY & WASTE WATER ENGINEERING	No. of days/ per week class allotted: 5	Semester From Date : 01/07/2024 to Date: 18/11/2024 No. of Weeks: 15
Week	Class Day	Theory/ Practical Topics
		<b>SECTION A: WATER SUPPLY</b>
		<b>1 Introduction to Water Supply, Quantity and Quality of water</b>
1ST	1	1.1 Necessity of treated water supply
	2	1.2 Per capita demand, variation in demand and factors affecting demand
	3	1.2 Per capita demand, variation in demand and factors affecting demand
	4	1.3 Methods of forecasting population, Numerical problems using different methods
	5	1.3 Methods of forecasting population, Numerical problems using different methods
2ND	1	1.4 Impurities in water – organic and inorganic, Harmful effects of impurities
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	3	1.5 Analysis of water –physical, chemical and bacteriological
	4	1.5 Analysis of water –physical, chemical and bacteriological
	5	1.6 Water quality standards for different uses
		<b>2 Sources and Conveyance of water</b>
3RD	1	2.1 Surface sources – Lake, stream, river and impounded reservoir
	2	2.2 Underground sources – aquifer type & occurrence – Infiltration gallery, infiltration well, springs, well
	3	2.3 Yield from well- method s of determination, Numerical problems using yield formulae ( deduction
	4	2.3 Yield from well- method s of determination, Numerical problems using yield formulae ( deduction
	5	2.4 Intakes – types, description of river intake, reservoir intake, canal intake
4TH	1	2.5 Pumps for conveyance & distribution – types, selection, installation.
	2	2.6 Pipe materials – necessity, suitability, merits & demerits of each type
	3	2.7 Pipe joints – necessity, types of joints, suitability, methods of jointing Laying of pipes – method
		<b>3 Treatment of water</b>
	4	3.1 Flow diagram of conventional water treatment system
	5	3.2 Treatment process / units :3.2.1 Aeration ; Necessity
5TH	1	3.2.2 Plain Sedimentation : Necessity, working principles, Sedimentation tanks – types, essential features, operation & maintenance
	2	3.2.2 Plain Sedimentation : Necessity, working principles, Sedimentation tanks – types, essential features, operation & maintenance
	3	3.2.3 Sedimentation with coagulation: Necessity, principles of coagulation, types of coagulants, Flash
	4	3.2.3 Sedimentation with coagulation: Necessity, principles of coagulation, types of coagulants, Flash
	5	3.2.4 Filtration : Necessity, principles, types of filters Slow Sand Filter, Rapid Sand Filter and Pressure
6TH	1	3.2.4 Filtration : Necessity, principles, types of filters Slow Sand Filter, Rapid Sand Filter and Pressure
	2	3.2.5 Disinfection : Necessity, methods of disinfection Chlorination – free and combined chlorine demand
	3	available chlorine, residual chlorine, pre-chlorination, break point chlorination, super-chlorination
	4	3.2.6 Softening of water – Necessity, Methods of softening – Lime soda process and Ion exchange
	5	3.2.6 Softening of water – Necessity, Methods of softening – Lime soda process and Ion exchange
		<b>4 Distribution system And Appurtenance in distribution system:</b>
7TH	1	4.1 General requirements, types of distribution system-gravity, direct and combined
	2	4.1 General requirements, types of distribution system-gravity, direct and combined
	3	4.2 Methods of supply – intermittent and continuous
	4	4.2 Methods of supply – intermittent and continuous
	5	4.3 Distribution system layout – types, comparison, suitability
8TH	1	4.3 Distribution system layout – types, comparison, suitability
	2	4.4 Valves-types, features, uses, purpose-sluice valves, check valves, air valves, scour valves, Fire
	3	4.4 Valves-types, features, uses, purpose-sluice valves, check valves, air valves, scour valves, Fire
		<b>5 W/s plumbing in building :</b>
	4	5.1 Method of connection from water mains to building supply
	5	5.2 General layout of plumbing arrangement for water supply in single storied and multi-storied building
		<b>SECTION B: WASTE WATER ENGINEERING</b>
		<b>6 Introduction</b>

9TH	1	6.1 Aims and objectives of sanitary engineering
	2	6.2 Definition of terms related to sanitary engineering
	3	6.2 Definition of terms related to sanitary engineering
	4	6.3 Systems of collection of wastes- Conservancy and Water Carriage System - features, comparison, suitability
	5	6.3 Systems of collection of wastes- Conservancy and Water Carriage System - features, comparison, suitability
10TH		7 Quantity and Quality of sewage
	1	7.1 Quantity of sanitary sewage - domestic & Industrial sewage, variation in sewage flow, numerical problem on computation quantity of sanitary sewage.
	2	7.1 Quantity of sanitary sewage - domestic & Industrial sewage, variation in sewage flow, numerical problem on computation quantity of sanitary sewage.
	3	7.2 Computation of size of sewer, application of Chazy's formula, Limiting velocities of flow : self-cleaning and scouring
	4	7.2 Computation of size of sewer, application of Chazy's formula, Limiting velocities of flow : self-cleaning and scouring
11TH	5	7.3 General importance, strength of sewage, Characteristics of sewage-physical, chemical & biological
	1	7.4 Concept of sewage-sampling, tests for - solids, pH, dissolved oxygen, BOD, COD
	2	7.4 Concept of sewage-sampling, tests for - solids, pH, dissolved oxygen, BOD, COD
		8 Sewerage system
	3	8.1 Types of system-separate, combined, partially separate , features, comparison between the types, suitability
12TH	4	8.1 Types of system-separate, combined, partially separate , features, comparison between the types, suitability
	5	8.2 Shapes of sewer - rectangular, circular, avoid-features, suitability
	1	8.2 Shapes of sewer - rectangular, circular, avoid-features, suitability
	2	8.3 Laying of sewer-setting out sewer alignment
		9 Sewer appurtenances and Sewage Disposal:
13TH	3	9.1 Manholes and Lamp holes - types, features, location, function
	4	9.2 Inlets, Grease & oil trap - features, location, function
	5	9.3 Storm regulator, inverted siphon - features, location, function
	1	9.4 Disposal on land - sewage farming, sewage application and dosing, sewage sickness-causes and remedies
	2	9.4 Disposal on land - sewage farming, sewage application and dosing, sewage sickness-causes and remedies
14TH	3	9.5 Disposal by dilution - standards for disposal in different types of water bodies, self purification of stream
	4	9.5 Disposal by dilution - standards for disposal in different types of water bodies, self purification of stream
		10 Sewage treatment :
	5	10.1 Principles of treatment, flow diagram of conventional treatment
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15TH	2	10.2 Primary treatment - necessity, principles, essential features, functions
	3	10.2 Primary treatment - necessity, principles, essential features, functions
	4	10.2 Primary treatment - necessity, principles, essential features, functions
	5	10.3 Secondary treatment - necessity, principles, essential features, functions
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	2	10.3 Secondary treatment - necessity, principles, essential features, functions
		11 Sanitary plumbing for building :
	3	11.1 Requirements of building drainage, layout of lavatory blocks in residential buildings, layout of building drainage
	4	11.2 Plumbing arrangement of single storied & multi storied building as per I.S. code practice
	5	11.3 Sanitary fixtures - features, function, and maintenance and fixing of the fixtures - water closets,

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