LESSON PLAN of Th.4- WATER SUPPLY AND WASTE WATER ENGINEERING for the Session 2022-2023(Winter 2022) Govt. polytechnic Kandhmal, Phulbani

Discipline: Civil Engineering	Semester: 5th	Name of the Teaching Faculty: Ashish Nayak , Lecturer in Civil GP Kandhamal
Subject:WATER SUPPLY AND WASTE WATER ENGINEERING, Th.4	No. of days/ per week class allotted: 5	Semester From Date : 15/09/2022 to Date: 22/12/2022 → 21/01/2023 No. of Weeks: 15
Week	Class Day	Theory/ Practical Topics
		SECTION A: WATER SUPPLY
1ST	1	**Introduction to Water Supply, Quantity and Quality of water**
	2	Necessity of treated water supply
	3	Per capita demand,
	4	Methods of forecasting population
	5	Numerical problems using different methods
2ND	1	Impurities in water – organic and inorganic
	2	Harmful effects of impurities
	3	Analysis of water –physical, chemical and bacteriological
	4	Water quality standards for different uses
	5	variation in demand and factors affecting demand
		Sources and Conveyance of water
3RD	1	Surface sources – Lake, stream, river and impounded reservoir
	2	Underground sources – aquifer type & occurrence – Infiltration gallery, infiltration well, springs, well
	3	Underground sources – aquifer type & occurrence – Infiltration gallery, infiltration well, springs, well
	4	Yield from well- method s of determination, Numerical problems using yield formulae (deduction excluded)
	5	Intakes – types, description of river intake, reservoir intake, canal intake
	1	Pumps for conveyance & distribution – types, selection, installation
4TH	2	Pipe materials – necessity, suitability, merits & demerits of each type
	3	Pipe joints – necessity, types of joints, suitability, methods of jointing Laying of pipes – method
		Treatment of water
	4	Flow diagram of conventional water treatment system
	5	Treatment process / units : Aeration ; Necessity
5TH	1	Plain Sedimentation : Necessity, working principles, Sedimentation tanks – types, essential features, operation & maintenance
	2	Plain Sedimentation : Necessity, working principles, Sedimentation tanks – types, essential features, operation & maintenance
	3	Sedimentation with coagulation: Necessity, principles of coagulation,
	4	types of coagulants, Flash Mixer, Flocculator, Clarifier (Definition and concept only)
	5	Filtration : Necessity, principles, types of filters
	1	Slow Sand Filter, Rapid Sand Filter and Pressure Filter – essential features
6TH	2	Disinfection : Necessity, methods of disinfection
	3	Chlorination – free and combined chlorine demand, available chlorine, residual chlorine
	4	pre-chlorination, break point chlorination, super- chlorination
	5	Softening of water – Necessity, Methods of softening – Lime soda process and Ion exchange method (Concept Only)
		Distribution system And Appurtenance in distribution system:
	1	General requirements, types of distribution system-gravity, direct
7TH	2	General requirements, types of distribution system-gravity, direct
	3	Methods of supply – intermittent and continuous
	4	Methods of supply – intermittent and continuous
	5	Distribution system layout – types, comparison, suitability
	1	Distribution system layout – types, comparison, suitability
	2	Valves-types, features, uses, purpose-sluice valves, check valves, air valves, scour valves, Fire hydrants, Water meters
8TH	3	Valves-types, features, uses, purpose-sluice valves, check valves, air valves, scour valves, Fire hydrants, Water meters

		W/s plumbing in building
	4	Method of connection from water mains to building supply
		General layout of plumbing arrangement for water supply in single storied and multi-
	5	storied building as per I.S. code
		WASTE WATER ENGINEERING
	1	**Introduction**
		Aims and objectives of sanitary engineering
9TH	2	Definition of terms related to sanitary engineering
		Systems of collection of wastes– Conservancy and Water Carriage System –
	3	features, comparison, suitability
		Systems of collection of wastes– Conservancy and Water Carriage System –
	4	features, comparison, suitability
		Systems of collection of wastes– Conservancy and Water Carriage System –
	5	features, comparison, suitability
		Quantity and Quality of sewage
	1	Quantity of sanitary sewage – domestic & industrial sewage, variation in sewage
10TH		flow
	2	numerical problem on computation quantity of sanitary sewage
		Computation of size of sewer, application of Chazy's formula, Limiting velocities of
	3	flow : self-cleaning and scouring
		Computation of size of sewer, application of Chazy's formula, Limiting velocities of
	4	flow : self-cleaning and scouring
		General importance, strength of sewage, Characteristics of sewage-physical,
	5	chemical & biological
		Concept of sewage-sampling, tests for – solids, pH, dissolved oxygen, BOD, COD
11TH	1	
		Sewerage system
	2	Types of system-separate, combined, partially separate , features, comparison
		between the types, suitability
	3	Types of system-separate, combined, partially separate , features, comparison
		between the types, suitability
	4	Shapes of sewer – rectangular, circular, avoid-features, suitability
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	5	
12TH	1	Laying of sewer-setting out sewer alignment
		Sewer appurtenances and Sewage Disposal:
	2	Manholes and Lamp holes – types, features, location, function
		Inlets, Grease & oil trap – features, location, function
	3	Storm regulator, inverted siphon – features, location, function
		Disposal on land – sewage farming, sewage application and dosing, sewage
	4	sickness-causes and remedies
		Disposal on land – sewage farming, sewage application and dosing, sewage
	5	sickness-causes and remedies
		Disposal by dilution – standards for disposal in different types of water bodies, self
	1	purification of stream
13TH		Disposal by dilution – standards for disposal in different types of water bodies, self
	2	purification of stream
		Sewage treatment
	3	Principles of treatment
		flow diagram of conventional treatment
	4	Primary treatment – necessity, principles
		Primary treatment – essential features, functions
		Secondary treatment – necessity, principles, essential features, functions
	1	Secondary treatment – necessity, principles, essential features, functions
14TH	2	Sanitary plumbing for building
	3	Requirements of building drainage, layout of lavatory blocks in residential buildings,
		layout of building drainage
	4	Plumbing arrangement of single storied & multi storied building as per I.S. code
		practice
	5	Sanitary fixtures – features, function, and maintenance and fixing of the fixtures –
		water closets, flushing cisterns, urinals, inspection chambers, traps, anti-
15TH		syphonage pipe

Signature of Lecturer

15/9/22

Signature of HOD

15/9/22

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