Badriprasad Institute of Technology, Sambalpur

Lesson plan for Theory -4, Water Supply & Waste Water Engineering

Semester & Branch : 5th Sem Civil Engineering **Total Periods-60**

Name of the faculty : Miss. Santosini Padhan **No of periods /week-4**

WEEK	CLASS DAY	THEORY TOPICS
SECTION A: WATER SUPPLY		
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, Numerical problems using different methods
	4TH	Impurities in water – organic and inorganic, Harmful effects of impurities
2ND	1ST	Analysis of water –physical, chemical and bacteriological
		Water quality standards for different uses
	2ND	**Sources and Conveyance of water**
	3RD	Surface sources – Lake, stream, river and impounded reservoir
	4TH	Underground sources – aquifer type & occurrence – Infiltration gallery, infiltration well, springs, well
3RD	1ST	Yield from well- method s of determination, Numerical problems using yield formulae (deduction excluded)
	2ND	Intakes – types, description of river intake, reservoir intake, canal intake
	3RD	Pumps for conveyance & distribution – types, selection, installation.
	4TH	Pipe materials – necessity, suitability, merits & demerits of each type
4TH	1ST	Pipe joints – necessity, types of joints, suitability, methods of jointing
	2ND	Laying of pipes – method
	3RD	**Treatment of water**
		Design of treatment units excluded.
	4TH	Students may be asked to prepare detailed sketches of units, preferably from working drawing, as home assignment
5TH	1ST	**Field visit to treatment plant, under practical should be arranged after covering this unit.**
		Flow diagram of conventional water treatment system
	2ND	Treatment process / units :
	3RD	Aeration ; Necessity
	4TH	Plain Sedimentation : Necessity, working principles, Sedimentation tanks – types, essential features, operation & maintenance

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6TH	1ST	Sedimentation with coagulation: Necessity, principles of coagulation, types of coagulants, Flash Mixer, Flocculator, Clarifier (Definition and concept only)
	2ND	Filtration : Necessity, principles, types of filters
	3RD	Slow Sand Filter, Rapid Sand Filter and Pressure Filter – essential features
	4TH	Disinfection : Necessity, methods of disinfection
7TH	1ST	Chlorination – free and combined chlorine demand, available chlorine, residual chlorine,
	2ND	pre-chlorination, break point chlorination, super- chlorination
	3RD	Softening of water – Necessity, Methods of softening – Lime soda process and Ion exchange method (Concept Only)
	4TH	**Distribution system And Appurtenance in distribution system:**
		General requirements, types of distribution system-gravity, direct and combined
8TH	1ST	Methods of supply – intermittent and continuous
	2ND	Distribution system layout – types, comparison, suitability
	3RD	Valves-types, features, uses, purpose-sluice 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
9TH	1ST	General layout of plumbing arrangement for water supply in single storied and multi-storied building as per I.S. code.
	2ND	Continue of 2nd Class
		SECTION B: WASTE WATER ENGINEERING
	3RD	**Introduction**
		Aims and objectives of sanitary engineering
	4TH	Definition of terms related to sanitary engineering
10TH	1ST	Systems of collection of wastes– Conservancy and Water Carriage System – features, comparison, suitability
	2ND	**Quantity and Quality of sewage**
		Quantity of sanitary sewage – domestic & industrial sewage, variation in sewage flow,
	3RD	numerical problem on computation quantity of sanitary sewage.
	4TH	Computation of size of sewer, application of Chazy's formula, Limiting velocities of flow : self-cleaning and scouring

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11TH	1ST	General importance, strength of sewage, Characteristics of sewage-physical, chemical & biological
	2ND	Concept of sewage-sampling, tests for – solids, pH, dissolved oxygen, BOD, COD
	3RD	**Sewerage system**
		Types of system-separate, combined, partially separate , features, comparison between the types, suitability
	4TH	Shapes of sewer – rectangular, circular, avoid-features, suitability
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
13TH	1ST	Disposal on land – sewage farming, sewage application and dosing,
	2ND	sewage sickness-causes and remedies
	3RD	Disposal by dilution – standards for disposal in different types of water bodies, self purification of stream
	4TH	**Sewage treatment :**
		Design of treatment units excluded.
14TH	1ST	Students may be asked to prepare detailed sketches of units, preferably from working drawing, as home assignment.
	2ND	.Field visit to treatment plant, under practical should be arranged after covering this unit.)
	3RD	Principles of treatment, flow diagram of conventional treatment
	4TH	Primary 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

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