IDEAL SCHOOL OF ENGINEERING,RETANG-752054

Discipline: Civil Engg	Semester: 5Th	Name of the Teaching faculty: Er. Adarshi Manisha Biswal & Er. Purak Sundaray
Subject: Th-4 Water Supply & Waste Water Engineering	No of Days/Week class allotted: 5 days	**Semester From Date: 15/09/2022 To Date: 22/12/2022 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
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	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
	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	4th	**Treatment of water** *Note:*
	5th	*Students may be asked to prepare detailed sketches of units, preferably from working drawing, as home assignment*
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
	5th	Filtration : Necessity, principles, types of filters Slow Sand Filter, Rapid Sand Filter and Pressure Filter – essential
6th	1st	Filtration : Necessity, principles, types of filters Slow Sand Filter, Rapid Sand Filter and Pressure Filter – essential
	2nd	Filtration : Necessity, principles, types of filters Slow Sand Filter, Rapid Sand Filter and Pressure Filter – essential
	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
	2nd	General requirements, types of distribution system-gravity, direct and combined
	3rd	Methods of supply – intermittent and continuous
	4th	Distribution system layout – types, comparison, suitability
	5th	Valves-types, features, uses, purpose-sluice valves, check valves, air valves, scour valves, Fire hydrants, Water meters
8th	1st	Valves-types, features, uses, purpose-sluice valves, check valves, air valves, scour valves, Fire hydrants, Water meters
	2nd	Valves-types, features, uses, purpose-sluice valves, check valves, air valves, scour valves, Fire hydrants, Water meters
	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
	5th	**WASTE WATER ENGINEERING** **Introduction**

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
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,
	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
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	2nd	Disposal by dilution – standards for disposal in different types of water bodies, self purification of stream

13th	3rd	Disposal by dilution – standards for disposal in different types of water bodies, self purification of stream
	4th	**Sewage treatment :** ***(Note: 1.Design of treatment units excluded.***
	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
	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
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