Discipline: Civil	**Semester: 5th**	**No. of weeks:17**
Subject: Water Supply and Waste Water Engineering Th-4	**No. of days/per week Class Allotted: 5**	**Name of the teaching faculty: Er.Sangram Mishra & Er .Adyashree Sahoo**
Week	**Class/Day**	**Theory Topics**
1st	1st	**SECTION A:WATER SUPPLY**
	2nd	**Introduction to Water Supply, Quantity and Quality of water :** Necessity of treated water supply
	3rd	Per capita demand
	4th	variation in demand and factors affecting demand
	5th	Methods of forecasting population, Numerical problems using different methods
		Methods of forecasting population, Numerical problems using different methods
2nd	1st	Methods of forecasting population, Numerical problems using different methods
	2nd	Methods of forecasting population, Numerical problems using different methods
	3rd	Impurities in water – organic and inorganic, Harmful effects of impurities
	4th	Analysis of water –physical, chemical and bacteriological
	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	Intakes – types, description of river intake
	5th	Reservoir Intake, Canal Intake
4th	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	**Treatment of water :** Flow diagram of conventional water treatment system
	5th	Treatment process / units : Aeration ; Necessity
5th	1st	Plain Sedimentation : Necessity, working principles
	2nd	Sedimentation tanks – types, essential features, operation & maintenance
	3rd	Sedimentation with coagulation: Necessity, principles of coagulation
	4th	Types of coagulants, Flash Mixer, Flocculator, Clarifier
	5th	

		(Definition and concept only) Filtration : Necessity, principles, types of filters
6th	1st	Slow Sand Filter -essential features
	2nd	Rapid Sand Filter -essential features
	3rd	Pressure Filter – essential features
	4th	Disinfection : Necessity, methods of disinfection Chlorination – free and combined chlorine demand, available chlorine, residual chlorine, pre-chlorination, break point chlorination, super-chlorination
	5th	Softening of water – Necessity, Methods of softening – Lime soda process and Ion exchange method (Concept Only)
7th	1st	**Distribution system And Appurtenance in distribution system:** General requirements, types of distribution system-gravity, direct and combined
	2nd	Methods of supply – intermittent and continuous
	3rd	Distribution system layout – types, comparison, suitability
	4th	Distribution system layout – types, comparison, suitability
	5th	Valves-types, features, uses
8th	1st	Purpose-Sluice Valves, Check Valves
	2nd	Air Valves, Scour Valves
	3rd	Fire hydrants, Water meters
	4th	**W/s plumbing in building :** Method of connection from water mains to building supply
	5th	General layout of plumbing arrangement for water supply in single storied and multi-storied building as per I.S. code.
9th	1st	**SECTION B: WASTE WATER ENGINEERING**
	2nd	**Introduction:** Aims and objectives of sanitary engineering
	3rd	Definition of terms related to sanitary engineering
	4th	Definition of terms related to sanitary engineering
	5th	Systems of collection of wastes– Conservancy and Water Carriage System – features, comparison, suitability
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10th	1st	**Quantity and Quality of sewage :** Quantity of sanitary sewage – domestic & industrial sewage
	2nd	Variation in sewage flow, numerical problem on computation quantity of sanitary sewage.
	3rd	Computation of size of sewer, application of Chazy's formula
	4th	Solving Problem related to Chazy's formula
	5th	Limiting velocities of flow : self-cleaning and scouring
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	Types of system-separate, combined, partially separate , features, comparison between the types, suitability
	5th	Shapes of sewer – rectangular, circular, avoid-features, suitability
	1st	
	2nd	Laying of sewer-setting out sewer alignment

	3rd	**Sewer appurtenances and Sewage Disposal:**
	4th	Manholes and Lamp holes – types, features, location, function
	5th	Manholes and Lamp holes – types, features, location, function
		Inlets, Grease & oil trap – features, location, function
13th	1st	Storm regulator, inverted siphon – features, location, function
	2nd	Disposal on land – sewage farming, sewage application and dosing
	3rd	Sewage sickness-causes and remedies
	4th	Disposal by dilution – standards for disposal in different types of water bodies, self purification of stream
	5th	**Sewage treatment :** Principles of treatment
14th	1st	Flow diagram of conventional treatment , Explaining function of each unit
	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	Secondary treatment – necessity, principles, essential features, functions
	3rd	**Sanitary plumbing for building :** Requirements of building drainage, layout of lavatory blocks in residential buildings, layout of building drainage
	4th	Plumbing arrangement of single storied & multi storied building as per I.S. code practice
	5th	Sanitary fixtures – features, function, and maintenance and fixing of the fixtures – water closets, flushing cisterns, urinals, inspection chambers, traps, anti-syphonage pipe
16th	1st	Revision
	2nd	Revision
	3rd	Revision
	4th	Revision
	5th	Revision
17th	1st	Revision
	2nd	Revision
	3rd	Revision
	4th	Revision
	5th	Revision