

**ACADEMIC SESSION: WINTER-2023**

<b>Discipline :</b> Civil engg	<b>Semester: 5th</b>	<b>Name of the Teaching Faculty : Subhasmita Behera</b>
<b>Subject:</b> water supply and waste water engg	<b>No. of Days / Week class allotted: 5</b>	<b>Semester Duration: 01/08/2023 to 30/11/2023</b>  <b>No. of Weeks : 17</b>
<b>Week</b>	<b>Class day</b>	<b>Theory/Practical Topics:</b>
1 <sup>st</sup>	1 <sup>st</sup>	Necessity of treated water supply
	2 <sup>nd</sup>	Water pollution, need for protected water supply
	3 <sup>rd</sup>	Per capita demand, variation in demand and factors affecting demand
	4 <sup>th</sup>	Analysis of water –physical, chemical Methods of forecasting population(Arithmetic Increase method)
	5 <sup>th</sup>	Problems on arithmetic increase method
2 <sup>nd</sup>	1 <sup>st</sup>	Geometrical increase method and Incremental Increase method
	2 <sup>nd</sup>	Problems on geometrical increase and incremental increase method
	3 <sup>rd</sup>	Water quality standards for different uses
	4 <sup>th</sup>	Impurities in water- organic and inorganic and harmful effects of impurities
	5 <sup>th</sup>	Analysis of water- physical, chemical and bacteriological
3 <sup>rd</sup>	1 <sup>st</sup>	Surface sources – Lake, stream, river and impounded reservoir
	2 <sup>nd</sup>	Underground sources – aquifer type & occurrence – Infiltration gallery, infiltration well, springs, well
	3 <sup>rd</sup>	Yield from well- methods of determination, Numerical problems using yield formulae ( deduction excluded)
	4 <sup>th</sup>	Intakes – types, description of river intake, reservoir intake, canal intake
	5 <sup>th</sup>	Pumps for conveyance & distribution – types, selection, installation
4 <sup>th</sup>	1 <sup>st</sup>	Pipe materials – necessity, suitability, merits & demerits of each type
	2 <sup>nd</sup>	Pipe joints – necessity, types of joints, suitability
	3 <sup>rd</sup>	methods of jointing Laying of pipes – method
	4 <sup>th</sup>	Flow diagram of conventional water treatment system

	5 <sup>th</sup>	Treatment process / units :
5 <sup>th</sup>	1 <sup>st</sup>	Aeration ; Necessity
	2 <sup>nd</sup>	Plain Sedimentation : Necessity, working principles,
	3 <sup>rd</sup>	Sedimentation tanks – types, essential features, operation & maintenance
	4 <sup>th</sup>	Sedimentation with coagulation: Necessity, principles of coagulation,
	5 <sup>th</sup>	types of coagulants, Flash Mixer, Flocculator, Clarifier (Definition and concept only)
6 <sup>th</sup>	1 <sup>st</sup>	Filtration : Necessity, principles, types of filters Slow Sand Filter
	2 <sup>nd</sup>	Rapid Sand Filter and Pressure Filter – essential features
	3 <sup>rd</sup>	Disinfection : Necessity, methods of disinfection
	4 <sup>th</sup>	Chlorination – free and combined chlorine demand, available chlorine, residual chlorine, pre-chlorination, break point chlorination, super- chlorination
	5 <sup>th</sup>	Softening of water – Necessity, Methods of softening – Lime soda process and Ion exchange method (Concept Only)
7 <sup>th</sup>	1 <sup>st</sup>	General requirements
	2 <sup>nd</sup>	types of distribution system-gravity, direct and combined
	3 <sup>rd</sup>	4.2 Methods of supply – intermittent
	4 <sup>th</sup>	Methods of supply – continuous
	5 <sup>th</sup>	Distribution system layout – types
8 <sup>th</sup>	1 <sup>st</sup>	comparison, suitability of distribution system layout
	2 <sup>nd</sup>	Valves-types, features, uses, purpose-slucie valves
	3 <sup>rd</sup>	check valves, air valves, scour valves, Fire hydrants, Water meters
	4 <sup>th</sup>	Method of connection from water mains to building supply
	5 <sup>th</sup>	General layout of plumbing arrangement for water supply in single storied and multi-storied building as per I.S. code
	1 <sup>st</sup>	Aims and objectives of sanitary engineering
	2 <sup>nd</sup>	Definition of terms related to sanitary engineering



9 <sup>th</sup>	3 <sup>rd</sup>	Systems of collection of wastes
	4 <sup>th</sup>	Conservancy and Water Carriage System
	5 <sup>th</sup>	features, comparison, suitability of water carriage system
10 <sup>th</sup>	1 <sup>st</sup>	Quantity of sanitary sewage – domestic & industrial sewage,
	2 <sup>nd</sup>	variation in sewage flow
	3 <sup>rd</sup>	numerical problem on computation quantity of sanitary sewage.
	4 <sup>th</sup>	Computation of size of sewer, application of Chazy's formula,
	5 <sup>th</sup>	Limiting velocities of flow : self-cleaning and scouring
11 <sup>th</sup>	1 <sup>st</sup>	General importance, strength of sewage, Characteristics of sewage-physical, chemical & biological
	2 <sup>nd</sup>	Concept of sewage-sampling, tests for – solids, pH, dissolved oxygen, BOD, COD
	3 <sup>rd</sup>	Types of system-separate, combined, partially separate
	4 <sup>th</sup>	features, comparison between the types, suitability
	5 <sup>th</sup>	Shapes of sewer – rectangular, circular, avoid-features, suitability
12 <sup>th</sup>	1 <sup>st</sup>	Laying of sewer-setting out sewer alignment
	2 <sup>nd</sup>	Class test
	3 <sup>rd</sup>	Manholes and Lamp holes – types, features, location, function
	4 <sup>th</sup>	Inlets, Grease & oil trap – features, location, function
	5 <sup>th</sup>	Storm regulator, inverted siphon – features, location, function
13 <sup>th</sup>	1 <sup>st</sup>	Durga puja Holiday
	2 <sup>nd</sup>	
	3 <sup>rd</sup>	
	4 <sup>th</sup>	
	5 <sup>th</sup>	
14 <sup>th</sup>	1 <sup>st</sup>	Disposal on land – sewage farming, sewage application and dosing, sewage sickness-causes and remedies
	2 <sup>nd</sup>	Disposal by dilution – standards for disposal in different types of water bodies, self purification of stream
	3 <sup>rd</sup>	Revision
	4 <sup>th</sup>	Class test
	5 <sup>th</sup>	Principles of treatment
	1 <sup>st</sup>	flow diagram of conventional treatment
	2 <sup>nd</sup>	Primary treatment – necessity, principles

15 <sup>th</sup>	3 <sup>rd</sup>	essential features, functions
	4 <sup>th</sup>	Secondary treatment – necessity
	5 <sup>th</sup>	principles of secondary treatment
16 <sup>th</sup>	1 <sup>st</sup>	essential features, functions of secondary treatment
	2 <sup>nd</sup>	Requirements of building drainage,
	3 <sup>rd</sup>	layout of lavatory blocks in residential buildings
	4 <sup>th</sup>	layout of building drainage
	5 <sup>th</sup>	Plumbing arrangement of single storied & multi storied building as per I.S. code practice
17 <sup>th</sup>	1 <sup>st</sup>	Sanitary fixtures – features, function, and maintenance
	2 <sup>nd</sup>	fixing of the fixtures – water closets, flushing cisterns, urinals,
	3 <sup>rd</sup>	inspection chambers, traps, anti-syphonage pipe
	4 <sup>th</sup>	Previous year questions discussion
	5 <sup>th</sup>	Previous year questions discussion

Prepared by

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Approved by

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11/8/23

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