LESSON PLAN			
Deparment: Civil Engineering	**Semester : 5TH**	**Name of the Teaching faculty: ARPITA ROUT**	
Subject :- Th4. WATER SUPPLY AND WASTE WATER ENGINEERING	**No.of Days/ week class allotted : 5**	**Semester from date: 15/09/2022 to 22/12/2022** **No. of Weeks :15** **Topics to be covered:-**	
Week	**Class Day**	**Topics**	**Remarks**
1st Week: (15 th Sept- 17th Sept)		**1. Introduction to Water Supply, Quantity and Quality of water (10P)**	
	4th	1.1 Necessity of treated water supply	
2nd Week: (19 th Sept- 24th Sept)	1st	1.2 Per capita demand, variation in demand and factors affecting demand	
	2nd	1.3 Methods of forecasting population, Numerical problems using different methods	
	3rd	1.3 Methods of forecasting population, Numerical problems using different methods	
	4th	1.3 Methods of forecasting population, Numerical problems using different methods	
3rd Week: (26th Sept-01 Oct)	1st (2hr)	1.4 Impurities in water – organic and inorganic, Harmful effects of impurities	
	2nd	1.5 Analysis of water –physical, chemical and bacteriological	
	3rd	1.6 Water quality standards for different uses	
4th Week		**VACATION**	
5 th Week: (10 th Oct- 15 th Oct)		**2. Sources and Conveyance of water (8P)**	
	1st	2.1 Surface sources – Lake, stream, river and impounded reservoir 2.2 Underground sources – aquifer type & occurrence – Infiltration gallery, infiltration well, springs, well	
	2nd	2.3 Yield from well- method s of determination, Numerical problems using yield formulae (deduction excluded)	
	3rd	2.4 Intakes – types, description of river intake, reservoir intake, canal intake	
	4th	2.5 Pumps for conveyance & distribution – types, selection, installation	

6 th Week: (17 th Oct- 22 nd Oct)	1st	2.6 Pipe materials – necessity, suitability, merits & demerits of each type 2.7 Pipe joints – necessity, types of joints, suitability, methods of jointing Laying of pipes – method	
	2nd	2.7 Pipe joints – necessity, types of joints, suitability, methods of jointing Laying of pipes – method	
		3. Treatment of water (12P)	
	3rd	3.1 Flow diagram of conventional water treatment system 3.2 Treatment process / units : 3.2.1 Aeration ; Necessity	
	4th	3.2.2 Plain Sedimentation : Necessity, working principles, Sedimentation tanks – types, essential features, operation & maintenance	
7 th Week: (25 th Oct- 29th Oct)	2nd	3.2.3 Sedimentation with coagulation: Necessity, principles of coagulation, types of coagulants, Flash Mixer, Flocculator, Clarifier (Definition and concept only)	
	3rd	3.2.3 Sedimentation with coagulation: Necessity, principles of coagulation, types of coagulants, Flash Mixer, Flocculator, Clarifier (Definition and concept only)	
	4th	3.2.4 Filtration : Necessity, principles, types of filters Slow Sand Filter, Rapid Sand Filter and Pressure Filter – essential features	
8 th Week: (31st oct- 5th Nov)	1st	3.2.4 Filtration : Necessity, principles, types of filters Slow Sand Filter, Rapid Sand Filter and Pressure Filter – essential features	
	2nd	3.2.5 Disinfection : Necessity, methods of disinfection Chlorination – free and combined chlorine demand, available chlorine, residual chlorine, pre-chlorination, break point chlorination, super┐ chlorination	
	3rd	3.2.5 Disinfection : Necessity, methods of disinfection Chlorination – free and combined chlorine demand, available chlorine, residual chlorine, pre-chlorination, break point chlorination, super┐ chlorination	
	4th	3.2.5 Disinfection : Necessity, methods of disinfection Chlorination – free and combined chlorine demand, available chlorine, residual chlorine, pre-chlorination, break point chlorination, super┐ chlorination	
9 th Week: (7 th Nov -12 th	1st	3.2.6 Softening of water – Necessity, Methods of softening – Lime soda process and Ion exchange method (Concept Only)	
		4. Distribution system and Appurtenance in distribution system (8P)	

Nov)	3rd	4.1 General requirements, types of distribution system-gravity, direct and combined	
	4th	4.1 General requirements, types of distribution system-gravity, direct and combined	
10 th Week: (14 th Nov -19 th Nov)	1st	4.2 Methods of supply – intermittent and continuous	
	2nd	4.3 Distribution system layout – types, comparison, suitability	
10 th Week: (14 th Nov -19 th Nov)	3rd	4.3 Distribution system layout – types, comparison, suitability	
	4th	4.4 Valves-types, features, uses, purpose-sluice valves, check valves, air valves, scour valves, Fire hydrants, Water meters	
11 th Week: (21st Nov - 26 th Nov)	1st	4.4 Valves-types, features, uses, purpose-sluice valves, check valves, air valves, scour valves, Fire hydrants, Water meters	
		SECTION B: WASTE WATER ENGINEERING **6. Introduction(5P)**	
		6.1 Aims and objectives of sanitary engineering	
	2nd	6.2 Definition of terms related to sanitary engineering Carriage System – features, comparison, suitability	
	3rd	6.2 Definition of terms related to sanitary engineering Carriage System – features, comparison, suitability	
	4th	6.3 Systems of collection of wastes– Conservancy and Water	
12 th Week: (28 th Nov -3 rd) Dec	1st	6.3 Systems of collection of wastes– Conservancy and Water	
		7. Quantity and Quality of sewage (7P)	
		7.1 Quantity of sanitary sewage – domestic & industrial sewage, variation in sewage flow, numerical problem on computation quantity of sanitary sewage.	
	2nd	7.2 Computation of size of sewer, application of Chazy's formula, Limiting velocities of flow : self-cleaning and scouring	
	3rd	7.2 Computation of size of sewer, application of Chazy's formula, Limiting velocities of flow : self-cleaning and scouring	
	4th	7.3 General importance, strength of sewage, Characteristics of sewage-physical, chemical & biological	
13 th Week: (5 th Dec -10 th	1st	7.4 Concept of sewage-sampling, tests for – solids, pH, dissolved oxygen, BOD, COD	
		8. Sewerage system (5P)	
	2nd	8.1 Types of system-separate, combined, partially separate , features, comparison between the types, suitability	

Dec)	3rd	8.1 Types of system-separate, combined, partially separate , features, comparison between the types, suitability	
	4th	8.2 Shapes of sewer – rectangular, circular, avoid-features, suitability	
14 th Week: (12 th Dec- 17th Dec)	1st	8.3 Laying of sewer-setting out sewer alignment	
		9. Sewer appurtenances and Sewage Disposal (7P)	
	2nd	9.1 Manholes and Lamp holes – types, features, location, function	
	3rd	9.2 Inlets, Grease & oil trap – features, location, function	
	4th	9.3 Storm regulator, inverted siphon – features, location, function	
15 th Week: (19 th Dec- 22nd Dec)	1st	9.4 Disposal on land – sewage farming, sewage application and dosing, sewage sickness-causes and remedies	
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	3rd	9.5 Disposal by dilution – standards for disposal in different types of water bodies, self purification of stream	
Extra Class		**10. Sewage treatment (8P)**	
		10.1 Principles of treatment, flow diagram of conventional treatment	
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		10.2 Primary treatment – necessity, principles, essential features, functions	
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		10.3 Secondary treatment – necessity, principles, essential features, functions	
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		5. W/s plumbing in building (2P)	
		5.1 Method of connection from water mains to building supply	
		5.2 General layout of plumbing arrangement for water supply in single storied and multi-storied building as per I.S. code.	
		11. Sanitary plumbing for building (3P)	

	11.1 Requirements of building drainage, layout of lavatory blocks in residential buildings, layout of building drainage.	
	11.2 Plumbing arrangement of single storied & multi storied building as per I.S. code practice.	
	11.3 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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