LESSON PLAN

Course Type :: Theory
Semester/Branch :: 5th Semester, Civil Engineering
Subject (with code) :: Water Supply and Waste Water Engineering (Th4)
Contact hours/week :: 5 hours
Name of Faculty :: Nivedita Panda

SL. NO.	CLASS ID	COURSE CONTENT	MODE OF DELIVERY	EXHIBIT/ REFERENCE
1	1.1	Necessity of treated water supply	Lecture (Explanation)	Study material
2	1.2	Per capita demand, variation in demand and factors affecting demand	Lecture (Elaboration)	Study material
3	1.3	Methods of forecasting population, Numerical problems using different methods	Problem based learning	Study material
4	1.4	Impurities in water – organic and inorganic, Harmful effects of impurities	Lecture (Explanation)	Study material
5		Class practice test-1	Flipped class	Study material
6	1.5	Analysis of water – physical, chemical and bacteriological	Lecture (Elaboration)	Study material
7	1.6	Water quality standards for different uses	Lecture (Explanation)	Personal Video Link
8	2.1	Quiz-1	Flipped class	Study material
9	2.2	Surface sources – Lake, stream, river and impounded reservoir	Lecture (Explanation)	Study material
10	2.3	Underground sources – aquifer type & occurrence – Infiltration gallery, infiltration well, springs, well	Lecture (Explanation)	Study material

11	2.4	Yield from well-method s of determination, Numerical problem	Lecture (Elaboration)	Study material
12	2.5	Doubt clearing class	Recap	Study material
13	2.6	Intakes – types, description of river intake, reservoir intake, canal intake	Lecture (Explanation)	https://youtu.be/cvUa82Qb1Hg **Nptel link**
14	2.7	Pumps for conveyance & distribution – types, selection, installation	Lecture (Elaboration)	Study material
15	2.8	Pipe materials – necessity, suitability, merits & demerits of each type	Flipped class	Study material
16	2.9	Pipe joints – necessity, types of joints, suitability, methods of jointing Laying of pipes – method	Lecture (Explanation)	Study material
17	2.10	Quiz-2	Flipped class	Study material
18	3.1	*Design of treatment units excluded*	Lecture (Elaboration)	Study material
19	3.2	*Students may be asked to prepare detailed sketches of units, preferably from working drawing, as home assignment*	Collaborative thinking	Study material
20	3.3	*Field visit to treatment plant*	Video presentation	Youtube link https://youtu.be/UU4Zj7zTKaw
21	3.4	Flow diagram of conventional water treatment system	Flipped class	Youtube link https://youtu.be/EoE_NkF8N8k
22	3.5	Treatment process / units	Lecture (Elaboration)	Study material
23	3.6	Aeration ; Necessity	Lecture (Elaboration)	Study material
24	3.7	Plain Sedimentation : Necessity, working principles, Sedimentation	Lecture (Explanation)	Study material
25		Class test-2	Flipped class	Study material
26	3.8	tanks – types, essential features, operation & maintenance	Studio based	Study material
27	3.9	Sedimentation with coagulation: Necessity, principles of coagulation,	Lecture (Elaboration)	Study material

28	3.10	types of coagulants, Flash Mixer, Flocculator, Clarifier (Definition and concept only)	Lecture (Explanation)	Study material
29	3.11	Filtration : Necessity, principles, types of filters	Lecture (Explanation)	Study material
30	3.12	Slow Sand Filter, Rapid Sand Filter	Lecture (Explanation)	youtube link **https://youtu.be/i4-Jb6V7ZTw**
31	3.13	Pressure Filter – essential features	Lecture (Explanation)	Study material
32	3.14	Disinfection : Necessity, methods of disinfection	Lecture (Elaboration)	Nptel link **https://youtu.be/ilvthF0_3GI**
33	3.15	Chlorination – free and combined chlorine demand, available chlorine residual chlorine, pre-chlorination, break point chlorination, super- chlorination	Flipped class	Study material
34	3.16	Softening of water – Necessity, Methods of softening	Lecture (Explanation)	Nptel Link **https://youtu.be/dCimAH5IRSA**
35		Class practice test-3	Flipped class	Study material
36	3.17	Lime soda process and Ion exchange method (Concept Only)	Studio based	Youtube Link https://youtu.be/7tfDBLHuNL8
37	4.1	General requirements, types of distribution system-gravity, direct and combined	Lecture (Explanation)	Study material
38	4.2	Methods of supply – intermittent and continuous	Lecture (Elaboration)	Youtube Link https://youtu.be/7g7ZA__oSXg
39	4.3	Distribution system layout – types, comparison, suitability	Guided thinking	Youtube Link https://youtu.be/d_7oLzEhVTg
40		Quiz-3	Flipped class	Study material
41	4.4	Valves-types, features, uses, purpose-sluice valves, check valves, air valves, scour valves, Fire hydrants, Water meters	Lecture (Explanation)	youtube link https://youtu.be/Vei7FUX9Ze8
42	5.1	Method of connection from water mains to building supply	Peer assisted learning	Study material

43	5.2	General layout of plumbing arrangement for water supply in single storied and multi-storied building as per I.S. code	Lecture (Explanation)	Study material
44	6.1	Definition of terms related to sanitary engineering	Lecture (Elaboration)	Study material
45		Class practice test-4	Flipped class	Study material
46	6.2	Systems of collection of wastes– Conservancy and Water Carriage System – features, comparison, suitability	Lecture (Elaboration)	Study material
47	7.1	Quantity of sanitary sewage – domestic & industrial sewage, variation in sewage flow	Lecture (Elaboration)	Youtube link https://youtu.be/rNSxqyOQlx0
48	7.2	Numerical problem on computation quantity of sanitary sewage	Problem based Learning	Study material
49	7.3	Computation of size of sewer, application of Chazy's formula, Limiting velocities of flow : self-cleaning and scouring	Problem based Learning	Study material
50	7.4	General importance, strength of sewage, Characteristics of sewage-physical, chemical & biological	Lecture (Explanation)	Study material
51	7.5	Concept of sewage-sampling, tests for – solids, pH, dissolved oxygen, BOD, COD	Lecture (Explanation)	Study material
52		Quiz-4	Flipped class	Study material
53	8.1	Types of system-separate, combined, partially separate , features, comparison between the types, suitability	Lecture (Elaboration)	Study material
54	8.2	Shapes of sewer – rectangular, circular, avoid-features, suitability	Lecture (Elaboration)	Study material
55	8.3	Laying of sewer-setting out sewer alignment	Lecture	Study material

			(Elaboration)	
56	9.1	Manholes and Lamp holes – types, features, location, function	Studio based	Youtube link https://youtu.be/hsQW9H3cV94
57	9.2	Inlets, Grease & oil trap – features, location, function	Flipped class	Study material
58	9.3	Storm regulator, inverted siphon – features, location, function	Lecture (Elaboration)	Study material
59	9.4	Disposal on land – sewage farming, sewage application and dosing,	Lecture (Elaboration)	Study material
60	9.5	Disposal by dilution – standards for disposal in different types of water bodies, self purification of stream	Collaborative thinking	Study material
61	10.1	Principles of treatment, flow diagram of conventional treatment	Peer assisted learning	Study material
62	10.2	Primary treatment – necessity, principles, essential features, functions	Lecture (Elaboration)	Study material
63	10.3	Principles of treatment, flow diagram of conventional treatment	Lecture (Elaboration)	Study material
64	11.1	Requirements of building drainage, layout of lavatory blocks in residential buildings, layout of building drainage	Lecture (Elaboration)	Study material
65	11.2	Plumbing arrangement of single storied & multi storied building as per I.S. code practice	Lecture (Explanation)	Study material
66	11.3	Sanitary fixtures – features, function, and maintenance and fixing of the fixtures – water closets, flushing cisterns, urinals, inspection chambers,	Lecture (Elaboration)	Study material

		traps, anti-syphonage pipe		