ENGINEERING, CUTTACK

DEPARTMENT OF CIVIL ENGINEERING



LESSON PLAN

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| SUBJECT: WATER SUPPLY & WASTE WATER ENGINEERING (TH4) | ACCADEMIC SESSION: 2021-22 |
| FACULTY: SRI GIRIJA PRASAD DAS | SEMESTER: 5TH |
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| H O D (Civil Engg.) |

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| **Discipline:**  **Civil Engineering** | **Semester:**  **5TH** | | **Name of teaching faculty:**  **SRI GIRIJA PRASAD DAS** |
| **Subject:**  **WATER SUPPLY AND WASTE WATER ENGG.** | **No. of days/ per week class allotted : 05 period per week**  **(Mon-1 period ;Tue- 2 period ;Thu-1 period; Fri- 1 period)** | | **Semester from date : 01/10/2021**  **To date : 08/01/2022**  **No of week : 14** |
| **Week** | **Class day** | **No of period available** | **Theory topics** |
| 1st | 01/10/2021 | 1 | **INTRODUCTION TO WATER SUPPLY, QUANTITY AND QUALITY OF WATER**  1.1 Necessity of treated water supply  1.2 Per capita demand, variation in demand |
| 2nd | 04/10/2021 | 1 | factors affecting demand |
| 05/10/2021 | 2 | 1.3Methods of forecasting population, Numerical problems using different methods |
| 07/10/2021 | 1 | Numerical problems using different method |
| 08/0/2021 | 1 | 1.4 Impurities in water – organic and inorganic, Harmful effects of impurities |
| 3rd | 21/10/2021 | 1 | 1.5 Analysis of water –physical, chemical and bacteriological |
| 22/10/2021 | 1 | 1.6 Water quality standards for different uses |
| 4th | 25/10/2021 | 1 | **SOURCES AND CONVEYANCE OF WATER**  **2.1** Surface sources – Lake, stream, river and impounded reservoir |
| 26/0/2021 | 2 | 2.2 Underground sources – aquifer type & occurrence – Infiltration gallery, infiltration well, springs,  2.3 Yield from well- method s of determination, Numerical problems using yield formulae |
| 28/10/2021 | 1 | **Monthly Test-1** |
| 29/10/2021 | 1 | 2.5 Pumps for conveyance & distribution – types, selection, installation |
| 5th | 01/11/2021 | 1 | 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 |
| 02/11/2021 | 2 | **3. TREATMENT OF WATER**  3.1 Flow diagram of conventional water treatment system  3.2 Treatment process / units :3.2.1 Aeration ; Necessity  3.2.2 Plain Sedimentation : Necessity |
| 05/11/2021 | 1 | working principles, Sedimentation tanks – types, essential features, operation & maintenance |
| 6th | 08/11/2021 | 1 | 3.2.3 Sedimentation with coagulation: Necessity, principles of coagulation, |
| 09/11/2021 | 2 | types of coagulants, Flash Mixer, Flocculator, Clarifier (Definition and concept only)  3.2.4 Filtration : Necessity, principles |
| 11/11/2021 | 1 | types of filter,Slow Sand Filter, Rapid Sand Filter and Pressure Filter – essential features |
| 12/11/2021 | 1 | 3.2.5 Disinfection : Necessity, methods of disinfection  Chlorination – free and combined chlorine demand |
| 7TH | 15/11/2021 | 1 | available chlorine, residual chlorine, pre-chlorination, break point chlorination, super-chlorination |
| 16/11/2021 | 2 | 3.2.6 Softening of water – Necessity, Methods of softening – Lime soda process and Ion exchange method |
| 18/11/2021 | 1 | **DISTRIBUTION SYSTEM AND APPURTENANCE IN DISTRIBUTION SYSTEM:**  4.1 General requirements, types of distribution system-gravity, direct and combined |
| 8TH | 22/11/2021 | 1 | 4.2 Methods of supply – intermittent and continuous |
| 23/11/2021 | 2 | 4.3 Distribution system layout – types, comparison, suitability4.4 Valves-types, features, uses, purpose-sluice valves, |
| 25/11/2021 | 1 | check valves, air valves ,scour valves, Fire hydrants, Water meters |
| 26/11/2021 | 1 | **SECTION B: WASTE WATER ENGINEERING*6 Introduction***6.1 Aims and objectives of sanitary engineering  6.2 Definition of terms related to sanitary engineering |
| 9TH | 29/11/2021 | 1 | **Monthly Test-2** |
| 30/11/2021 | 2 | 6.3 Systems of collection of wastes– Conservancy and Water Carriage System –features, comparison, suitability  **QUANTITY AND QUALITY OF SEWAGE**  7.1 Quantity of sanitary sewage – domestic & industrial sewage, variation in sewage flow |
| 02/12/2021 | 1 | **Internal Assessment** |
| 03/12/2021 | 1 | **Internal Assessment** |
| 10TH | 06/12/2021 | 1 | numerical problem on computation quantity of sanitary sewage  7.2 Computation of size of sewer, application of Chazy’s formula, |
| 07/12/2021 | 2 | Limiting velocities of flow : self-cleaning and scouring  7.3 General importance, strength of sewage,Characteristics of sewage-physical,chemical & biological |
| 09/12/2021 | 1 | 7.4 Concept of sewage-sampling, tests for – solids, pH, dissolved oxygen, BOD,COD  **8.SEWERAGE SYSTEM**  8.1 Types of system-separate, combined, partially separate , features, comparison between the types, suitability |
| 10/12/2021 | 1 | 8.2 Shapes of sewer – rectangular circular,avoid-features, suitability |
| 11TH | 13/12/2021 | 1 | 8.3 Laying of sewer-setting out sewer alignment |
| 14/12/2021 | 2 | Sewer appurtenances and Sewage Disposal:9.1 Manholes and Lamp holes-types,features,location,functions  9.2 Inlets, Grease & oil trap – features, location, function |
| 16/12/2021 | 1 | 9.3 Storm regulator, inverted siphon – features, location, function9.4 Disposal on land – sewage farming, sewage application and dosing,sewage sickness-causes and remedies |
| 17/12/2021 | 1 | 9.5 Disposal by dilution – standards for disposal in different types of water bodies,self purification of stream |
| 12TH | 20/12/2021 | 1 | **9. SEWAGE TREATMENT :**  10.1 Principles of treatment, flow diagram of conventional treatment |
| 21/12/2021 | 2 | 10.2 Primary treatment – necessity, principles, essential features, functions |
| 23/12/2021 | 1 | 10.3 Secondary treatment – necessity, principles, |
| 24/12/2021 | 1 | essential features, functions of secondary treatment unit |
| 13TH | 27/12/2021 | 1 | SANITARY PLUMBING FOR BUILDING :  11.1 Requirements of building drainage, layout of lavatory blocks in residential,buildings, layout of building drainage |
| 28/12/2021 | 2 | 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 |
| 30/12/2021 | 1 | **SECTION A: WATER SUPPLY ENGG**  **W/S PLUMBING IN BUILDING**  5.1 Method of connection from water mains to building supply |
| 31/12/2021 | 1 | 5.2 General layout of plumbing arrangement for water supply in single storied and multi-storied building as per I.S. code |
| 14TH | 03/01/2022 | 1 | **Monthly Test-3** |
| 04/01/2022 | 2 | Revision |
| 06/01/2022 | 1 | Revision |
| 07/01/2022 | 1 | Previous Year Question Discussion |