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| <b>Name of the Faculty</b>  | <b>Sandeep Tanwar</b>                           |
| <b>Discipline</b>           | <b>Civil Engineering</b>                        |
| <b>Semester</b>             | <b>4<sup>th</sup> Semester</b>                  |
| <b>Subject</b>              | <b>Water Supply and Waste Water Engineering</b> |
| <b>Lesson Plan Duration</b> | <b>16 Weeks (06.03.23 to 23.06.23)</b>          |

### Details

| <b>Week</b>     | <b>Theory Day</b> | <b>Topic</b>  | <b>Drawing Day</b> | <b>Drawing Name</b>                           |
|-----------------|-------------------|---|--------------------|---|
| 1 <sup>st</sup> | 1 <sup>st</sup>   | Necessity and brief description of water supply system                        | 1 <sup>st</sup>    | To determine turbidity of water sample        |
|                 | 2 <sup>nd</sup>   | -do-  | 2 <sup>nd</sup>    | -do-  |
|                 | 3 <sup>rd</sup>   | Source of water   |                    |   |
|                 | 4 <sup>th</sup>   | Surface/Sub-surface sources   |                    |   |
| 2 <sup>nd</sup> | 1 <sup>st</sup>   | Quality of water- water requirement   | 1 <sup>st</sup>    | To determine dissolved oxygen of given sample |
|                 | 2 <sup>nd</sup>   | Rate of demand and variation in rate of demand                                | 2 <sup>nd</sup>    | -do-  |
|                 | 3 <sup>rd</sup>   | Per capita consumption for domestic, industrial, public and firefighting uses |                    |   |
|                 | 4 <sup>th</sup>   | Population forecasting  |                    |   |
| 3 <sup>rd</sup> | 1 <sup>st</sup>   | Meaning of pure water and method of analysis of water                         | 1 <sup>st</sup>    | To determine pH value of water                |
|                 | 2 <sup>nd</sup>   | Physical, Chemical and bacteriological tests and their significance           | 2 <sup>nd</sup>    | -do-  |
|                 | 3 <sup>rd</sup>   | Standard of potable water as per Indian Standard                              |                    |   |
|                 | 4 <sup>th</sup>   | Maintenance of purity of water  |                    |   |
| 4 <sup>th</sup> | 1 <sup>st</sup>   | Sediment purpose, types of sedimentation tanks                                | 1 <sup>st</sup>    | To perform jar test for coagulation           |
|                 | 2 <sup>nd</sup>   | Coagulation /flocculation- usual coagulation and their feeding                | 2 <sup>nd</sup>    | --do--  |
|                 | 3 <sup>rd</sup>   | Filtration- significance, types of filters and their suitability              |                    |   |
|                 | 4 <sup>th</sup>   | Flow diagrams and function of – i) Aeration fountain ii) mixer                |                    |   |

|                 |                 |   |                 |  |
|-----------------|-----------------|---|-----------------|--|
| 5 <sup>th</sup> | 1 <sup>st</sup> | iii) flocculator iv) classifier   | 1 <sup>st</sup> | To determine BOD of given sample   |
|                 | 2 <sup>nd</sup> | v) Slow and rapid sand filters  | 2 <sup>nd</sup> | Do-  |
|                 | 3 <sup>rd</sup> | vi) Chlorination  |                 |  |
|                 | 4 <sup>th</sup> | Types of pipes – cast iron, PVC, Steel, asbestos cement, cement and lead pipes  |                 |  |
| 6 <sup>th</sup> | 1 <sup>st</sup> | Suitability of pipes and uses, types of joints in different type of pipes       | 1 <sup>st</sup> | To determine residual chlorine in water  |
|                 | 2 <sup>nd</sup> | Appurtenances: sluice, air, reflux valves, relief valves                        | 2 <sup>nd</sup> | -do-   |
|                 | 3 <sup>rd</sup> | Scour valves, bib cocks, stop cocks, fire hydrants                              |                 |  |
|                 | 4 <sup>th</sup> | Water meters their working and uses   |                 |  |
| 7 <sup>th</sup> | 1 <sup>st</sup> | Setting out alignment of pipes  | 1 <sup>st</sup> | To determine conductivity of water and total dissolved solids                  |
|                 | 2 <sup>nd</sup> | Excavation for laying of pipes and precaution to be taken                       | 2 <sup>nd</sup> | -do-   |
|                 | 3 <sup>rd</sup> | Handling, lowering and joining of pipes Testing of pipes lines, back filling    |                 |  |
|                 | 4 <sup>th</sup> | Building water supply-connection to water main                                  |                 |  |
| 8 <sup>th</sup> | 1 <sup>st</sup> | Water supply fittings and terminology related to plumbing                       | 1 <sup>st</sup> | To study the installation of water meter                                       |
|                 | 2 <sup>nd</sup> | Waste water Engineering-Introduction  | 2 <sup>nd</sup> | -do-   |
|                 | 3 <sup>rd</sup> | Purpose of sanitation, necessity of systematic collection and disposal of waste |                 |  |
|                 | 4 <sup>th</sup> | Definition of terms in sanitary engineering                                     |                 |  |
| 9 <sup>th</sup> | 1 <sup>st</sup> | Collection and conveyance of sewage   | 1 <sup>st</sup> | To study the installation of connection of water supply of building with mains |
|                 | 2 <sup>nd</sup> | Conservancy and water carriage systems, their advantages and disadvantages      | 2 <sup>nd</sup> | -do-   |
|                 | 3 <sup>rd</sup> | Surface drains: various types, suitability                                      |                 |  |

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|                  | 4 <sup>th</sup> | Types of sewage: domestic, industrial   |                 |   |
| 10 <sup>th</sup> | 1 <sup>st</sup> | Storm water and its seasonal variation  | 1 <sup>st</sup> | To study the installation of pipe valves and bends  |
|                  | 2 <sup>nd</sup> | Types of sewerage systems, materials for sewers, their sizes and joints         | 2 <sup>nd</sup> | -do-  |
|                  | 3 <sup>rd</sup> | Appurtenances: location, function and construction features                     |                 |   |
|                  | 4 <sup>th</sup> | Manholes, drop manholes, tank hole catch basin                                  |                 |   |
| 11 <sup>th</sup> | 1 <sup>st</sup> | Inverted siphon, flushing tank, grease and oil traps                            | 1 <sup>st</sup> | To study the installation of water supply and sanitary fittings   |
|                  | 2 <sup>nd</sup> | Storm regulators, ventilating shafts  | 2 <sup>nd</sup> | -do-  |
|                  | 3 <sup>rd</sup> | Setting out/alignment of sewers   |                 |   |
|                  | 4 <sup>th</sup> | Excavation, checking the gradient with boning rods preparation of bedding       |                 |   |
| 12 <sup>th</sup> | 1 <sup>st</sup> | Handling and jointing testing and back filling of sewer/pipes                   | 1 <sup>st</sup> | To study and demonstrate the joining/ period seading of GI pipes, CI pipes, SWG pipes, PVC pipes and copper pipes |
|                  | 2 <sup>nd</sup> | Construction of surface drains and different section required                   | 2 <sup>nd</sup> | -do-  |
|                  | 3 <sup>rd</sup> | Properties of sewage and IS standard for analysis of sewage                     |                 |   |
|                  | 4 <sup>th</sup> | Physical, chemical and bacteriological parameters                               |                 |   |
| 13 <sup>th</sup> | 1 <sup>st</sup> | General composition of sewage and disposal methods                              | 1 <sup>st</sup> | To demonstrate the laying of SWG pipes for sewers   |
|                  | 2 <sup>nd</sup> | Disposal by dilution and self purification of stream                            | 2 <sup>nd</sup> | -do-  |
|                  | 3 <sup>rd</sup> | Disposal by land treatment, nuisance due to disposal                            |                 |   |
|                  | 4 <sup>th</sup> | Meaning and principle of primary and secondary treatment                        |                 |   |
| 14 <sup>th</sup> | 1 <sup>st</sup> | Activated sludge process their flow diagram                                     | 1 <sup>st</sup> | Study of water purifying process by visiting a field lab  |
|                  | 2 <sup>nd</sup> | Introduction and uses of screens, grit chambers, detritus tanks, skimming tanks | 2 <sup>nd</sup> | -do-  |

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|                  | 3 <sup>rd</sup> | Plain sedimentation tanks, primary clarifiers, secondary clarifiers |                 |                                 |
|                  | 4 <sup>th</sup> | Filters, control beds, intermittent sand filters                    |                 |                                 |
| 15 <sup>th</sup> | 1 <sup>st</sup> | Sludge treatment and disposal, oxidation ponds                      | 1 <sup>st</sup> | Demonstration of plumbing tools |
|                  | 2 <sup>nd</sup> | Visit to a sewage treatment plant                                   | 2 <sup>nd</sup> | -do-                            |
|                  | 3 <sup>rd</sup> | Aims of building drainage and its requirements                      |                 |                                 |
|                  | 4 <sup>th</sup> | Different sanitary fittings and installations, traps                |                 |                                 |
| 16 <sup>th</sup> | 1 <sup>st</sup> | Revision  | 1 <sup>st</sup> | Revision                        |
|                  | 2 <sup>nd</sup> | Revision  | 2 <sup>nd</sup> | Revision                        |
|                  | 3 <sup>rd</sup> | Revision  |                 |                                 |
|                  | 4 <sup>th</sup> | Revision  |                 |                                 |