**SARDAR VALLABHBHAI NATIONAL INSTITUTE OF TECHNOLOGY, SURAT**

**DEPARTMENT OF CIVIL ENGINEERING**

**WATER RESOURCES ENGINEERING SECTION**

**WATER RESOURCES ENGINEERING LABORATORY**

Water resources engineering (WRE) laboratory was established in the year 1961. The laboratory is located behind the Department of Civil Engineering. The laboratory facilities are utilized by undergraduate and postgraduate students for their curriculum laboratory work. The research scholars also utilize it for the research and development activities. Set ups like groundwater modeling, cavitation studies and open channel are used for some of the consultancy work. It is one of the key laboratory for UG/PG courses working with majority of available set ups. The laboratory has good potential to carry out research and generate revenue using calibration and testing work in future. List of equipments available in the laboratory is given below:

|  |  |
| --- | --- |
| **Sr. No.** | **Equipment Name** |
| 1 | Wind Tunnel Equipment With Auto Model A8 |
| 2 | Hele Shaw Apparatus |
| 3 | Infiltrometer |
| 4 | Multipurpose Flume |
| 5 | Pipe Surge and Water Hammer Apparatus |
| 6 | Ground Flow/Well Abstraction |
| 7 | Hydraulic Bench |
| 8 | Basic Hydrology System/ Rainfall Simulator |
| 9 | Pipe Fitting |
| 10 | Orifice and Mouthpiece |
| 11 | Notch Apparatus |
| 12 | Reynolds Apparatus |
| 13 | Bend Meter |
| 14 | Rota Meter |
| 15 | Bernoulli’s Theorem |
| 16 | Friction in Pipeline |
| 17 | Metacentric Height |
| 18 | Impact on Jets |
| 19 | Nozzle Meter |
| 20 | Pitot Static Tube |
| 21 | Venturimeter and Orifice Meter |
| 22 | Free And Force Vortex Apparatus |
| 23 | Current Meter |
| 24 | Double Ring Infiltrometer |
| 25 | Electrical Analogy Apparatus |
| 26 | Specialized Software |

**Information Regarding Few Important Set Ups in the WRE Laboratory**

**Multipurpose Flume:**

The set-up comprises of a rectangular tilting flume. The water is generally supplied by a centrifugal pump. At the inlet and the exit sections for flow control, gates with rack and pinion arrangements are provided. The flume inlet portion is equipped with a honeycomb or baffles wall to calm the flow. On top of the side walls, the flume is provided with rails on which a trolley moves to and fro. The trolley is equipped with the pitot-static tube and the pointer gauge. The flume can be tilted to give the required slope with a screw jack provided for this purpose. A calibrated orifice meter is provided on the supply line for discharge measurement. Alternatively, a large measuring tank can collect water. Multipurpose flume is shown in figure 1 below.

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Figure.1 Multipurpose Flume

**Basic Hydrology System/ Rainfall Simulator:**

Basic Hydrology System is a laboratory instrument by which we can measure the run-off discharge, base flow discharge by adjusting rainfall intensity. For equally distributing rainfall over the bed, nine showers are fitted at equal distances from each other. The rainfall simulator is shown below in figure 2.

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Figure.2 Basic Hydrology Simulator

**LIST OF EXPERIMENTS**

**Hydraulic Engineering (CE201) (B. Tech-II (Civil), Semester III)**

|  |  |
| --- | --- |
| **Sr. No.** | **Title of Experiment** |
| 1 | Determination of metacentric height |
| 2 | Estimation of hydraulic coefficients for orifice |
| 3 | Calibration of rectangular and triangular notches |
| 4 | Calibration of venturi meter and orifice meter |
| 5 | Verification of Bernoulli’s principle |
| 6 | Friction factor of laminar and turbulent flow for single and multiple pipes |
| 7 | Characteristics of free and forced vortex |
| 8 | Measurement of velocity distribution using pitot tube and current meter |
| 9 | Development of specific energy diagram |
| 10 | Characteristics of hydraulic jump |
| 11 | Main characteristics of turbines |
| 12 | Operating characteristics of centrifugal pump |

**LIST OF EXPERIMENTS**

**Hydraulic Engineering Laboratory-1 (CEWR105) (M. Tech-I (Civil), Semester I)**

|  |  |
| --- | --- |
| **Sr. No.** | **Title of Experiment** |
| 1 | Development of uniform flow in open channel |
| 2 | Measurement of velocity distribution in open channel using pitot tube and plotting of isovels and computation of α and β |
| 3 | Establishment of subcritical, critical and supercritical flow in open channel, plotting of specific energy diagram |
| 4 | Characteristics of hydraulic jump in open channel |
| 5 | Measurement and computation of gradually varied flow profiles in open channel |
| 6 | Rainfall and runoff characteristics using rainfall simulator |
| 7 | Infiltrometer to study infiltration capacity of different types of soil |
| 8 | Measurement of boundary layer thickness on flat plate |
| 9 | Measurement of drag and lift force coefficient for cylinder and spheres |
| 10 | Development of synthetic unit hydrograph and flood hydrograph using CWC method |

**LIST OF EXPERIMENTS**

**Hydraulic Engineering Laboratory-II (CEWR204) (M. Tech-I (Civil), Semester II)**

|  |  |
| --- | --- |
| **Sr. No.** | **Title of Experiment** |
| 1 | Measurement of discharge using Venturi flume for free and submerged flow condition |
| 2 | Measurement of discharge using Broad-crested weir for free and submerged condition |
| 3 | Incipient motion of sediments in mobile boundary channel |
| 4 | Flow through porous media using ground water flow unit |
| 5 | Measurement of bed shear stress by preston tube |
| 6 | Seepage analysis of earthen dam using electrical analogy |
| 7 | Water hammer pressure and surge tank analysis |
| 8 | Cavitation demonstration and analysis |

**Photos of Some Other UG/PG Set Ups**

**METACENTRIC HEIGHT APPARATUS**

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**BERNOULLIS THEORAM APPARATUS**

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**NOTCH APPRATUS**



**FORCED VORTEX APPARATUS**

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**FREE VORTEX APPARATUS**

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***VENTURI/ORRIFICE METER***

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**GROUND FLOW/WELL ABSTRACTION**

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**Cavitation Demonstration**

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**HAMMER WATER APPARATUS**

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**ELECTRICAL ANALOGY APPARATUS**

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