

OBJECTIVES:

- Students should be able to verify the principles studied in theory by performing the experiments in lab.

LIST OF EXPERIMENTS

17

A. Flow Measurement

- Calibration of Rotometer
- Flow through Venturimeter Orificemeter
- Flow through variable duct area - Bernoulli's Experiment
- Flow through Orifice, Mouthpiece and Notches

B. Losses in Pipes

4

- Determination of friction coefficient in pipes
- Determination of loss coefficients for pipe fittings

C. Pumps

12

- Characteristics of Centrifugal pumps
- Characteristics of Gear pump
- Characteristics of Submersible pump
- Characteristics of Reciprocating pump

D. Turbines

9

- Characteristics of Pelton wheel turbine
- Characteristics of Francis turbine
- Characteristics of Kaplan turbine

E. Determination of Metacentric height

3

- Determination of Metacentric height (Demonstration)

TOTAL: 45 PERIODS**OUTCOMES:**

- The students will be able to measure flow in pipes and determine frictional losses.
- The students will be able to develop characteristics of pumps and turbines.

REFERENCES:

- Sarbjit Singh." Experiments in Fluid Mechanics", Prentice Hall of India Pvt. Ltd, Learning Private Limited, Delhi, 2009.
- "Hydraulic Laboratory Manual", Centre for Water Resources, Anna University, 2004.
- Modi P.N. and Seth S.M., "Hydraulics and Fluid Mechanics", Standard Book House, New Delhi, 2000.
- Subramanya K. "Flow in open channels", Tata McGraw Hill Publishing. Company, 2001.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

Sl. No.	Description of Equipment	Quantity
1.	Bernoulli's theorem – Verification Apparatus	1 No.
2.	Calculation of Metacentric height water tank Ship model with accessories	1 No.
3.	Measurement of velocity Pitot tube assembly	1 No.
4.	Flow measurement open channel flow (i) Channel with provision for fixing notches (rectangular, triangular & trapezoidal forms)	1 Unit
	(ii) Flume assembly with provisions for conducting experiments on Hydraulic jumps, generation of surges etc.	1 Unit
5.	Flow measurement in pipes (i) Venturimeter, U tube manometer fixtures like Valves, collecting Tank	1 Unit
	(ii) Orifice meter, with all necessary fittings in pipe lines of different Diameters	1 Unit

	(iii) Calibration of flow through orifice tank with Provisions for fixing orifices of different shapes, collecting tank	1 Unit
	(iv) Calibration of flow through mouth piece Tank with provisions for fixing mouth pieces Viz external mouth pieces & internal mouth piece Borda"s mouth piece	1 Unit
6.	Losses in Pipes Major loss – Friction loss Pipe lengths (min. 3m) of different diameters with Valves and pressure rapping & collecting tank	1 Unit
7.	Minor Losses Pipe line assembly with provisions for having Sudden contractions in diameter, expansions Bends, elbow fitting, etc.	1 Unit
8.	Pumps (i) Centrifugal pump assembly with accessories (single stage)	1 Unit
	(ii) Centrifugal pump assembly with accessories (multi stage)	1 Unit
	(iii) Reciprocating pump assembly with accessories	1 Unit
	(iv) Deep well pump assembly set with accessories	1 Unit
9.	Turbine (i) Impulse turbine assembly with fittings & accessories	1 Unit
	(ii) Francis turbine assembly with fittings & accessories	1 Unit
	(iii) Kaplan turbine assembly with fittings & accessories	1 Unit