Course code	Course Name	L-T-P-Credits	Year of Introduction
SB231	**MECHANICS OF FLUIDS LAB**	**0-0-3-1**	**2016**

Prerequisite : SB203 Mechanics of fluids

Course Objectives:

1. Introduce major instruments commonly used in the domain of fluid mechanics.
2. Familiarization with setting up of experiments in a laboratory environment.
3. Provide an environment to enable correlation of theoretical knowledge gained in the class room with the physical world.

List of Exercises/ Experiments (Minimum 10 are mandatory)

1. Study of Various Pressure, Velocity and Flow Measuring Instruments.
   Equipment: Pressure/ Vacuum Gauge, U Tube Manometer, Pitot Tube, Flow Meter etc.

2. Pressure Measurements using a U-Tube Manometer.
   Equipment: U Tube Manometer.

3. Determination of Metacentric Height and Radius of Gyration of Floating Bodies.
   Equipment: Flat Bottom Pontoon, Water Tank.

4. Experimental Verification of Bernoulli's Theorem.
   Equipment: Bernoulli Apparatus.

5. Determination of Darcy's Constant and Chezy's Constant for Pipe Flow.
   Equipment: Experiment set up with pipes of various diameters fitted with flow control valves, Tank, U Tube Manometer.

6. Determination of Critical Velocity in Pipe Flow.
   Equipment: Reynold's Apparatus.

7. Determination of Minor Losses in Pipe Flow.
   Equipment: Hydraulic Bench, Pipe Bends & Fittings Apparatus.

8. Determination of Type of Flow using Reynolds Number.
   Equipment: Reynold's Apparatus.

9. Study of Laminar-Turbulent Transition for Flow in a Tube.
   Equipment: Reynold's Apparatus.

10. Determination of Coefficient of Discharge of V Notch.
    Equipment: Supply Tank, Collecting Tank, V Notch.

11. Determination of Coefficient of Discharge of Rectangular & Trapezoidal Notches.
    Equipment: Supply Tank, Collecting Tank, Rectangular Notch.

12. Determination of Coefficient of Discharge of Trapezoidal Notch.
    Equipment: Supply Tank, Collecting Tank, Trapezoidal Notch.

13. Determination of Hydraulic Coefficients of Orifices under Constant Head Method.

Equipment: Supply Tank, Collecting Tank, Orifices.

14. Determination of Hydraulic Coefficients of Mouthpieces under Constant Head Method.
    Equipment: Supply Tank, Collecting Tank, Mouthpieces.

15. Determination of Hydraulic Coefficients of Orifices under Time of Emptying Method.
    Equipment: Supply Tank, Collecting Tank, Orifices.

16. Determination of Hydraulic Coefficients of Mouthpieces under Time of Emptying Method.
    Equipment: Supply Tank, Collecting Tank, Mouthpieces.

17. Calibration of Venturimeter.
    Equipment: Venturimeter, U Tube Manometer, Supply Tank, Collecting Tank.

18. Calibration of Orificemeter.
    Equipment: Orificemeter, U Tube Manometer, Supply Tank, Collecting Tank.

19. Calibration of Watermeter.
    Equipment: Watermeter, Supply Tank, Collecting Tank.

20. Study and acquire a thorough knowledge of the various Pipe Fittings and Plumbing Tools.
    Equipment: Fittings like Reducers, Bends, Elbows, Y Connectors, Union, Coupling etc; Tools like Pipe Wrenches, Pipe Threaders, Pipe Bending Machine etc.

21. Study the use of different types of Valves.
    Equipment: Gate Valve, Butterfly Valve, Globe Valve, Relief Valve, Non-return valve etc.

22. Determination of Chezy's Constant and Manning's Number for Open Channel Flow.
    Equipment: Open channel of rectangular cross section with slope adjusting mechanism.

Note: Only major equipments are indicated.

Expected Outcome:
Upon successful completion of the course, the student will be:
   i.   Familiar with the arrangement and conduct of experiments in the fluid mechanics laboratory environment.
  ii.   Able to note down relevant readings and perform calculations while an experiment is in progress.
 iii.   Able to comprehend the factors responsible for variation between theoretical and experimental results pertaining to the domain of fluid mechanics.

Text Books:
- Yunus A. Cenegel, John M. Cimbala; Fluid Mechanics- Fundamentals and Applications (in SI Units); McGraw Hill.
- Bansal R.K, Fluid Mechanics and Hydraulic Machines (SI Units); Laxmi Publications.