

FLUID DYNAMICS LABORATORY

| III Semester: AE | | | | | | | | |
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| Course Code | Category | Hours / Week | | | Credits | Maximum Marks | | |
| AAEB05 | Core | L | T | P | C | CIA | SEE | Total |
| | | - | - | 2 | 1 | 30 | 70 | 100 |
| Contact Classes: Nil | | Tutorial Classes: Nil | | | Practical Classes: 24 | | Total Classes: 24 | |
| <p>OBJECTIVES: The course should enable the students to:</p> <ol style="list-style-type: none"> I. Gain knowledge on working of centrifugal pumps, positive displacement pumps, hydraulic turbines centrifugal blowers and steam turbines. II. Compare performance of various machines at different operating points. III. Knowledge of various flow meters and the concept of fluid mechanics. <p>COURSE LEARNING OUTCOMES (CLOs):</p> <ol style="list-style-type: none"> 1. Analyze the flow discharge through venturimeter and orificemeter. 2. Understand the effects of friction for various pipe flows. 3. Explain the pipe flow losses in various pipes. 4. Understand the application of Bernoulli's theorem. 5. Understand the concepts of dimensionless numbers in fluid flows. 6. Observe the transition of flow under various circumstances. 7. Understand the impact of jet on different vanes and its applications on impellers. 8. Analyze the power efficiency of a centrifugal pump. 9. Analyze the power efficiency of a reciprocating pump. 10. Differentiate the flow properties around centrifugal pump and reciprocating pump. 11. Analyze the power efficiency and mechanical efficiency of a Pelton wheel. 12. Analyze the power efficiency and mechanical efficiency of a Francis turbine. 13. Differentiate the flow properties and efficiencies of Pelton wheel and Francis turbine 14. Understand the rate of discharge for flow through weirs 15. Understand the calculation of discharge for flow through dams. 16. Analyze the flow discharges through different shapes of mouth pieces. | | | | | | | | |
| LIST OF EXPERIMENTS | | | | | | | | |
| Week-1 | CALIBRATION | | | | | | | |
| Calibration of Venturimeter and Orifice meter. | | | | | | | | |
| Week-2 | PIPE FLOW LOSSES | | | | | | | |
| Determination of pipe flow losses in rectangular and circular pipes | | | | | | | | |
| Week-3 | BERNOULLI'S THEOREM | | | | | | | |
| Verification of Bernoulli's theorem. | | | | | | | | |
| Week-4 | REYNOLDS EXPERIMENT | | | | | | | |
| Determination of Reynolds Number of fluid flow | | | | | | | | |

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| Week-5 | IMPACT OF JET ON VANES |
| Study Impact of jet on Vanes. | |
| Week-6 | CENTRIFUGAL PUMPS |
| Performance test on centrifugal pumps. | |
| Week-7 | RECIPROCATING PUMPS |
| Performance test on reciprocating pumps. | |
| Week-8 | PELTON WHEEL TURBINE |
| Performance test on Pelton wheel turbine. | |
| Week-9 | FRANCIS TURBINE |
| Performance test on Francis turbine. | |
| Week-10 | FLOW THROUGH WEIRS |
| Rate of discharge Flow through Weirs | |
| Week-11 | FLOW THROUGH NOTCH |
| Flow through rectangular and V-Notch | |
| Week-12 | FLOW THROUGH ORIFICE MOUTH PIECE |
| Flow analysis of different shapes of mouth pieces | |
| Reference Books: | |
| <ol style="list-style-type: none"> 1. Yuan S W, "Foundations of fluid Mechanics", Prentice-Hall, 2nd Edition, 1987. 2. Milne Thompson L M, "Theoretical Hydrodynamics", MacMillan, 5th Edition, 1968. 3. Rathakrishnan. E, "Fundamentals of Fluid Mechanics", Prentice-Hall, 5th Edition, 2007. 4. Som S. K., Biswas. G, "Introduction to fluid mechanics and fluid machines", Tata McGraw-Hill, 2nd Edition, 2004. | |