



MARRI LAXMAN REDDY INSTITUTE OF TECHNOLOGY AND MANAGEMENT

(AN AUTONOMOUS INSTITUTION)

(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)

Accredited by NAAC with 'A' Grade & Recognized Under Section 2(f) & 12(B) of the UGC act, 1956

COURSE CONTENT

| FLUID MECHANICS AND HYDRAULIC MACHINES LABORATORY | | | | | | | | |
|--|-----------------------|------------------------|---|---|-------------------|---------------|-----|-------|
| III Semester: ME | | | | | | | | |
| Course Code | Category | Hours / Week | | | Credits | Maximum Marks | | |
| 2530377 | Foundation | L | T | P | C | CIA | SEE | Total |
| | | 0 | 0 | 2 | 1 | 40 | 60 | 100 |
| Contact Classes: 30 | Tutorial Classes: Nil | Practical Classes: Nil | | | Total Classes: 30 | | | |
| Prerequisites: Basic knowledge in Physics | | | | | | | | |

Course Overview:

This laboratory course provides hands-on experience in fluid mechanics and hydraulic machinery. Students will perform experiments on flow measuring devices such as Venturi and Orifice meters, and study energy losses in pipelines due to friction and sudden contractions. Verification of fundamental principles like Bernoulli's theorem strengthens their understanding of fluid behavior. The course also emphasizes performance evaluation of hydraulic turbines (Pelton, Francis, Kaplan) and pumps (centrifugal and reciprocating) under various operating conditions. Through these experiments, students develop practical skills in calibration, testing, data interpretation, and analysis, enabling them to apply theoretical knowledge to real-world hydraulic systems.

Course Objectives:

1. Understand fluid flow measurement using Venturi and Orifice meters.
2. Analyze energy losses and friction in pipelines.
3. Verify fluid mechanics principles like Bernoulli's theorem.
4. Evaluate performance of turbines and pumps.
5. Develop experimental and data analysis skills in hydraulics.

Course Outcomes: After Completion of the Course, Students should be able to

1. Calibrate and use flow measuring devices accurately.
2. Determine friction factors and head losses in pipelines.
3. Verify Bernoulli's theorem experimentally.
4. Assess performance of turbines and pumps.
5. Apply experimental results for practical hydraulic system analysis.

LIST OF EXPERIMENTS:

1. Calibration of Venturi meter.
2. Calibration of Orifice meter.
3. Determination of friction factor for a given pipe line.
4. Determination of loss of head due to sudden contraction in a pipeline.
5. Verification of Bernoulli's Theorems.
6. Impact of jets on Vanes.
7. Performance Test on Pelt on Wheel.
8. Performance Test on Francis Turbine.

9. Performance Test on Kaplan Turbine.
10. Performance Test on Single Stage Centrifugal Pump.
11. Performance Test on Multi Stage Centrifugal Pump.
12. Performance Test on Reciprocating Pump.

TEXT BOOKS:

1. Hydraulics, Fluid mechanics and Hydraulic Machinery, Modi and Seth, standard Book House, 22nd Edition, 2019.
2. Fluid Mechanics and Hydraulic Machines, R.K. Bansal, Laxmi Publications, 10th Edition, 2020.

LAB MANUALS:

1. Fluid Mechanics and Machinery Laboratory Manual, Sadhu Singh, Khanna Publishers, 2022.
2. Fluid Mechanics and Hydraulic Machines, K. Subramanya, McGraw Hill Education, 2022.

ELECTRONIC RESOURCES:

1. <https://fm-iitk.vlabs.ac.in/>

MATERIALS ONLINE:

1. Lab Manual