Course Type	Course Code	Name of Course	L	T	P	Credit
DC	MEC 206	Fluid Machines	3	0	0	9

Course Objective

- To understand kinematic and dynamic behaviour of fluid while passing through different fluid machines.
- To understand working and performance characteristics of various hydraulic machines.
- To provide knowledge about in field application and operational aspects of various hydraulic machines.

Learning Outcomes

Upon successful completion of this course, students will:

- have a broad understanding of classification of fluid machines used to handle different types of fluid for different purpose.
- have an understanding about basics of rotodynamic machines.
- be able to design different types of fluid machines based on dimensional analysis.
- be able to understand operation principle of different fluid machines, design or select it for particular purpose and identify the reasons for faults during operation.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Introduction to incompressible and compressible flow. Classification and field of application of fluid machines, Jet Striking Plates	7	Understanding basics of fluid flow. Classification of fluid machines and types of fluid handled by the machines.
2	Water Turbines: Theory of Rotodynamic Machines-Euler's Equation, components of energy transfer, Classification – Impulse and Reaction Turbines, Construction, Operation, Head and efficiencies, Power calculation and governing of Pelton, Francis and Kaplan turbines; Draft tube; Surge tank.	10	Basics of rotodynamic machines. Detailed introduction and operation of different hydraulic turbines.
3	Application of dimensional analysis in fluid machines - Unit quantities and Specific speed.	4	Utility of dimensional analysis to design and analyze the performance of fluid machines.
4	Centrifugal Pumps: Types; Heads and efficiencies; Construction of impeller and casing; Multi-stage pumps; Specific speed; Model testing; Characteristic curves; NPSH; Cavitations; Selection of centrifugal pump.	7	This unit demonstrates the operation principle of centrifugal pump handling water.
5	Reciprocating Pumps: Classification with constructional details; Theory; Indicator diagram; Effect of acceleration of piston; Effect of friction in pipes; Air vessel and its effects; NPSH. Rotary Positive Displacement Pumps: Types and constructional details.	6	This unit demonstrates the operation principle of reciprocating pump handling liquid.
6	Air compressors, selection steps and testing procedure of fluid machines.	8	This unit demonstrates the operation principle of air compressor.

Text Books:

1. Introduction to Fluid Mechanics, S.K. Som, Gautam Biswas and Suman Chakraborty, 3rd Edition, 2011, McGraw Hill Publication

Reference Books:

1. Fluid Mechanics, Victor L Streeter, E. Benjamin Wylie and K.W. Bedford, 9th Edition, McGraw Hill Publication
2. Mechanics of Fluids, I.H. Shames, 3rd edition, 2013, Tata McGraw Hill Publication