Semester III			
Elective III A	Fluid Mechanics		
Course Code: 21PMAE31	Hrs/Week: 4	Hrs/Sem: 60	Credits: 3

Course Objectives

- To introduce fundamental aspects of fluid flow behaviour and to develop steady state mechanical energy balance equation for fluid flow systems.
- To estimate pressure drop in fluid flow systems and determine performance characteristics of fluid machinery.

Course Outcome

CO.No.	Upon completion of this course, students will be able to	PSO Addressed	CL
CO-1	explain fundamentals of fluid mechanics, which is used in the applications of Hydraulics.	1,8	Un
CO-2	employ Archimedes principle to solve numerical examples on Buoyancy.	2,5	Ap
CO-3	develop understanding about hydrostatic law, principle of buoyancy and stability of a floating body and application of mass, momentum and energy equation in fluid flow.	2	Ap
CO-4	imbibe basic laws and equations used for analysis of static and dynamic fluids.	1,8	Un
CO-5	examine stability of submerged and floating bodies.	6	An
CO-6	differentiate horizontal motion and vertical motion.	1	An
CO-7	describe methods of implementing fluid mechanics laws and phenomena.	5,6	Re
CO-8	calculate and optimize operational parameters of hydraulic problems, systems and machines	2	Cr,Ap

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Unit I

Properties of Fluids: Viscosity - Thermodynamic properties- Compressibility and Bulk modulus - Surface Tension and Capillarity - Vapour Pressure and Cavitation.

(Chapter 1: Sec 1.1 – 1.7)

Unit II

Pressure and its measurement: Fluid pressure of a point - Pascal's Law - Pressure variation in a fluid at rest - Absolute, Gauge, Atmospheric and Vacuum Pressure - Measurement of pressure - Simple manometer - Differential Manometer - Pressure at a point in Compressible fluid.

(Chapter 2: Sec 2.1 – 2.8)

Unit III

Hydrostatic forces on Surfaces: Total pressure and Centre of Pressure- Vertical Plane Surfaces submerged in liquid - Horizontal Plane Surfaces submerged in liquid -Inclined Plane Surface submerged in liquid - Curved Surface submerged in liquid

(**Chapter 3: Sec 3.1-3.6**)

Unit IV

Total Pressure and Centre of pressure on lock gates - Pressure Distribution in a liquidsubjected to Horizontal/Vertical Acceleration.

(Chapter3:Sec3.7-3.9)

Unit V

Buoyancy and flotation: Buoyancy - Centre of Buoyancy - Metacentre - Metacentric height - Conditions of Equilibrium of a Floating and Submerged bodies - Experimental Method of Determination of Meta - centric Height - Oscillation of a floating body.

(Chapter 4 Sec 4.1 – 4.9)

Text Book

1. Dr.R.K. Bansal. *A text book of Fluid Mechanics*. Laxmi Publication private limited, Tenth edition.

Books for Reference

1. Joseph H.Spurk, NuriAksel. *Fluid Mechanics*. Springer- Verlag Berlin Heidelberg, Second Edition, 2008.
2. Ranald V. Giles. *Fluid Mechanics and Hydraulics*. McGraw - Hill Book Company, Second Edition.