AIM: Expose the students to understand the basic of Fluid Mechanics, fluid properties, fluid flow and fluid machineries.

Course outcomes:	
Explain the fundamentals of fluid properties and fluid flows.	K2
Use Euler and Bernoulli's equations for various applications.	K3
Apply dimensional analysis to simple problems.	K3
Apply principles of fluid mechanics to the operation, design, and selection of hydraulics turbines.	K3
Analyze the performance of hydraulic pump.	K4

UNIT - I BASIC CONCEPTS AND PROPERTIES	**12**
Units & Dimensions – Properties of fluids – Specific gravity, specific weight, viscosity, compressibility – capillarity and surface tension – Flow characteristics: concepts of system and control volume – Application of control volume to continuity equation – energy equation, momentum equation Pascal's law, measurement of pressure, manometers, Hydrostatic law.	
UNIT – II FLOW THROUGH PIPES	**12**
Laminar flow though circular conduits and circular annuli – Boundary layer concepts – Boundary layer thickness – Hydraulic and energy gradient – Darcy Weisbach equation – Friction factor and Moody diagram –Minor losses – Flow through pipes in series and in parallel – loss of energy in pipes – Equivalent pipes - Buoyancy and stability of floating bodies	
UNIT - III DIMENSIONAL ANALYSIS	**12**
Dimension and units – Buckingham's Π theorem – Discussion on dimensionless parameters – Models and similitude – Applications of dimensionless parameters	
UNIT – IV HYDRAULIC TURBINES	**12**
Force exerted on moving plate vanes – Definition and classifications – Pelton, Francis, Propeller and Kaplan turbine: Working principles – Velocity triangle – Work done – specific speed – efficiencies – Performance curve for turbines	
UNIT- V HYDRAULIC PUMPS	**12**
Definition and classifications – Centrifugal and Reciprocating Pumps: Working principles – Indicator diagram – Specific speed – efficiency and performance curves – Cavitations in pumps	
Total: 60 Periods	

TEXTBOOK:

1. BansalR.K.,**"ATextbookofFluidMechanicsandHydraulicsMachines",**LaxmiPublication,India, (2015)
2. RajputR.K.,**"FluidMechanicsandHydraulicMachines",**S.Chand&CompanyLtd.,New Delhi,(2013)
3. Modi P.N., & Seth S.M., "Hydraulics and Fluid Mechanics including Hydraulic Machines", Standard book house, (2012)

REFERENCEBOOK:

1. KumarK.L.,**"EngineeringFluidMechanics",**S.ChandPublishing(P)Ltd.,NewDelhi,(2014)
2. StreeterV. L.,and Wylie E.B., **"FluidMechanics",**McGrawHill,(2008)
3. WhiteF.M.,**"FluidMechanics",**TataMcGraw-Hill,NewDelhi,(2010)

WEB RESOURCES:

1. https://www.academia.edu/48949774/A_Textbook_of_Fluid_Mechanics_and_Hydraulic_Machines_by_R_K_Rajput_
2. https://library.iitd.ac.in/index.php/node/81773

PSN College of Engineering and Technology		Regulation: 2022				
Department:	Mechanical Engineering	Branch Code/ Degree/Branch (mention all branches for which the subject is offered)	10/ B.E - MECH			
Semester:	III					
Subject Code:	510001		L	T	P	C
Subject Title:	FLUID MECHANICS AND MACHINERY		3	0	0	3

Course objective:

To understand the characteristics of fluids and working of hydraulic machines

UNIT - I BASIC CONCEPTS AND PROPERTIES **12**

Units & Dimensions – Properties of fluids – Specific gravity, specific weight, viscosity, compressibility – capillarity and surface tension – Flow characteristics: concepts of system and control volume – Application of control volume to continuity equation – energy equation, momentum equation Pascal's law, measurement of pressure, manometers, Hydrostatic law.

UNIT – II FLOW THROUGH PIPES **12**

Laminar flow though circular conduits and circular annuli – Boundary layer concepts – Boundary layer thickness – Hydraulic and energy gradient – DarcyWeisbach equation – Friction factor and Moody diagram –Minor losses – Flow through pipes in series and in parallel – loss of energy in pipes – Equivalent pipes - Buoyancy and stability of floating bodies

UNIT - III DIMENSIONAL ANALYSIS **12**

Dimension and units – Buckingham's Π theorem – Discussion on dimensionless parameters – Models and similitude – Applications of dimensionless parameters

UNIT – IV HYDRAULIC TURBINES **12**

Force exerted on moving plate vanes – Definition and classifications – Pelton, Francis, Propeller and Kaplan turbine: Working principles – Velocity triangle – Work done – specific speed – efficiencies – Performance curve for turbines

UNIT- V HYDRAULIC PUMPS **12**

Definition and classifications – Centrifugal and Reciprocating Pumps: Working principles – Indicator diagram – Specific speed – efficiency and performance curves – Cavitations in pumps

Total: 60 Periods

Course outcomes:

CO1 : Explain the fundamentals of fluid properties and fluid flows. K2

CO2 :	Use Euler and Bernoulli's equations for various applications.	K3
CO3 :	Apply dimensional analysis to simple problems.	K3
CO4 :	Apply principles of fluid mechanics to the operation, design, and selection of hydraulics turbines.	K3
CO5 :	Analyze the performance of hydraulic pump.	K4

TEXTBOOK:

1. BansalR.K.,**"ATextbookofFluidMechanicsandHydraulicsMachines",**LaxmiPublication,India, (2015)
2. RajputR.K.,**"FluidMechanicsandHydraulicMachines",**S.Chand&CompanyLtd., New Delhi,(2013)
3. Modi P.N., & Seth S.M., "Hydraulics and Fluid Mechanics including Hydraulic Machines", Standard book house, (2012)

REFERENCEBOOK:

1. KumarK.L.,**"EngineeringFluidMechanics",**S.ChandPublishing(P)Ltd.,NewDelhi, (2014)
2. StreeterV. L.,and Wylie E.B., **"FluidMechanics",**McGrawHill,(2008)
3. WhiteF.M.,**"FluidMechanics",**TataMcGraw-Hill,NewDelhi,(2010)

WEB RESOURCES:

1. https://www.academia.edu/48949774/A_Textbook_of_Fluid_Mechanics_and_Hydraulic_Machines_by_R_K_Rajput_
2. https://library.iitd.ac.in/index.php/node/81773