LESSON PLAN SESSION Jan-May 2024-2025

SUBJECT: Fluid Mechanics & Machinery   **SEMESTER:** 4TH

BRANCH: - MECHANICAL ENGINEERING

UNIT NUMBER	NAME OF THE TOPIC	NO OF CLASS REQUIRED	REMARK
Unit-1.0 Fluid properties and Fluid Pressure	1.1 Introduction and classification of fluid.	01	
	1.2 Fluid properties- Density, Specific gravity, specific weight, specific volume, Dynamic & Kinematic viscosity, Surface tension, Capillarity, Vapour pressure, Compressibility, Bulk modulus.	04	
	1.3 Types of fluids: Ideal, Real, Newtonion, Non- Newtonion fluid	01	
	1.4 Continuity equation and simple numerical problems based on it.	03	
	1.5 Pressure, Fluid pressure, pressure head, Pressure Intensity, Concept of absolute Vacuum, Gauge Pressure, Atmospheric Pressure, Absolute Pressure,	01	
	1.6 Pressure measurement- Manometer, U- tube manometer, Incline manometer, Inverted U manometer, Piezometer.	04	
	1.7 Concept of Total pressure, Centre of pressure, Pascal's law, Hydrostatic forces on plane and curved surface immersed in liquid and simple problems on it,	04.	
	1.8 Metacenter	01	
Unit-2.0. Fluid flow energy equation	2.1 Various forms of energies applicable to fluid flow – Potential energy, Kinetic energy, Pressure energy, Total energy	01	
	2.2 Concept of datum pressure, Velocity and total head of fluid in motion.	01	
	2.3 Energy equation- Steady flow energy equation and derivation of Bernoulli Theorem and its assumption and practical application. Simple numerical problems on Bernoulli equation.	03	
	Simple numerical problems on Bernoulli equation.	02	
Unit-3.0 Flow through pipes	3.1 Fluid flow- Steady, unsteady, uniform, non uniform, laminar and turbulent flow	01	
	3.2 Flow measurement- definition and types of orifices, Vena contraction, coefficient of contraction, Experimental determination of Cc, Cd , Cv	02	
	3.3 Construction, working, application and simple problem on – Venturimeter, orifice meter, pitot tube, Nozzle.	04	
	3.4 Viscous flow-Concept of viscosity of fluids, Reynolds number and its criteria for plate and pipes, Darcy -Weisbatch equation, loss of head due to friction in pipe , Hagen- Poiseuille formula	04	
	3.5 Flow through pipes- Pipes in series, Pipes in parallel, Head losses-various types of minor and major energy loss occur in fluid flow through pipes. H.G.L. and T.E.L., surge tank, water hammer and its effects.	04	
Unit-4.0 Hydraulic Turbine	4.1 Classification of hydraulic turbines	01	
	4.2 Functions and working principle of Impulse and reaction turbine	01	
	4.3 Comparison of impulse and reaction turbine	01	
	4.4 Construction and working principle of Pelton wheel, Francis and Kaplan turbine	03	
	4.5 Selection of turbine on the basis of head and discharge 4.6 Draft tube – types, constructions, and benefit of draft tubes	02	
	4.7 Calculation of work done, power, efficiency of turbines 4.8 Safety precaution on turbines	02	
	4.9 Impact of jet on flat and curved plate in stationary and moving blades.	03	
Unit 5.0 Pumps	5.1 Centrifugal pumps- Construction, working principle and application of centrifugal pump. Total head of pump, Classification of centrifugal pump, impellers, casing, stages, priming and cavitations.	02	
	5.2 Reciprocating pumps- Construction, working principle and	02	

	application of reciprocating pump, single acting and double acting, slip, negative slip, use of air vessels, Comparison of centrifugal and reciprocating pump.		
	5.3 Submersible pump- Construction, working principle and application of submersible pump.	02	
	Total Class Required	60	

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