RGPV (DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT-3	Sheet No. 1/3
Branch	**Mechanical Engineering**	**Semester**	**IV**
Course Code	402	**Course Name**	**Fluid Mechanics & Hydraulic Machinery**

Course Outcome 1	**Discuss fluids, properties of fluid , pressure and its measurements.**		Teach Hrs	Marks
Learning Outcome 1	Compare different fluids on the basis of their properties/characteristics.		**06**	**10**
Contents	Definition of fluid, Types of fluid- Ideal and Real fluids, Compressible and Incompressible fluids, Newtonian and non-Newtonian fluid, viscous and non- viscous fluids, rotational and ir-rotational fluids, fluid properties- Density, Specific weight, Specific gravity, Specific volume, Vapour pressure, surface tension, capillarity, Dynamic and kinematic viscosity.			
Method of Assessment	Paper pen test (Part of Progressive Test – I)			
Learning Outcome 2	Measure pressure using simple and differential manometers.		**10**	**10**
Contents	**Pressure and Its Measurement:** Fluid pressure and its units, atmospheric pressure, gauge pressure, vacuum pressure, absolute pressure, pressure head, Pascal's law, manometers- principle, its types- Simple and Differential manometer			
Method of Assessment	Laboratory Test by Observation (Part of LW)			
Learning Outcome 3	Solve simple numerical problems based on Pascal's law.		**05**	**06**
Contents	Numerical problems based on Pascal's law, Simple and Differential manometers for pressure measurement.			
Method of Assessment	Theory exam			
Course Outcome 2	**Measure discharge using Venturimeter, Orifice-meter, Pitot-tube.**		Teach Hrs	Marks
Learning Outcome 1	Compare different fluid flow based on properties/characteristics.		**04**	**10**
Contents	**Basics of Fluid Flow:-** potential energy, kinetic energy, pressure energy, total energy, Types of fluid flow- Laminar, turbulent and transient, Steady and Unsteady, Uniform and non-uniform.			
Method of Assessment	Paper pen test (Part of progressive – II)			
Learning Outcome 2	Use Bernoulli's theorem and Continuity equation for a given situation.		**06**	**10**
Contents	Continuity equation, Bernoulli's theorem:- Assumptions, Equation and its practical applications			
Method of Assessment	Theory exam			
Learning Outcome 3	Calculate discharge using Venturimeter, Orifice-meter, Pitot-tube.		**15**	**10**

Contents	Venturimeter- Principle, Construction and working, discharge through Venturimeter, Vena contracta, Orifice- meter- Principle, Construction and working, discharge through Orifice- meter , Pitot-tube - Principle, Construction and working, hydraulic coefficients-Cc, Cv and Cd Simple numerical problem based on Continuity equation and application of Bernoulli's equation.
Method of Assessment	Laboratory test by observation (Part of Practical Exam)

Course Outcome 3	**Solve numerical problems based on minor, major losses in pipes and impact of jet.**	Teach Hrs	Marks
Learning Outcome 1	Measure Reynold's number and minor losses in pipes.	**11**	**10**
Contents	**Flow Through Pipes**: Laminar, turbulent and transient flow, Reynold's number, differentiation of laminar, turbulent and transient flow on the basis of Reynold's number, minor losses in pipes.		
Method of Assessment	Laboratory test by observation (Part of Practical Exam)		
Learning Outcome 2	Calculate major losses in pipe flow using Darcy's equation and Chezy's equation.	**06**	**10**
Contents	Calculate major losses in pipe flow using Darcy's equation and Chezy's equation.		
Method of Assessment	Theory exam		
Learning Outcome 3	Calculate force exerted by a jet for a given vane/plate.	**06**	**8**
Contents	**Impact of Jets:** Impact of Jet on fixed vertical flat plate, moving vertical flat plates and curved plates stationary and moving, velocity diagram. Simple numerical problems based on fixed vertical, moving plates.		
Method of Assessment	Theory exam		

Course Outcome 4	**Select a suitable hydraulic turbine for a given situation.**	Teach Hrs	Marks
Learning Outcome 1	Explain Construction, working and selection criteria of Pelton wheel, Francis and Kaplan turbine.	**15**	**16**
Contents	**Hydraulic Turbines:** Classification of hydraulic turbines, Selection of turbine on the basis of head, discharge and specific speed, Construction, working principle of Pelton wheel, Francis and Kaplan turbines. Draft tubes–function, types, and construction, Cavitation in turbines		
Method of Assessment	Theory exam		
Learning Outcome 2	Calculate Work done, Power, efficiency of the given turbine.	**06**	**10**
Contents	Simple numerical problems on work done, Power, efficiency of turbines, Layout of hydroelectric power plant.		
Method of Assessment	Theory exam		
Learning Outcome 3	Identify components of a given turbine.	**09**	**10**
Contents	Demonstration of components of Pelton wheel, Francis and Kaplan turbines.		
Method of Assessment	Laboratory test by observation(Part of Practical Exam)		

Course Outcome 5	Describe different hydraulic pumps for a given situation.	Teach Hrs	Marks
Learning Outcome 1	Explain construction, Principle, Working and Application of centrifugal pump.	09	10
Contents	Principle, Working and Application of centrifugal pump, Types of casing and impeller, Concept of multistage pump, Manometric head, workdone, Manometric and Overall efficiency. Calculations of overall efficiency and power required to drive pumps. Priming and its methods in centrifugal pump, Concept of Slip, Negative slip, Cavitation and separation.		
Method of Assessment	Theory exam		
Learning Outcome 2	Explain construction, Principle, Working and Application of reciprocating pump.	06	10
Contents	Construction, Principle, Working and Application of single and double acting reciprocating pump.		
Method of Assessment	Paper pen test (Part of TW)		
Learning Outcome 3	Measure overall efficiency of centrifugal pump.	06	10
Contents	Experimental determination of overall efficiency of centrifugal pump.		
Method of Assessment	Laboratory test by observation(Part of LW)		