

RGPV (DIPLOMA WING) BHOPAL		OBE CURRICULUM FOR THE COURSE		FORMAT- 3	Sheet No. 1/3
Branch	Civil Engg. /Construction Tech. & Management		Semester	3	
Course Code	C03 C05	Course Name	HYDRAULICS		
Course Outcome 1	To measure pressure using various pressure measuring devices and to calculate hydrostatic pressure on different surfaces		Teach Hrs	Marks	
Learning Outcome 1	Explain the terms related with Hydraulics and compute properties of fluid with given data.		06	10	
Contents	<p>Technical terms used in Hydraulics –fluid, fluid mechanics, hydraulics, hydrostatics and hydrodynamics, application of hydraulics.</p> <p>Physical properties of fluid Mass density, Weight density, Specific volume, Specific gravity, Surface tension and capillarity, Compressibility, Viscosity, Newton’s law of viscosity – Dynamic and kinematics viscosity. Ideal and Real liquids</p>				
Method of Assessment	Internal – Mid Semester Exam				
Learning Outcome 2	Calculate pressure using various pressure measuring devices Piezometer/ U tube manometer/ U tube differential manometer		08	10	
Contents	<p>MEASUREMENT OF LIQUID PRESSURE IN PIPES: Definition of pressure and its SI unit Concept of pressure head and its unit Variation of pressure with depth of liquid Types of pressure- atmospheric gauge and absolute pressure. Conversion of pressure head of one liquid in to other Devices for pressure measurements in pipes – Piezometer, U-tube manometer, Bourdon’s pressure gauge. Explain and calculate pressure difference using differential manometer – U tube differential manometer / inverted U-tube differential manometer. Simple Numerical Problems.</p>				
Method of Assessment	External – End Semester Exam				
Learning Outcome 3	Measure pressure using various pressure measuring devices Piezometer/ U tube manometer/ U tube differential manometer		06		
Content	<ol style="list-style-type: none"> 1. Measurements of pressure and pressure head by Piezometer, U-tube manometer 2. Measurement of pressure difference by U-tube differential manometer. 3. Study of Bourdon’s gauge 				
Method of Assessment	Practical test in laboratory				

Learning Outcome 4	Compute Total pressure and centre of pressure for horizontal/Vertical/inclined surfaces	06	08
Contents	HYDROSTATIC PRESSURE : Hydrostatic pressure at point Pascal's law Pressure diagram – Concept and use Total hydrostatic pressure and center of pressure Determination of total pressure & center of pressure on horizontal, vertical & inclined immersed surfaces Determination of total pressure & center of pressure on sides and bottom of water tanks. Numerical Problems		
Method of Assessment	External – End Semester Exam		
Course Outcome 2	Apply fundamentals of fluid flow with help of continuity equation and Bernoulli's theorem.	Teach Hrs	Marks
Learning Outcome 1	Differentiate various types of flows	03	05
Contents	FUNDAMENTALS OF FLUID FLOW : Concept of flow Gravity flow and pressure flow. Types of flow – steady and Unsteady, uniform and non-uniform, Laminar and turbulent Reynolds number and its application		
Method of Assessment	External – End Semester Exam		
Learning Outcome 2	Calculate flow parameters using continuity equation / Bernoulli's theorem	06	10
Contents	Discharge and its units Continuity equation for fluid flow. Various forms of energies present in fluid flow-potential, kinetic, & pressure energy. Bernoulli's theorem, its assumptions and limitations. Loss of head and modified Bernoulli's theorem Application of Bernoulli's theorem. Simple Numerical Problems.		
Method of Assessment	External – End Semester Exam		
Learning Outcome 3	Perform experiments related to fundamentals of fluid flow	04	
Content	1. Reynold's experiment to study types of flow. 2. Verification of Bernoulli's theorem		
Method of Assessment	Practical test in laboratory		

Course Outcome 3	To apply basic principles of hydraulics in pipe flow	Teach Hrs	Marks
Learning Outcome 1	Calculate major head loss / minor head losses in pipes/ size of equivalent pipe	10	10
Contents	FLOW OF LIQUID THROUGH PIPES : Major head loss in pipes due to friction and its calculation by Darcy-Weisbach Equation, Use of Nomograms Minor loss of head in pipe flow- loss of head due to sudden Contraction, sudden expansion, at entrance and exit of pipes and in various pipe fittings. Hydraulic gradient line and Energy gradient line Pipes in series and parallel Equivalent pipe – Dupuit’s equation Simple Numericals		
Method of Assessment	External – End Semester Exam		
Learning Outcome 2	explain water hammer and siphon in pipe flow	03	05
Contents	Water hammer in pipes – cause, effects and remedial measures Siphon		
Method of Assessment	Internal – Quiz / Assignment		
Learning Outcome 3	Calculate discharge in a pipe for the given data using Venturimeter and Calculate and Determine Hydraulic coefficients of orifice	06	08
Contents	Discharge measuring device for pipe flow Venturimeter – construction & working Discharge measuring for a tank using orifice Hydraulic coefficients of orifice		
Method of Assessment	External – End Semester Exam		
Learning Outcome 4	Determination of Darcy’s friction factor of a pipe and hydraulic coefficients for given venturimeter and orifice	06	
	1. Determination of Darcy’s friction factor for given pipe. 2. Determination of coefficient of discharge for a given Venturimeter. 2. Determination of hydraulic coefficients for sharp edge orifice.		
Method of Assessment	Practical test in laboratory		
Course Outcome 4	To determine fluid flow parameters in Open channel flow	Teach Hrs	Marks
Learning Outcome 1	Calculate velocity and discharge using Chezy’s / Manning’s equation and properties of most economical channel section for rectangular/ trapezoidal channel sections	10	12

Contents	FLOW THROUGH OPEN CHANNEL : Types of channels- artificial & natural, purposes of artificial channel, Different shapes of artificial channels. Geometrical properties of channel section – wetted area, wetted Perimeter, hydraulics radius. Chezy’s equation and Manning’s equation for calculation of discharge through an open channel Most economical channel section, conditions for most economical rectangular and trapezoidal channel sections.		
Method of Assessment	External – End Semester Exam		
Learning Outcome 2	Explain specific energy diagram and hydraulic jump	03	05
Contents	Specific energy diagram, Froud’s number and its significance. Critical, sub-critical and supercritical flow in channel Hydraulic jump its occurrence in field, uses of hydraulic jump		
Method of Assessment	Internal – Quiz / Assignment		
Learning Outcome 3	Explain discharge / velocity measuring devices.	05	07
Contents	Discharge measuring devices – Triangular and rectangular notches, Weirs Velocity measurement devices - Floats, current meter and Pitot tube		
Method of Assessment	External – End Semester Exam		
Learning Outcome 4	Determination of coefficient of discharge for given rectangular or triangular notch.	02	
Content	1. Find out coefficient of discharge for given rectangular or triangular notch.		
Method of Assessment	Practical test in laboratory		
Course Outcome 5	To select a suitable hydraulic pump for various applications.	Teach Hrs	Marks
Learning Outcome 1	Describe construction and working of centrifugal pump /Reciprocating pump and recognize selection criteria of hydraulic pumps	6	10
Contents	HYDRAULIC PUMPS: Pumps - Definition and types. Suction head, delivery head, static head and manometric head. Centrifugal pump - component parts and their functions, principle of working, priming. Reciprocating pump - component parts and working. submersible pump and Jet pump. Selection and choice of pump.		
Method of Assessment	Internal – Mid Semester Exam		