RGPV (DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT-3	Sheet No. 1/3

Branch	REFINERY AND PETROCHEMICAL ENGG.	Semester	4th Sem.

Course Code		Course Name	FLUID MECHANICS

Course Outcome 1	To identify and analyze the variation in properties of fluids with pressure.	Teach Hrs	Marks
Learning Outcome 1.1	To understand concept of fluid pressure and its measurement	05	05
Contents	Fluid and its nature , pressure concept, Pascal's law, hydrostatic equilibrium, barometric equation, hydrostatic equilibrium in centrifugal field.		
Method of Assessment	External theory exam		
Learning Outcome 1.2	To use applications of fluid statics in process industry	07	10
Contents	Piezometers manometer Utube, inclined manometer differential manometer, continuous gravity decanter centrifugal decanter, simple problems based on applications of fluid statics.		
Method of Assessment	External theory exam		
Learning Outcome 1.3	To determine the pressure difference between two points by using manometers.	07	10
Contents	Determine the pressure difference between two points by using U-tube manometer, Determine small pressure difference between two points by using inclined manometer.		
Method of Assessment	Internal practical (Lab work)		

Course outcome -2	To study the behavior of fluid during fluid flow in process industry.		
Learning Outcome 2.1	To describe rheology of fluid flow	06	05
Contents	Introduction to potential flow, velocity field, one dimensional flow, laminar flow, turbulent flow, velocity gradient and rate of shear, shear stress field, Newtonian and non-Newtonian fluid, viscosity, kinematic viscosity, Turbulence, Reynolds number and transition from laminar to turbulent flow.		
Method of Assessment	External theory exam		
Learning Outcome 2.2	To understand concept of boundary layer formation, separation and its impact on flow characteristics.	07	10
Content	Boundary layer, flow in boundary layer, boundary layer formation in straight tube, transition length for laminar flow and turbulent flow, boundary layer separation and wake formation, skin and form friction.		
Method of assessment	Internal Midsem Test		
Course Outcome 3	To solve simple problems based on basic equations of fluid flow.		
Learning Outcome 3.1	To analyze fluid flow problem with the application of mass and momentum equation.	05	05
Content	Stream lines and stream tubes, equation of continuity, average and mass velocity, momentum balance and momentum correction factor, laws of fluid motion, Navier stokes		

	equation		
Method of assessment	External theory exam		
Learning Outcome 3.2	To calculate the energy losses between in let and outlet of pipe.	6	5
Content	The Bernoulli equation without friction, Mechanical energy equation, kinetic energy of stream, kinetic energy correction factor, correction of Bernoulli equation for fluid friction, simple problems.		
Method of assessment	External theory exam		
Learning Outcome 3.4	To analyze basic equation of fluid flow in industry	4	5
Content	Verification of Bernoulli equation		
Method of assessment	External practical		
Course Outcome 4	To estimate energy losses during the fluid flow on the basis of fluid dynamic.		
Learning Outcome 4.1	To understand shear stress, skin friction and velocity distribution in pipes.	6	10
Contents	Shear stress distribution in cylindrical tube relation between skin friction and wall shear, friction factor, relation between skin friction parameters, laminar flow of Newtonian fluid, relation between local and maximum local velocity, average velocity, kinetic energy and momentum correction fact Hagen- Poiseuille equation.		
Method of assessment	Internal Midsem Test-2		
Learning Outcome 4.2	To analyze friction losses during fluid flow.	05	05
Content	Effect of roughness, friction factor chart ,flow through		

	channels of non circular cross section from change in velocity or direction, friction loss from sudden expansion and sudden contraction of cross section.		
Method of assessment	External theory exam		
Learning Outcome 4.3	To calculate the power requirement for pumping operation.	7	10
Content	Effect of fittings and values, form friction losses in the Bernoulli equation, simple numerical problems.		
Method of assessment	External theory exam		
Learning Outcome 4.3	To calculate coefficient of friction and head loss in fluid flow.	7	10
Content	Determination of coefficient of friction for pipes, to determine loss of head due to sudden expansion and contraction.		
Method of assessment	Internal practical (Lab work)		
Learning Outcome 4.4	To find the head loss due to pipe fitting.	4	05
Contents	To determine loss of head due to elbow and bend, study of different pipe fittings.		
Method of assessment	External practical		
Course Outcome 5	Select suitable equipment for metering and transportation of fluid.		
Learning Outcome 5.1	To measure the fluid flow in closed channel.	7	10
Content	Principle, construction working and flow equation of Venturi meter, Orifice meter and Rota meter. Measurement of local velocity by pitot tube, simple problems.		

Method of assessment	External theory exam		
Learning Outcome 5.2	To measure the fluid flow in open channel	6	10
Content	Notches and weir and their classification, discharge over rectangular and triangular notches and weir, simple problems.		
Method of assessment	Internal sectional/quiz		
Learning Outcome 5.3	To identify the characteristics of different types of pipe fittings and valves according to requirement	5	5
Content	Pipe and tubing, size and selection of size joints and fittings, flow controlling valve i.e. Gate Globe, Ball, Needle, Butterfly, check or non return and diaphragm value, prevention of leakages around moving parts.		
Method of assessment	External theory exam		
Learning Outcome 5.3	To select suitable pump by understanding the principle of it.	08	10
Content	Classification of pumps, centrifugal pumps main parts of centrifugal pumps, relation between developed head, capacity power and speed, priming cavitations, suction lift, net positive suction head characteristics curve of centrifugal pump, construction, working, classification and main parts of reciprocating pumps, comparison between centrifugal and reciprocating pumps, Elementary idea about jet ejector, fan, blowers and compressors		
Method of assessment	External theory exam		
Learning Outcome 5.4	Metering of fluids in refinery and petrochemical industry.	07	10

Content	Flow measurement by venturimeter, orifice meter and rotameter, determination of local fluid velocity by pitot tube, determination of coeffiient of discharge for rectangular and triangular notch.		
Method of assessment	External practical		
Learning Outcome 5.5	To study the construction and working of different type of pumps and valves used in industry.	06	10
Content	Study of reciprocating, centrifugal and rotary pumps study of gate, globe and check values.		
Method of assessment	External practical		

Total marks : 150 No of periods :115