

GANPAT UNIVERSITY									
FACULTY OF ENGINEERING & TECHNOLOGY									
Programme		Bachelor of Technology			Branch/Spec.		Petrochemical Engineering		
Semester		III			Version		1.0.0.0		
Effective from Academic Year			2020-21		Effective form the batch Admitted in			July 2019	
Subject code		2PCE3102		Subject Name		Fluid Mechanics			
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	1	1	0	5	Theory	40	60	100
Hours	3	1	2	0	6	Practical	30	20	50
Pre-requisites:									
<ul style="list-style-type: none"> • Basic concept of physics • unit system 									
Course Objective									
<ul style="list-style-type: none"> • To Know about fluid statics and dynamics. • Able to calculate Mass and volumetric flow rate for fluid flowing through pipe. • To Know about different pipe fittings and flow pattern • Understand the fundamentals Bernoulli's and continuity equation. • To Know about types of pumps and their principle and working. 									
Theory syllabus									
Unit	Content								Hrs
1	Introduction to Fluid Mechanics: Classification of fluid mechanics, Properties of fluids, Classification of fluids, Shearing and flow, characteristics of Newtonian and Non-Newtonian fluids, Shear stress distribution of fluids, Pressure measurement, U-tube, Inverted U-tube, Differential and Inclined manometers, Reynolds number, Friction facto								8
2	Basic Fluid flow equations: Bernoulli's equation, Frictional loss in pipe, Continuity equation, Velocity distribution for, laminar flow and turbulent flow, Hydraulic mean diameter, losses due to enlargement and contraction of pipe cross - section								7
3	Pipe Fittings: - Equivalent length of pipe, Pipe fittings, Gate , Globe, Check and Butterfly valves, Boundary layer development, Two-phase flow, Flow patterns in two phase flow. The Baker diagram, Erosion in two phase flow.								7
4	Flow Measurement: Flow rate measurement, Working principle and expressions for flow rate through Pitot tube, Orifice meter, Venturimeter, Nozzle, Rotameter, Notch and Weir, Coefficient of discharge, Wet gas flowmeter, Pressure recovery in Orifice meter, Venturimeter and Nozzle..								7
5	Pumps: Pumping of fluids, Classification of pumps, Positive displacement pumps, Reciprocating, Pump, Plunger pump, Diaphragm pump, Metering pump, Rotary gear pump, Rotary lobe Pump, Rotary vane pump, Flexible vane pump, Mono pump, Centrifugal pump, Volute pump, Volute pump with vortex chamber and diffuser vanes, Cavitation, Priming, Net positive suction head ,Multistage centrifugal pumps. Specific speed and operating characteristics of centrifugal pump.								10

6	Fluid Flow in Packed Column : Fluid flow in packed column, Classification of packing's, Characteristics of packing material, Loading and flooding in packed column, Specific surface of packed column, Permeability coefficient, Modified Reynolds number, Modified friction factor,	6
Practical content		
The practical work shall be based on experimental work on the topics mentioned above .		
Text Books		
1	R. P. Vyas, Fluid Mechanics, Second edition, Denett & Co. Publication, 2008	
2	W.L. McCabe, J.C. Smith, P. Harriott, Unit Operations of Chemical Engineering, Seventh Edition, McGraw Hill Publication, 2005	
Reference Books		
1	J.M. Coulson, J.F. Richardson with J.R. Backhurst, J.H. Harker, Chemical Engineering Vol. II: Particle Technology and Separation Processes, Fifth Edition, ButterworthHeinemann an imprint of Elsevier	
2	G.G. Brown, Unit Operations, CBS Publishers Pvt. Ltd, 2005.	
ICT/MOOCs references		
1	https://nptel.ac.in/courses/103104043/	
2	https://nptel.ac.in/courses/103104044/	
3	https://www.youtube.com/playlist?list=PLbMVogVj5nJQqyKLjvvgAC38ThsmjCJad	
Course Outcomes		
	Know about fluid statics and dynamics. Able to calculate Mass and volumetric flow rate for fluid flowing through pipe. Know about different pipe fittings and flow pattern Understand the fundamentals Bernoulli's and continuity equation. Know about types of pumps and their principle and working.	