

**GANPAT UNIVERSITY**  
**B. Tech. Sem. III – Mechanical Engineering**  
**ME – 306 Fluid Mechanics**

Teaching scheme (Hrs)			Examination scheme (Marks)							Grand Total
			Theory				Practical			
L	P	Total	Internal Asses.	Sem End		Total	Internal Asses.	Sem. End	Total	
				Marks	Hrs					
4	2	6	30	70	3	100	25	25	50	150

**1. Properties of fluid:**

Introduction: Fluid, liquids and gases, physical properties such as density, specific weight, viscosity, compressibility, capillarity, surface tension, vapor pressure, cavitations & its all effects and remedies, Thoma's cavitations factor.

**2. Fluid Statics:**

Pressure at a point, center of pressure, pressure measurement, with manometers, buoyant force, Meta center & Meta centric height – analytical and experimental determination.

**3. Kinematics of fluid flow:**

Stream line path line, streak line, stream tube, classification of flow steady and unsteady uniform and non-uniform. One-type and three dimensional flow definition, Laminar & Turbulent flow, Reynold's number and critical velocity. Continuity equation for three-dimensional flow in Cartesian co-ordinates, Euler's equation and its application, Bernoulli's equation and its application, venturimeter, pilot tube, generalized energy equation.

**4. Viscous flow:**

Flow between two parallel fixed plates, Counter flow, viscous flow through pipes, Hagen – Poiseuille's equation, friction factor, moody diagram, Darcy weight back equation Stokes law, measurement of viscosity, viscosity index, Petroff's equation for journal bearings, power lost in over – coming friction, water hammer & its effects and remedies, surge tanks.

**5. Turbulent Flow:**

Introduction, Reynolds Experiment, Frictional loss in pipe flow, expression for loss of head due to friction in pipes, coefficient of friction, shear stress in turbulent flow, Reynold expression for turbulent shear stress, velocity distribution in turbulent flow in pipes,

**6. Compressible Fluid Flow:**

Thermodynamic concept, speed of a sound wave, Mach number, Mach cone, Mach cone and Mach angle, flow with friction through pipes, adiabatic and isothermal flow, jet propulsion flow through variable area, flow through nozzle, Back pressure variation.

**7. Dimensional analysis:**

Fundamental dimension, dimensional homogeneity, Rayleigh's method and Buckingham's theorem for dimensional analysis, dimensionless force ratios, and Hydraulic similitude model testing.

**8. Flow Measurement:**

Measurement of flow with venturimeter, orifice plate, notch, nozzles, bendmeter, flowmeter and rotameter.

**Practical work: -**

The practical work shall be based on experimental and analytical work on the topics mentioned above and will be defended by the candidates.

**REFERENCE BOOKS:**

1. Fluid Mechanics – (R.K. BANSAL)
2. Fluid Mechanics – (K. R. ARORA)
3. Fluid Mech. & Fluid Power Engg. (D.S. Kumar)
4. Fluid Mechanics – by K.L. Kumar
5. Mech. Measurements – by R.K. Jain
6. Fluid Mechanics – by A.K. Jain
7. Fluid Mechanics – by R.S. Khurmi