Gautam Buddha University, Greater Noida

School of Engineering (Mechanical Engineering)

Degree	Course Name	Course Code	Marks:100
Integrated B. Tech. + M. Tech. / M.B.A.	Fluid Mechanics	ME 208	SM+MT+ET 25+25+50
Semester	**Credits**	**L-T-P**	**Exam.**
IV	3	3-1-0	3 Hours

Unit - I

Fluid Properties and Statics: Continuum concept; Properties of fluids; Newtonian and non Newtonian fluids; Pascal's Law; Hydraulic pressure; Pressure measurement; Manometer and micro-manometer; Pressure gauge; Forces on plane and curved surfaces; Centre of pressure; Equilibrium of submerged and floating bodies; Buoyancy; Meta-centric height; Fluid subjected to constant linear acceleration and to constant rotation.   **(08 Hours)**

Unit - II

Kinematics of Fluid: Types of flow; Lagrangian and Eulerian approach; Path line; Streak line and stream line; Stream tube; Stream function and potential function; Flownet; Deformation of fluid elements; Vorticity and circulation.

(07 Hours)

Unit - III

Fluid Dynamics and its Applications: Conservation equation of mass; Conservation equation of momentum and energy; Navier-Stokes; Euler and Bernaulli Equation; Reynolds transport theorem; Forces due to fluid flow over flat plates; Curved vanes and in the bends; Pitot tube; Venturimeter and orifice meters; Orifice and mouthpieces; Notches and weirs; Rotameter and other devices.   **(08 Hours)**

Unit – IV

Dimensional Analysis and Similitude: Basic and derived quantities; Similitude and dimensional analysis; Rayleigh's method; Buckingham π method; Non-dimensional parameters and model testing.   **(07 Hours)**

Unit – V

Ideal Fluid Flow: Ideal flow identities; Flow over half body; Rankine Oval; Stationary and rotating cylinders; Magnus effect; D'Alembert's paradox.

(07 Hours)

Unit - VI

In-compressible Flow: Reynold's Experiment; Laminar and turbulent flow; Darcy equation; Poiseuille flow; Couette flow; Hagen-Poiseuille flow; Friction factor and Moody's diagram; Flow through pipes; Losses in pipes and fittings; HGL and TEL; Aerofoil; Lift and drag; Flow separation.   **(08 Hours)**

Recommended Books:

1. Fluid Mechanics; F. M. White; Mc Graw-Hill Publications.
2. Fundamental of Fluid Mechanics; B. R. Munson; D. F. Young and T. H. Okishi; Wiley India.
3. Foundation of Fluid Mechanics; Yuan; Prentice-Hall Publications.
4. Fluid Mechanics and Machines; S. K. Som; Tata McGraw Hill.
5. Fluid Mechanics; W. Streeter and Bedford; McGraw Hills Publications.