**MA\*720 Fluid Dynamics**

Kinematics of Fluids in Motion : Continuum Hypothesis, Lagrangian and Eularian description, Introduction to stream lines, velocity potential, vorticity vector etc.

Equation of continuity. Equations of Motion, Euler’s equations of motion, Bernouli’s equation. Potential flows.

Three-dimensional flows: Singularities and image systems. Weiss’ sphere theorem, axi-symmetric flows, Stokes stream function. Two-dimensional flows : stream function and complex potential for two-dimensional, irrotational incompressible flows, two-dimensional image systems, Milne-Thomson circle theorem and its applications, Blasius theorem, use of conformal transformations, Kutta-joukowski condition, Karman vortex street.

Viscous flows: Stress analysis in fluid motion, relations between stress and rate of strain, Navier-Stokes equations of motion of a viscous fluid, some exact solutions of Navier – Stokes equations, flow past a sphere, Prandtl’s boundary layer theory, Karman’s integral equation, inviscid compressible flow – Propagation of pressure change.

**References:**

1. S K Som, Gautam Biswas, S Chakraborty, Introduction to Fluid Mechanics and Fluid Machines, McGraw Hill Education; 3 edition
2. Ira M. Cohen, Pijush K. Kundu,Fluid Mechanics, Academic Press; 3 edition
3. Batchelor, An Introduction to Fluid Dynamics, Foundation Books
4. John Anderson, Fundamentals of Aerodynamics, McGrawHill