Module Code: MATH-430
Module Title: **Fluid Mechanics-II**
Module Rating: 3 Cr. Hours
Pre-Requisite: Fluid Mechanics-I

Two and Three-Dimensional Potential Flows

- Circular cylinder without circulation
- Circular cylinder with circulation
- Blasius theorem
- Kutta condition and the flat-plate airfoil
- Joukowski airfoil
- Vortex motion
- Karman's vortex street
- Method of images
- Velocity potential
- Stoke's stream function
- Solution of the Potential equation
- Uniform flow
- Source and sink
- Flow due to a doublet

Viscous Flows of Incompressible Fluids

- Constitutive equations
- Navier-Stokes's equations, exact solutions of Navier-Stokes's equations
- Steady unidirectional flow
- Poiseuille flow
- Couette flow
- Flow between rotating cylinders
- Stokes' first problem
- Stokes' second problem

Simplified Approach to Fluid Flow Problems

- Similarity from a differential equation
- Dimensional analysis
- One dimensional, steady compressible flow

Recommended Books

1. H. Schlichting, K. Gersten, E. Krause and H. Oertel, Jr.: *Boundary-Layer Theory*, 8th edition (Springer, 2004)
2. Yith Chia-Shun: *Fluid Mechanics* (McGraw Hill, 1974)
3. I. L. Distsworth: *Fluid Mechanics* (McGraw Hill, 1972)
4. F. M. White: *Fluid Mechanics* (McGraw Hill, 2003)
5. I. G. Curie: *Fundamentals of Mechanics of Fluids, Third edition* (CRC, 2002)
6. R. W. Fox, A. T. McDonald and P. J. Pritchard: *Introduction to Fluid Mechanics* (John Wiley and Sons, 2003)