



Code	Subject Title	Cr. Hrs	Semester
MATH-431	Fluid Mechanics-II	3	VIII
Year	Discipline		
4	Mathematics		

Objectives:

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:

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