

Course Name:
Hydrodynamics

Course Number:
20626

Credit:
3

Course Content (outline):

- Vectors algebra: Scalar and vector field, Divergence and Grad, Stokes' theorem, Tensors
- Kinematics of flow field
- Eulerian and Lagrangian approaches
- Integral form of equations
- Rotation and strain
- Conservation of mass equation
- Velocity potential, Potential flow
- Conservation of momentum equation (Navier-Stokes' Eq.)
- Incompressible and inviscid flow (ideal flow) Eq., Stream function
- Two-dimensional motion: Sink, Source, Superposition of flows, Method of images
- Viscous fluid motion
- Water wave mechanics
- Turbulent flow

References:

- "Principals of ideal-fluid aerodynamics", K. Karamcheti, 1966.
- "Introduction of fluid mechanics", R.W. Fox & A.T. McDonalld, 1985.
- "Water wave mechanics for engineers and scientists", R.G. Dean & R.A. Dalrymple, 1984.
- "Hydrodynamics", H. Lamb, 1945.
- "An Introduction to fluid dynamics", G.K. Batchelor, 1967.
- "Applied hydrodynamics", H.R. Vallentine, 1967.
- "Foundations of aerodynamics", A.M. Kuethe & C.-Y. Chow, 1998.
- "Hydrodynamics in theory and application", J.M. Robertson, 1965.
- "Theoretical hydrodynamics", L.M. Milne-Thomson, 1968.