



Fluid Mechanics II

Course Code: 28462
Credits: 3
Course Type: Theoretical
Prerequisites: Fluid Mechanics I
Co-Requirement: Engineering Mathematics
Course Length: 51 hours

Outlines:

1. Differential Analysis of Fluid Flow

- Fluid Element Kinematics
- Conservation of Mass
- The Stream Function
- Conservation of Linear Momentum
- Navier-Stokes equations
- Energy equation
- Boundary conditions for the governing equations
- Exact solutions of N-S equations (some examples)

2. Potential Flows

- Elementary Plane Flows
- Superposition of plane flow solutions
- Other plane potential flows (flow around a corner)
- Image method
- Airfoil theory
- Axisymmetric potential flows

3. Flows passed immersed bodies

- Flat plate boundary layer
- Integral method
- Blasius solution of boundary layer
- Boundary layer with pressure gradient
- Drag of immersed bodies
- Lift of immersed bodies

4. Turbomachinery



Classification of turbomachines
Centrifugal pumps
Pump performance curves
Non-dimensional groups in turbomachines
Specific speed
Axial pumps
Classification of turbines
Impulse turbines
Reaction turbines

References:

1. F. M. White, “Fluid Mechanics”, Mc-Graw Hill, 8th ed., 2016.
2. B. R. Munson, D.F. Young & T.H. Okishi, “Fundamentals of Fluid mechanics”, John – Wiley, 8th ed., 2016.
3. V. L. Streeter, E.B. Wylie, K.W. Bedford, “Fluid Mechanics”, Mc- Graw Hill , 9th ed., 1998.
4. I. H. Shames, “Mechanics of Fluid”, 4th ed., Mc- Graw Hill. 2003.
5. R.W. Fox, A.T. Mc- Donald, [P. J. Pritchard](#) “Introduction to Fluid mechanics”, 9th ed., John – Wiley, 2015.