Course Outline:

1. **Two Dimensional Potential Flow Theory:** Introduction: circulation, vorticity, definition of potential flow; Basic equations for a 2-D potential flow; Velocity potential and stream functions of elementary potential-flow models: uniform flow, source/sink flow, vortex; Superposition of elementary potential-flow models: Rankine oval, Doublet; Lifting flow over a cylinder and an airfoil, Kutta-Joukowski theorem; Finite wing theory.
2. **Compressible Flow:** Introduction, brief review of Thermodynamics; The speed of sound, definition and classification of compressible flow; Governing equations of isentropic flow with gentle area variation, stagnation properties; Isothermal flow through pipes, Fanno and Rayleigh lines; Normal shock wave: characteristic features, governing equations, calculation of properties; Flow through convergent-divergent (De-Laval) nozzle; Oblique shock wave: characteristic features, governing equations, calculation of properties; Lift and drag on supersonic airfoils.
3. **Mixed Jet Flow**: Characteristic features; Semi-empirical models of the flow.

4. **Flow Measurement:** Density measurement; Viscosity measurement; Pressure measurement; Velocity measurement; Discharge measurement.