ME 668 Aerodynamics (3-0-0-6)

Aerodynamic forces and moments; continuity, momentum and energy equations; Inviscid incompressible flow – incompressible flow in a low speed wind tunnel, source and doublet flows, nonlifting flow over a circular cylinder, Kutta-Joukowski theorem; Incompressible flow over airfoils and finite wings – Kutta condition, Kelvin's circulation theorem, Biot-Savart law, Helmholtz vortex theorem, Prandtle's classical lifting line theory; Thin aerofoil theory; Three dimensional source and doublet; Inviscid compressible flow – normal and oblique shocks, expansion waves, supersonic wind tunnels; Elements of hypersonic flow, Newtonian theory; Equations of viscous flow; Laminar and turbulent boundary layers; Panel methods in aerodynamics

Textbooks/References:

[1] Anderson, J.D. Jr, (2005), Fundamentals of Aerodynamics, McGraw Hill.
[2] Bertin, J.J., (2002), Aerodynamics for Engineers, Pearson Education.
[3] Clancy, L. J., (1996), Aerodynamics, Himalayan Books
[4] Houghton, E.L., and Carruthers, N.B. (1988), Aerodynamics for Engg. Students, Arnold Pub.
[5] Kuethe, A. M., and Chow, C-Y, (1998), Foundations of Aerodynamics, Wiley.