SYSE- 822-Applied Aerodynamics   **Annex A**

1.   The goal in teaching this course is to provide students with a clear explanation of the fundamentals of aerodynamics and its associated practical side. The course will start from the fundamental equations of fluid mechanics and take on to the broader classification of incompressible and compressible flows. By getting the crisp and useful idea of incompressible flows, extensive investigations will be marched into the area of compressible flow regime.

Course Outcomes

2.   After the course the students will be able to apply different concepts of aerodynamics on various practical problems.

3.   Detailed Course Contents

   a.   Introduction
   b.   Dynamics of Incompressible, Invsicid flow field
   c.   Viscous Boundary Layers
   d.   Airfoil & Wing Aerodynamics
   e.   Aerodynamic evaluation using Vortex-Lattice method
   f.   Dynamics of Compressible, Inviscid flow field
       (1) Normal Shock waves : Rankine-Hugonoit relations
       (2) Oblique Shock waves
       (3) Expansion waves : Prandtl-Meyer Flows
       (4) Supersonic flows around airfoil and wings
   g.   Internal Compressible Flows
       (1) Variable Area Flows
       (2) Adiabatic flow with friction : Fannoline flows
       (3) Flow with heat addition or removal : Rayleigh line flows
   h.   Hypersonic flows
   i.   Aerodynamic design considerations

4.   Recommended Text/Reference Books

   a.   Anderson, J. D., Fundamentals of Aerodynamics, 4th ed. McGraw Hill International, Singapore, 2007.
   b.   Oosthuizen & Carscallen, Compressible Fluid Flow, 1st ed.
   c.   Bertin, J., Cummings, R. M., Aerodynamics for Engineers, 5th ed. McGraw Hill International, Singapore, 2007.