

# **AE 1350: Introduction to Aerospace Engineering Course Syllabus**

1. Course Introduction (3 hrs.)
  - 1.1 Historical developments in aeronautics
  - 1.2 Historical developments in astronautics
  
2. Fundamental Concepts (2 hrs.)
  - 2.1 Gas properties
  - 2.2 Equation of state
  - 2.3 Hydrostatic equilibrium
  - 2.4 Standard atmosphere
  
3. Fluid Mechanics (3 hrs.)
  - 3.1 Incompressible flow assumptions and governing equations
  - 3.2 Compressible flow assumptions and governing equations
  
4. Applied Aerodynamics (2 hrs.)
  - 4.1 Lift, drag and moment coefficients
  - 4.2 How lift and drag are produced
  - 4.3 Airfoil data
  
5. Propulsion (2 hrs.)
  - 5.1 Propellers
  - 5.2 Jet propulsion
  - 5.3 Rocket propulsion
  
6. Airplane Performance (2 hrs.)
  - 6.1 Equations of motion
  - 6.2 Propulsion requirements
  - 6.3 Range and endurance
  
7. Stability and Control (1 hr.)
  - 7.1 Static and dynamic stability
  - 7.2 Static trim

## 8. Astronautics (3 hrs.)

8.1 Equations of motion

8.2 Orbits

## 9. Launch Vehicle Performance (3 hrs.)

9.1 Basic vehicle performance (the ideal rocket equation and assumptions)

9.2 Vehicle sizing and synthesis (structural and propellant mass fractions)

9.3 Vehicle staging

## 10. Aerospace Discipline and Applied Guest Lectures (4 hrs.)

10.1 UAVs

10.2 Human-Powered Aircraft

10.3 Phoenix Mars Scout mission

10.4 AE Curriculum

\*1 hour reserved for in-class midterm

\*3 hours reserved for class project