APT A138: AERODYNAMICS

Item	Value
Top Code	302020 - Piloting
Units	3 Total Units
Hours	54 Total Hours (Lecture Hours 54)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Grading Policy	Standard Letter (S)

Course Description

Course covers the basic principles of flight theory in both low and high speed regimes. Airflow theory, airfoil design, high lift devices, induced and parasitic drag, stall patterns, climb and sink performance, thrust and power, control & stability in the subsonic, transonic, and supersonic conditions. Extensive discussion of stall/spin aerodynamics and recovery techniques. Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. Explain the aerodynamic forces acting on an aircraft in both high and low speed flight.
2. Explain the aerodynamic principles of stalls, spins and departure from controlled flight.
3. Define positive, negative and neutral static and dynamic stability.

Course Objectives

- 1. Explain the principles of basic aerodynamics and how Bernoullis principle affects wing and airfoil forces, how aerodynamic forces develop and how high lift conditions and high lift device affect lift characteristics.
- 2. Explain the development of aerodynamic pitching moments and center of pressure movement affects stability and control.
- 3. Describe induced drag, parasite drag and the total drag curve along with the affects of wing taper and sweepback with respect to high speed drag.
- 4. Describe the relationship between thrust and power required.
- 5. Describe stall patterns on various wings.
- 6. Explain the relationship between lift, drag, thrust and loading in straight and level flight, climbs, turns and descending flight.
- 7. Describe supersonic air flow patterns and compressibility with regards to high speed flight.
- 8. Describe the factors that affect aircraft stability and control.
- 9. Explain the causes of aerodynamic stalls and spins along with the aerodynamic justification for stall and spin recovery techniques.
- 10. Apply principles of aerodynamics to specific problems of flying.

Method(s) of Instruction

- Lecture (02)
- DE Live Online Lecture (02S)
- DE Online Lecture (02X)