Principles of Flight

4o

Lesson Objective

During this lesson the student/candidate will learn the key elements of the principles of flight. A proper understanding of the principles of flight is necessary to understand how a glider flies and how it is controlled. The student will learn about basic glider and airfoil design and how an airfoil generates lift. The student will learn the relationship of lift and drag, the 4 forces that act on a glider in both straight and turning flight and the aerodynamics of stalls and spins.

Regulatory Requirement

- Solo Pilot: 14 CFR part 61.87(b)(iii)
- Private Pilot: Practical Test Standard V, VII, IX and 14 CFR part 61.105(b)(10)

Content

- Glider and airfoil design characteristics
    - Relative wind
    - Angle of attack
- The three axes of rotation and stability about those axes.
- The forces of Lift and drag and their relationship
- Forces acting on a glider in straight flight and turns
- Stalls and spins

Completion Standards

The student must be able to

- Describe the components of a glider, their function and operation
- Understand and explain how an airfoil generates lift
- Explain the three axes of rotation and stability about those axes
- Understand and explain the lift/drag relationship of a glider in flight
- Understand and describe the forces acting on a glider in straight flight and turns
- Understand and explain why a wing stalls and how spins occur

Homework for Pre-Solo

- “Glider Flight Training Manual” by Thomas Knauff, pp.7-41, 68-74, 146-153, 188-200

Homework for Solo to Private

- Jim Burch Online Study Guide Subjects “Glider Aerodynamics”
- Glider Flying Handbook (2013), Chapters 2&3, 7-32 to 36, 8-15 to 18
- FAA Pilot's Handbook of Aeronautical Knowledge, Chapter 3
- PowerPoint 02D(a) Principles of Flight

Further Reading

- CFIG Lesson Plan Notes

Next Lesson: 4p -- Navigation
Previous Lesson: 4n -- Airspace
Return to Training Syllabus