



COMMERCIAL PILOT — AIRPLANE

# Course Study Guide

# How to Use This Document

This guide contains a summary of the Commercial Pilot — Airplane Course flashcard questions, and should be used to evaluate your understanding. When you identify weak areas, mark them for further study. And remember if you get stuck you can always reach out to your course instructor!

Additionally, we have outlined the exact requirements in the Commercial ACS to eliminate any grey area on what exactly you are being evaluated on. The outline includes references to the appropriate source material for your reference.

## **We recommend the following study strategy:**

1. Review your notes, flashcards, and any subject areas in which you already know you're not fully prepared.
2. When you feel like you have a good grasp of general concepts, go through the Course Study Guide (the one *without* the answer key). Write down your answers and mark questions when you don't know the answers.
3. Re-study the problem subject areas identified in step #2.
4. Once you again feel comfortable with all the subject areas, go through the Course Study Guide with the answers and verify you have the correct answers. Where you don't, go back through, study, and make sure you improve your understanding of the subject area(s).

We highly recommend thinking about the content on your own and discussing any questions with your instructor before consulting this guide for the “answers”. Although it is not the most enjoyable process, thinking critically about the subject is the best way to encourage long term retention of this information, which is the real goal. Good learning is not always the most “efficient” learning.

This guide is for **informational purposes**. We've designed it to help pilots learn and apply concepts in the real world, and to improve their flight training experience. But it is not a substitute for time in an airplane with a flight instructor.

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# Revisions Log

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# Pilot Qualifications

## Commercial Pilot Privileges and Limitations

What operations are permitted for commercial pilots purely under part 91?

Your friend asks if you'd be interested in taking several clients on a sightseeing tour from Central California through the Cascades to Sun Valley, OR. Is this legal?

A former student approaches you and asks if you'd be interested in flying with him to pick up his new Piper Cherokee on a flight from Tulsa, OK to Jacksonville, FL. He says he will pay you a flat rate of \$200 per day. Is this legal?

After earning your commercial pilot certificate a friend offers you a job at her part 135 company as a pilot flying passengers in between islands in a Cessna Caravan, are you able to accept the job?

## Recency of Experience

As a commercial pilot you have not made 3 takeoffs and landings to a full stop within the preceding 90 days. Is it legal to transport a passenger in their aircraft for higher during the period beginning from the end of evening civil twilight to the beginning of morning civil twilight?

You fly for a part 135 certificated air carrier have not conducted 6 instrument approaches in the preceding 6 calendar months in simulated or actual instrument conditions. A friend without an instrument rating asks you to fly their 172 to the coast and shoot an approach through a fog layer. Are you legal to do this?

## Medical Requirements



What minimum class of medical is required to exercise commercial pilot privileges?

## Required Documents

As a commercial pilot your logbook **IS** required to be in your possession while exercising the privileges of the certificate. (True/False)

# Airworthiness

## Required Certificates

## Required Inspections

If operating an aircraft for commercial purposes in Class G airspace under VFR flight rules, a transponder check is required. (True/False)

## AD's and Service Bulletins

When are service bulletins mandatory?

## Special Flight Permits

Passengers may be carried onboard while operating an aircraft under a special flight permit. (True/False)

## Pilot Preventative Maintenance

# Advanced Aerodynamics

## High Altitude Aerodynamics

At what altitude is 50% of the atmosphere, by density, below your aircraft?

## Types of Airspeed

Mach number is a representation of an aircraft's speed as what?

What happens to the speed of sound as altitude increases? Why?

## Indicated vs True Airspeed

Which airspeed will determine how the aircraft responds to abrupt control inputs at altitude?

On average, how much does true airspeed increase per 1,000ft of altitude?

## Low Altitude Speed Limit

In high altitude flight, the laws of slow speed high angle of attack stalls still apply. (True/False)

## High Altitude Speed Limit

In a manner of speaking, an aircraft can “stall” at high altitude due to being at too fast of a velocity. (True/False)

The maximum speed of an aircraft at high altitude is generally with relationship to which type of velocity?

With respect to the speed of sound, what value does a mach number represent?

The maximum operating mach number of an aircraft is depicted using what notation?

Aircraft that have a  $M_{MO}$  speed do not have a  $V_{NE}$  speed. (True/False)

## Maximum Altitude - Speed

Two identical aircraft are climbing at the same weight, which factor would allow one aircraft to reach a higher altitude than the other?

An aircraft is able to climb due to what physical force?

Which aircraft has a more stable energy state? An aircraft climbing at a lower or higher FPM assuming both aircraft have the same thrust to weight ratio of excess thrust?

While climbing at a constant mach number, what instrument value can be seen decreasing?

## Maximum Altitude - Weight

How does weight impact the maximum altitude capability of an aircraft?

Since weight changes throughout a flight, a cruise altitude not attainable at GTOW might be attainable later in the flight. (True/False)

## Coffin Corner

Coffin corner is the term for the difference between what values?

What causes the high speed and low speed cue to become closer together?

What preventative aircraft feature generally helps increase overspeed/stall protection at altitude?

Special care should be taken while turning at altitude for what reason?

## Transonic Flight & Mcrit

The speed at which the first molecule of airflow over the wing reaches the speed of sound marks the beginning of what flight regime?

The transonic flight regime generally begins around what mach number/percentage of the speed of sound?

## Transonic Flight & Shockwaves

Name a factor that the normal shockwave increases on an airfoil

Shockwaves are created by the pressure differential of what types of airflow?

## Swept Wing Aerodynamics

Name a benefit of swept wings.

How do swept wings accomplish this benefit?

What is a downside of swept wings?

## High Lift Devices - Slots

How do slots increase lift?

## High Lift Devices - Slats

How do slats differ from slots?

## Vortex Generators

How do vortex generators increase low speed performance?

## Mach Tuck

What causes mach tuck?

# Systems

## Oxygen

Beginning at what flight altitude must flight crew begin the use of supplemental oxygen immediately?

If operating a pressurized aircraft, above what flight altitude must the pilot at the controls don and utilize an oxygen mask?

## Turbine Engines

Generally speaking what are the two main types of compressors in turbine engines?

What are the 4 main types of gas turbine engines?

## Bleed Air

What does the term “Bleed Air” refer to?

## Pressurization

Pressurization is generally provided by which type of unit?

Cabins pressurize by trapping ambient air pressure at the surface and recycling it throughout the flight. (True/False)

What component of the pressurization system regulates cabin pressure?

## Advanced Hydraulics

Generally speaking what PSI do nearly all hydraulic systems operate at?

Provide some examples of systems that are often operated hydraulically on large aircraft?

## Advanced Flight Controls

Describe the purpose of flight spoilers

Describe the purpose of ground spoilers, or ground lift dumping devices.



# Human Factors

Watching Yourself

Human Factors - Passengers

Hypoxia

Hyperventilation

Ear & Sinus

Spatial Disorientation

Motion Sickness

CO Poisoning

Stress

Fatigue

Dehydration & Nutrition

Hypothermia

Optical Illusions

Scuba

Alcohol and Drugs

Hazardous Attitudes

Task Management

Managing Pressure

# Flight Deck Management

Passenger Briefing

Checklist Use

Portable Electronic Devices (PEDs)

Automation

# Commercial Operations

Busy Airports

RVSM and High Altitude Operations

SATR/SFRA

# High Altitude Operations

Flight Level Breakdown

Use of Pressurization Systems

# Survival

Survival Gear and Planning

Ditching Considerations

# ACS References Table

Reference	Title
14 CFR part 39	Airworthiness Directives
14 CFR part 43	Maintenance, Preventative Maintenance, Rebuilding and Alteration
14 CFR part 61	Certification: Pilots, Flight Instructors, and Ground Instructors
14 CFR part 68	Requirements for Operating Certain Small Aircraft Without a Medical Certificate
14 CFR part 71	Designation of Class A, B, C, D, and E Airspace Areas; Air Traffic Service
14 CFR part 91	General Operating and Flight Rules
14 CFR part 93	Special Air Traffic Rules
14 CFR part 119	Certification: Air Carriers and Commercial Operators
AC 00-6	Aviation Weather
AC 00-45	Aviation Weather Services
AC 60-28	English Language Skill Standards Required by 14 CFR parts 61, 63, 65
AC 61-67	Stall and Spin Awareness Training
AC 68-1	Alternative Pilot Physical Examination and Education Requirements
AC 00-54	Pilot Windshear Guide
AC 61-107	Aircraft Operations at Altitude Above 25,000 Feet Mean Sea Level or Mach Numbers Greater Than .75/with Change 1
AC 91.21-1	Use of Portable Electronic Devices Aboard Aircraft
AC 91-73	Parts 91 and 135 Single Pilot, Flight School Procedures During Taxi Operations
AFM	Airplane Flight Manual
AIM	Aeronautical Information Manual
FAA-H-8083-1	Aircraft Weight and Balance Handbook

Reference	Title
FAA-H-8083-2	Risk Management Handbook
FAA-H-8083-3	Airplane Flying Handbook
FAA-H-8083-6	Advanced Avionics Handbook
FAA-H-8083-15	Instrument Flying Handbook
FAA-H-8083-23	Seaplane, Skiplane, and Float/Ski Equipped Helicopter Operations Handbook
FAA-H-8083-25	Pilot's Handbook of Aeronautical Knowledge
FAA-H-8083-66	Flying Light Twins Safely Pamphlet
POH/AFM	Pilot's Operating Handbook/FAA-Approved Airplane Flight Manual
Other	Chart Supplements
	Navigation Charts
	Navigation Equipment Manual
	USCG Navigation Rules, International-Inland
	NOTAMs