Discovering Aviation
Fundamentals of Flight

BECOMING A PILOT

Steps to Become a Pilot
- Student Pilot’s Certificate
  - Valid for up to 24 or 60 months
- Medical Certificate
  - Minimum 3rd Class
- Training
  - Minimum 40 flight hours
- FAA Knowledge Exam
  - 60 question (70% is passing)
- FAA Oral & Practical Exam
  - FAA examiner
Airman Certification - Aircraft Category

- Airman Certification relates to what a pilot is trained to fly.
- Airplane
- Rotorcraft
- Glider
- Lighter-than-air

Airman Certification - Aircraft Category cont'

- Powered-lift
- Powered parachute
- Weight-shift-control aircraft

Airman Certification - Airplane Class

- Land or Sea
- Single engine or Multi engine

Class rating refers to the similarities of an aircraft category.
Airman Certification - Aircraft Type Rating

- Category: Airplane
- Class: Multi-engine Land
- Type: Boeing 727

Aircraft Certification – Aircraft Category

- Aircraft Certification relates to how an aircraft is built and its intended use.

What to do with your New Certificate

- Travel the country
- Fly in the mountains
- Fly at night
- Can learn to fly in clouds
- Aerobatic training
- Fly different aircraft
A Few Aviation Organizations

- AOPA
  - Aircraft Owners and Pilots Association
- EAA
  - Experimental Aircraft Association
- The Ninety-Nines
  - International Women Pilot Organization
- CAP
  - Civil Air Patrol

FAR/AIM

Regulation Titles

- FAR 1 - Definitions
- FAR 23 – Airworthiness Standards
- FAR 39 – Airworthiness Directives
- FAR 43 - Maintenance
- FAR 61 – Certification of Pilots
- FAR 73 - Airspace
- FAR 91 – General Operations
- NTSB 830 – Accident Notification & Reporting
FAR 1 - Definitions

• **Night** - The time between the end of evening civil twilight to the beginning of morning civil twilight.

• **V_{FE}** - Maximum flap extended speed
• **V_{LE}** - Maximum landing gear extended speed
• **V_{LO}** - Maximum landing gear operating speed

• **V_{NE}** - Never Exceed speed
• **V_{NDO}** - Maximum structural cruising speed in smooth air
• **V_{SO}** - Stalling speed in the landing configuration

FAR 1 - Definitions

• **V_{A}** - Maneuvering speed (older aircraft)
• **V_{O}** - Maneuvering speed (newer aircraft)

• **V_{Y}** - Best Rate of climb
• **V_{X}** - Best Angle of climb

FAR 61.3 – Requirements for Documents

• **Pilot Documents**
  • Pilot Certificate
  • Medical Certificate
  • Photo identification (government issued)

• **Inspection of Documents**
  • FAA administrator
  • NTSB representative
  • Law enforcement officer
  • TSA representative
**FAR 61.15 – Alcohol/Drug Offenses**

- Convictions result in
  - Denial of airman certificate applications
  - Suspension or revocation of certificates

- Must report convictions to
  - FAA Civil Aviation Security Division with 60 days and
  - On all future aviation medical examinations

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**FAR 61.23 – Medical Certificates**

- **1st Class** – Required by ATP (airline captains)
- **2nd Class** – Required by commercial pilots
- **3rd Class** – Required by
  - Private pilots
  - Recreational pilots
  - Student pilots

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**FAR 61.23 – Medical Certificate Durations**

- **Age 40 & older**
  - 1st class privileges
  - 2nd class privileges
  - 3rd class privileges

- **Under Age 40**
  - 1st class privileges
  - 2nd class privileges
  - 3rd class privileges
FAR 61.31 Additional Training

- Type Ratings
  - Large Aircraft over 12,500 lbs
  - Turbojet-powered airplanes
  - Other aircraft specified by FAA
- Complex Aircraft
  - Retractable gear, flaps & a controllable propeller
- High Performance Aircraft
  - Engine has more than 200HP
- High Altitude Pressurized Aircraft
- Tail Wheel Aircraft

FAR 61.56 – Flight Review

- Required every 24 calendar months
- Minimum of 1 hour ground and 1 hour flight training
  
or one of the following
- Pass a FAA check ride
- Complete FAA Wings Program

A flight review allows a pilot to fly as PIC for the next 24 calendar months.

FAR 61.57 – Recent Flight Experience

- To carry passengers in flight...
- Within preceding 90 days
  - Complete 3 takeoffs and landings

- To carry passengers in flight at night...
- Within preceding 90 days
  - Complete 3 takeoffs and landings
  - 1 hour after sunset to 1 hour before sunrise
FAR 61.60 – Change of Address
- Must notify FAA of address change within 30 days otherwise
- A pilot may not exercise their pilot privileges

FAR 61.69 – Glider Towing
- Private Pilot or higher certificate
- Minimum 100 PIC hours in category & class
- Logbook endorsement
- 3 actual or simulated tows within preceding 24 months

FAR 61.113 Privileges and Limitations
- No compensation or hire activities
  - Unless it is in connection with your business/employment
- May share expenses (pro rata share)
  - Fuel, oil, airport or rental expenses
- PIC for nonprofit or community events
- Reimbursed for search and rescue operations
- Sell aircraft if 200 flight hours are logged
**FAR 91.313 – Restricted Category Aircraft**

- No compensation or hire operations
- Only flight crewmembers and essential personal are allowed on board
- Cannot fly over densely populated areas or near busy passenger airports

**FAR 91.319 – Experimental Category Aircraft**

- Limited compensation or hire operations
  - No PAX or property
  - Glider towing or flight training only
- FAA waiver needed to fly over densely populated areas
- VFR operations only
- Must advise the control tower of experimental status

**WEATHER**
Atmospheric Composition

- Earth’s atmosphere is a mixture of life-giving gases which are unique when compared to that of the other planets in the solar system.

Atmospheric Volume

- As altitude increases, the same volume of air contains fewer molecules of the gases that make it up.
- This changing density of air directly affects weather phenomena in atmospheric levels.

Atmospheric Density

- The earth’s atmosphere thins rapidly with increasing altitude.
  - 120,000’ msl (≈ 20 miles) – 99% thinner
  - 60,000’ msl (≈ 10 miles) – 90% thinner
  - 42,000’ msl (≈ 7 miles) – 75% thinner
  - 18,000’ msl (≈ 3 miles) – 50% thinner
**Atmospheres**

- **Troposphere**
  - SFC to 36,000' msl (average)
  - Decreasing temperatures
  - Weather occurs here

- **Stratosphere**
  - Up to 160,000' msl
  - Some weather here

- **Mesosphere & Thermosphere**
  - No affect on weather

**Satellite**

- Two geostationary satellites provide the "Big Picture" of weather.

**Surface Analysis (No stations)**

- Weather systems
- Issued every 3 hrs
Surface Analysis (With stations)

- Weather systems
- Issued every 3 hrs

Multiplication

E6B FLIGHT COMPUTER

E6b Introduction – Front Side

- Temperature conversions
- Environmental corrections
- Outer Scale
  - Distance
  - Fuel
- Middle Scale – movable
  - Rate
- Inner Scale – movable
  - Time
Multiplication
• $8 \times 2 = ?$
  - Find 8 on outer scale
  - Rotate middle scale and line up the Black 10 under 8
  - Find 2 on the inner scale
  - Read answer on outer scale.

Answer = 16

How does it Work?
• The E6b works on the principle of ratios

\[
\frac{8}{1} = \frac{16}{2}
\]

Multiplication
• $30 \times 5.5 = ?$
  - Find 30 on outer scale
  - Rotate middle scale and line up the Black 10 under 30
  - Find 55 on the inner scale
  - Read answer on outer scale.

Answer = 165
Multiplication

- $120 \times 0.4 = ?$

- Find 12 on outer scale
- Rotate middle scale and line up the Black 10 under 12
- Find 40 on the inner scale
- Read answer on outer scale.

Answer = 48

End of Lesson

- Visit website for links
  - Assignment A1 available online
    - Turn in by end of week
  - Quiz A1 is online
    - Turn in online
  - Other
    - Practice E6b flight computer problems
    - Complete workbook pages