Private Pilot

Airplane Single-Engine Land

Revision 17-May-17

There's no sensation to compare with this
Suspended animation -- a state of bliss
Can't keep my mind from the circling skies

-- Pink Floyd, "Learning to Fly"

Flyers have a sense of adventures yet to come, instead of dimly recalling adventures of long ago as the only moments in which they truly lived.

-- Richard Bach, A Gift of Wings

Science, freedom, beauty, adventure: what more could you ask of life?

-- Charles A. Lindbergh, The Spirit of St. Louis

Pilots track their lives by the number of hours in the air, as if any other kind of time isn't worth noting.

-- Michael Parfit, "The Corn was Two Feet Below the Wheels", Smithsonian Magazine

Contents

Training Materials

- Syllabus
- FAA Pilot's Handbook of Aeronautical Knowledge (FAA-H-8083-25B)
- FAA Airplane Flying Handbook (FAA-H-8083-3A)
- FAA Aeronautical Chart User's Guide
- Current Federal Aviation Regulations (FAR)
- Current Aeronautical Information Manual (AIM)
- Private Pilot Airman Certification Standards (FAA-S-ACS-6)
- Private Pilot Knowledge Exam Guide
- Private Pilot Oral Exam Guide
- Airplane Flight Manual / Pilot's Operating Handbook (POH)
- Pilot Logbook
- Checklists
- Current Sectional Chart(s) and Terminal Area Chart(s)
- Current Chart Supplement
- Plotter
- E6-B
- VFR Kneeboard
- Flight bag
- Headset
- Foggles or hood

Feel free to choose one of the many training kits available from ASA, Jeppesen, Gleim, etc. These typically include most of the items listed above. The lessons in this syllabus reference the FAA text-books, but are easily adaptable to any commercial textbooks / courses.

Advanced Reading

While the textbooks used in training are great, they are introductory in nature rather than in-depth and complete. The following books are excellent studies of various, important topics from Aircraft Systems to Aerodynamics to Regulations.

- Collins, L. *Takeoffs and Landings: The Crucial Maneuvers & Everything in Between*
- Crane, D. *A Pilot's Guide to Aircraft and Their Systems*
- Hurt, H. H., Jr. *Aerodynamics for Naval Aviators*
- Langewiesche, W. *Stick and Rudder: An Explanation of the Art of Flying*
- Lankford, T. *Aviation Weather Handbook*
- Stowell, R. *The Light Airplane Pilot's Guide to Stall / Spin Awareness*

When you finish reading these books, go search Amazon or your local bookstore for more! Always strive to be a better pilot, and NEVER stop learning.

Useful Webpages

FAA and Federal Websites

FAA Aircraft Handbooks
https://www.faa.gov/regulations_policies/handbooks_manuals/aircraft/

FAA Aviation Handbooks
https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/

FAA Aeronautical Information Manual
https://www.faa.gov/air_traffic/publications/

FAA Airman Certification Standards
https://www.faa.gov/training_testing/testing/acs/

FAA Notices to Airmen Online Search
https://pilotweb.nas.faa.gov/PilotWeb/

FAA Notices to Airmen Publication
https://www.faa.gov/air_traffic/publications/notices/

The GPO's Code of Federal Regulations Download Site
https://www.gpo.gov/fdsys/browse/collectionCfr.action?collectionCode=CFR

FAA Safety
https://www.faasafety.gov/

Aviation Safety Reporting System
http://asrs.arc.nasa.gov/

Textbooks and Ground Courses

Gleim Publications (FAR / AIM, textbooks, knowledge exam guides, etc.)
http://www.gleim.com/aviation/

Aviation Supplies and Academics (FAR / AIM, oral and knowledge exam guides, etc.)
http://www.asa2fly.com

Sporty's Flight Training
http://www.sportys.com/pilotshop/learn-to-fly.html

Jeppesen Flight Training
http://ww1.jeppesen.com/personal-solutions/aviation/faa-training.jsp

StudentPilot.com Forums
http://www.studentpilot.com

Weather and Flight Planning

National Weather Service Aviation Weather Center
http://www.aviationweather.gov/adds/

NOAA Hazard Mapping System Fire and Smoke Product
http://www.ospo.noaa.gov/Products/land/hms.html

Lockheed Martin Flight Service
http://www.1800wxbrief.com/

CSC DUATS (Weather and flight planning service)
http://www.duats.com

DTC DUAT (Weather and flight planning service)
http://www.duat.com

FltPlan.com (Flight planning service)
http://www.fltplan.com/

Aircraft Owners and Pilots Association

Aircraft Owners and Pilots Association
http://www.aopa.org

AOPA Airports
http://www.aopa.org/airports/

AOPA Flight Planner
http://www.aopa.org/flightplanning/flyq/

AOPA Air Safety Institute
http://www.aopa.org/asf

AOPA Medication Database
http://www.aopa.org/members/databases/medical/search_faa_meds.cfm

This list does not imply an endorsement of products or services.

Ground Lessons

You, Your Goals, and the Training Ahead

Objectives

The student and instructor should become familiar with each other, and the student should become familiar with the training process, training materials, and certification.

References

- Pilot's Handbook of Aeronautical Knowledge; Ch. 1 (Introduction to Flying)
- FAR Part 61; §§ 23, 35, 39, 51, 56, 57, 83, 85, 87(a-d, n, o), 89, 93(a-c, e), 95, 103, 105, 107, 109(a), 113
- FAR Part 91; § 17
- AC 61-98B (Currency Requirements and Guidance for the Flight Review and Instrument Proficiency Check)

Materials

- Training books
- FAR / AIM

Schedule

1 hour

Instructor Actions

Learn about the student, the student's previous aviation experience, and the student's aviation goals.

Discuss:

- ❑ The flight training process and major milestones including: first solo, first solo cross county, and final preparation for the FAA written, oral, and practical exams.
- ❑ Training materials.
- ❑ Medical certificates and their duration, alcohol, and drugs.
- ❑ The Student Pilot certificate, its privileges, and its limitations.
- ❑ The Private Pilot certificate, category and class, privileges and limitations.
- ❑ Logbooks and logging flight experience.
- ❑ Recent experience requirements and flight reviews.

Student Actions

Engage in a discussion with the instructor about his or her own expectations for the flight training process. The student should discuss his or her interests, any previous aviation experience, and any future aviation goals.

Completion Standards

The student should have a good, broad understanding of how the training will proceed, his or her own expectations for training, and what materials will be required for training.

The student should be comfortable with the instructor, be confident that the instructor understands his or her aviation goals, and be confident that the instructor can help the student achieve those goals.

Aeronautical Decision Making

Objectives

In this lesson, the student will learn strategies for identifying, analyzing, mitigating, and supervising aviation hazards, managing risk, maintaining situational awareness, and managing workload.

References

- Pilot's Handbook of Aeronautical Knowledge; Ch. 2 (ADM)
- AC 60-22 (Aeronautical Decision Making)

Materials

- Whiteboard and markers

Schedule

1 hour

Instructor Actions

The instructor will present the student with some common scenarios he or she is likely to encounter. While discussing the scenarios with the student, the instructor will discuss the following topics with the student:

- ❑ Hazardous attitudes and how to mitigate them.
- ❑ Situational Awareness.
- ❑ The PAVE checklist.
- ❑ The IMSAFE checklist.
- ❑ Proficiency vs. Currency, and personal minimums.
- ❑ Aircraft hazards.
- ❑ Environmental hazards.
- ❑ External pressures.
- ❑ Assessing risk with the CARE process.
- ❑ Analyzing risk with the TEAM process.
- ❑ The 5P checklist and the OODA loop process.
- ❑ Automatic decision making.
- ❑ Common pitfalls.
- ❑ Workload management.

Student Actions

The student will discuss the instructor's scenarios and apply Aeronautical Decision Making principles.

Completion Standards

The student will demonstrate ability to use the Aeronautical Decision Making process to analyze common scenarios and make reasonable decisions on how to handle the scenarios. The student will also demonstrate a deeper understanding of situational awareness and workload management through planning.

The Preflight Inspection

Objectives

In this lesson, the student will discover the training airplane, the preflight inspection process, and the required documents.

References

- Pilot's Handbook of Aeronautical Knowledge
  - Ch. 3 (Aircraft Construction)
  - Ch. 9 (Flight Manuals and Other Documents)
- FAR Part 91; §§ 3, 9, 103, 203, 205, 207, 213, 215, 409, 411, 413
- AC 91-67 (Minimum Equipment Requirements for General Aviation Operations Under Part 91)
- Airplane Flight Manual / Pilot's Operating Handbook
- Checklists

Materials

- Airplane Flight Manual / Pilot's Operating Handbook
- Checklists
- FAR / AIM

Schedule

1 hour

Instructor Actions

Discuss the following topics with the student:

- ❑ The major airplane components, structure, and flight controls.
- ❑ Required certificates and documents (ARROW).
- ❑ AFM vs. POH vs. PIM
- ❑ Airplane logbooks, required inspections, and airworthiness directives.
- ❑ Maintenance you can do as a pilot.
- ❑ Day VFR equipment requirements.
- ❑ Minimum equipment lists, equipment failures, and special flight permits.
- ❑ The importance of IMSAFE and checklists.
- ❑ Fuel grades.

Student Actions

Answer questions related to the lesson topics and perform a preflight inspection of the airplane.

Completion Standards

The student will be able to answer questions and discuss the structure of an airplane, flight controls, airplane systems, flight instruments, required certificates and documents, the airplane POH, airplane logbooks, required inspections, be able to perform a preflight inspection of the airplane, and understand basic, personal psychological and physiological limitations.

Aerodynamics

Objectives

In this lesson, the student will discover basic aerodynamics, the forces acting on an airplane in flight, and stalls. This lesson will also introduce load factor, weight, and balance concepts.

References

- Pilot's Handbook of Aeronautical Knowledge
  - Ch. 4 (Principles of Flight)
  - Ch. 5 (Aerodynamics of Flight)
- AC 61-67C (Stall and Spin Awareness Training)
- NPR's Radiolab, "Loop the Loop" Episode
  - http://www.radiolab.org/story/159748-loop-loop/

Materials

- Whiteboard and markers
- Miniature airplane

Schedule

1 hour

Instructor Actions

Discuss the following topics with the student:

- ❑ Pressure, temperature, and density altitude.
- ❑ How airfoils produce lift.
- ❑ The four basic forces, types of drag, and the lift-to-drag ratio.
- ❑ Wing tip vortices, and how the ground affects airplane flight characteristics.
- ❑ Airplane axes, moment arms, center of gravity, and stability.
- ❑ How the four basic forces act on a maneuvering airplane.
- ❑ Stalls and spins.
- ❑ Propeller principles and the effect of propellers on flight.
- ❑ Load factors in flight, weight and balance.

Student Actions

Answer questions related to the lesson topics.

Completion Standards

The student will be able to answer questions about and discuss the principles of flight and aerodynamics.

Flight Controls

Objectives

In this lesson, the student will gain a more thorough understanding of the primary and secondary flight controls.

References

- Pilot's Handbook of Aeronautical Knowledge; Ch. 6 (Flight Controls)

Materials

- Whiteboard and markers
- Miniature airplane

Schedule

1 hour

Instructor Actions

Discuss the following topics with the student:

- ❑ Ailerons use and types of ailerons.
- ❑ Adverse yaw.
- ❑ Elevator use and types of elevators.
- ❑ Effect of propeller wash on elevators.
- ❑ Rudder use.
- ❑ Flap use and types of flaps and leading-edge devices.
- ❑ Trim use and types of trim.
- ❑ Servo and anti-servo tabs.
- ❑ Ground adjustable tabs.
- ❑ Autopilot concepts.

Student Actions

Answer questions related to the lesson topics.

Completion Standards

The student will be able to answer questions about and discuss the use and different types of primary and secondary flight controls.

Flight Instruments

Objectives

In this lesson, the student will gain a deeper understanding of the basic flight instruments, how they operate, and the errors inherent to their design.

References

- Pilot's Handbook of Aeronautical Knowledge; Ch. 8 (Flight Instruments)

Materials

- Whiteboard and markers
- Toy gyroscope and miniature airplane
- A flight deck poster with appropriate instruments

Schedule

1 hour

Instructor Actions

Discuss the following topics with the student:

- ❑ Pitot-static concepts.
- ❑ Altimeter operation, verification, environmental effects, and errors.
- ❑ Vertical speed indicator operation and verification.
- ❑ Airspeed indicator operation, verification, environmental effects, and errors.
- ❑ Air Data Computers.
- ❑ Gyroscope principles.
- ❑ Turn Coordinator operation and verification.
- ❑ Attitude indicator operation and verification.
- ❑ Heading indicator operation, verification, and errors.
- ❑ Altitude Heading and Reference Systems.
- ❑ The magnetic compass and compass errors.
- ❑ Using the outside air temperature gauge.

Student Actions

Answer questions related to the lesson topics.

Completion Standards

The student will be able to answer questions about and discuss the principles of flight instruments, their operation, and their errors.

Aircraft Systems

Objectives

In this lesson, the student will learn about common airplane system concepts and where to find detailed information about the training airplane's systems.

References

- Pilot's Handbook of Aeronautical Knowledge; Ch. 7 (Aircraft Systems)
- Airplane Flight Manual / Pilot's Operating Handbook
  - POH Section 7 (Airplane & Systems Descriptions)

Materials

- Whiteboard and markers
- Airplane Information Manual / Pilot's Operating Handbook
- An airplane like the training airplane with its cowling removed, if possible

Schedule

1 hour

Instructor Actions

Using an actual airplane, if possible, discuss the following topics with the student:

- ❑ Piston engine operation, detonation, and pre-ignition.
- ❑ Propeller design, fixed-pitch and constant-speed propellers.
- ❑ Carburetor principles, fuel / air mixture, and icing.
- ❑ Fuel injection, fuel system, and fuel grades.
- ❑ Ignition system.
- ❑ Oil, cooling, and exhaust systems.
- ❑ Electrical system.
- ❑ Hydraulic systems.
- ❑ Landing gear.
- ❑ Anti-ice and deicing systems.

Student Actions

Answer questions related to the lesson topics.

Completion Standards

The student will be able to answer questions about and discuss aircraft systems. The student will also have a better understanding of how to find systems information specific to the training airplane.

Emergency Procedures

Objectives

In this lesson, the student will learn about general emergency procedures common to most airplanes and discuss emergency procedures specific to the training airplane.

References

- Airplane Flying Handbook; Ch. 17 (Emergency Procedures)
- Airplane Information Manual / Pilot's Operating Handbook
  - POH Section 3 (Emergency Procedures)
- Aeronautical Information Manual; Ch. 6 (Emergency Procedures)
- Checklists

Materials

- Whiteboard and markers.
- FAR / AIM
- Airplane Flight Manual / Pilot's Operating Handbook
- Checklists

Schedule

1 hour

Instructor Actions

The instructor will construct several urgent / distress situations and guide the student through the emergency procedures for handling the situations. While guiding the student, the instructor will discuss the following topics with the student:

- ❑ Psychological hazards to safely handling the situation.
- ❑ Pre-flight planning.
- ❑ Using ATC, emergency transponder code.
- ❑ Selecting terrain, planning the approach, and configuring the airplane.
- ❑ Special considerations for landing in trees, water, or snow.
- ❑ Engine failure just after takeoff and during cruise flight.
- ❑ In-flight fires.
- ❑ Flap and elevator failures.
- ❑ Landing gear failures.
- ❑ Electrical failures.
- ❑ Pitot-static failures.
- ❑ Door opening in flight.
- ❑ Inadvertent flight into IMC.

Student Actions

Answer questions related to the lesson topics and demonstrate knowledge of the immediate action items on the emergency checklists for the training airplane.

Completion Standards

The student will be able to answer questions about and discuss general emergency procedures and know the immediate action items on the emergency checklists for the training airplane.

Aeromedical Factors

Objectives

In this lesson, the student will learn about the various aeromedical factors that can affect a pilot's ability to safely operation an airplane. Aeromedical factors range from hypoxia, to optical illusions, to the effects of drugs and alcohol.

References

- Pilot's Handbook of Aeronautical Knowledge; Ch. 17 (Aeromedical Factors)
- Aeronautical Information Manual; Ch. 8 (Medical Facts for Pilots)
- AC 60-4A (Pilot's Spatial Disorientation)

Materials

- Whiteboard and markers
- FAR / AIM

Schedule

1 hour

Instructor Actions

Discuss the following topics with the student:

- ❑ Types of hypoxia, their symptoms, treatment, and oxygen systems.
- ❑ Hyperventilation, its symptoms, and treatment.
- ❑ Middle-ear problems, sinus problems, and treatment.
- ❑ Vestibular, somatosensory, and visual systems.
- ❑ Leans, Coriolis, graveyard spiral, somatogravic, inversion, and elevator illusions.
- ❑ Carbon Monoxide poisoning.
- ❑ Fatigue, dehydration, and heatstroke.
- ❑ Decompression sickness.
- ❑ Empty-field myopia, night vision, false horizon, and autokenesis.

Student Actions

Answer questions related to the lesson topics.

Completion Standards

The student will be able to answer questions about and discuss the various aeromedical factors that can affect the safety of a flight.

Weather Theory

Objectives

In this lesson, the student will learn the basics of how weather works.

References

- Pilot's Handbook of Aeronautical Knowledge; Ch. 12 (Weather Theory)
- AC 00-6A (Aviation Weather for Pilots and Flight Operations Personnel)
- AC 00-24C (Thunderstorms)
- AC 00-54 (Pilot Windshear Guide)

Materials

- Whiteboard and markers

Schedule

1 hour

Instructor Actions

Discuss the following topics with the student:

- ❑ The atmosphere, circulation, the Coriolis Force, and surface friction.
- ❑ Atmospheric pressure.
- ❑ High pressure, low pressure, wind, convection, and turbulence.
- ❑ Isobars.
- ❑ Atmospheric stability, inversions, humidity, temperature / dew point.
- ❑ Methods and results of air saturation.
- ❑ Cloud types, and ceiling.
- ❑ Air masses and fronts.
- ❑ Wind shear.
- ❑ Thunderstorms, squall lines, tornadoes, icing, SLD, and hail.

Student Actions

Answer questions related to the lesson topics.

Completion Standards

The student will be able to answer questions about and discuss weather theory.

Weather Information Sources

Objectives

In this lesson, the student will learn how to use Internet-, telephone-, and radio-based weather information sources.

References

- Pilot's Handbook of Aeronautical Knowledge; Ch. 13 (Aviation Weather Services)
- AC 00-45G (Aviation Weather Services)
- Aeronautical Information Manual; Ch. 7 (Safety of Flight)

Materials

- Internet connection or printed briefing

Schedule

1 hour

Instructor Actions

The instructor will setup a typical cross-country scenario and guide the student through a standard briefing. While reading through the briefing with the student, the instructor will discuss the following topics with the student:

- ❑ ASOS, AWOS, ATIS.
- ❑ A/FSS, DUATS, HIWAS.
- ❑ Standard and abbreviated weather briefings.
- ❑ Routine Meteorological Reports (METAR's).
- ❑ Pilot Reports (PIREP's).
- ❑ Terminal Area Forecasts (TAF's).
- ❑ Area Forecasts (FA's).
- ❑ AIRMET's, SIGMET's, and Convective SIGMET's.
- ❑ Temperature and Winds Aloft Forecasts (FD's).
- ❑ Surface Analysis and Weather Depiction Charts.
- ❑ Radar Summary Charts.
- ❑ Significant Weather Prognostic Charts.
- ❑ Limitations of ground-based weather equipment and reports.
- ❑ Limitations of in-flight weather equipment.

Student Actions

Answer questions related to the lesson topics.

Completion Standards

The student will be able to answer questions about and discuss how to use aviation weather information sources.

Airspace

Objectives

In this lesson, the student will learn about the United States National Airspace System and Air Traffic Control's role in the system.

References

- Pilot's Handbook of Aeronautical Knowledge; Ch. 15 (Airspace)
- FAR Parts 71 and 73
- FAR Part 91; §§ 126, 127, 129, 130, 131, 133, 135, 137, 138, 139, 141, 143, 155, 157
- Aeronautical Information Manual; Ch. 3 (Airspace)
- Sectional chart legend

Materials

- Sectional chart and Chart Supplement
- Airspace quick-reference card
- FAR / AIM

Schedule

1 hour

Instructor Actions

Discuss the following topics with the student:

- ❑ Controlled airspace, uncontrolled airspace, and their purposes.
- ❑ Class A, B, C, D, E, G, and special-use airspace.
- ❑ Basic VFR weather minimums.
- ❑ Special VFR.
- ❑ Equipment requirements.

Student Actions

Answer questions related to the lesson topics.

Completion Standards

The student will be able to answer questions about and discuss the different airspace designations, their purpose, and their requirements. The student will also be able to discuss the role of Air Traffic Control in the National Airspace System.

Airport Operations

Objectives

In this lesson, the student will learn the information necessary to operate and airplane safely in the airport environment.

References

- Pilot's Handbook of Aeronautical Knowledge; Ch. 14 (Airport Operations)
- Airplane Flying Handbook; Ch. 7 (Airport Traffic Patterns)
- FAR Part 91; §§ 111, 113, 117, 119, 121, 123, 125, 126, 127, 129, 130, 131
- Aeronautical Information Manual
  - Ch. 2 (Aeronautical Lighting and Other Airport Visual Aids)
  - Ch. 4 (Air Traffic Control), § 3 (Airport Operations), Parts 1-5
- AC 90-23F (Aircraft Wake Turbulence)
- AC 90-48C (Pilot's Role in Collision Avoidance)

Materials

- Whiteboard and markers
- Miniature airplane and runway
- Airport diagrams and signage / marking examples
- FAR / AIM

Schedule

1 hour

Instructor Actions

Discuss the following topics with the student:

- ❑ Towered and non-towered airport operations.
- ❑ Sources of airport information.
- ❑ Airport signs and markings.
- ❑ Airport, approach, and glide path lighting.
- ❑ Traffic patterns, altitudes, spacing, and right-of-way.
- ❑ Wind direction indicators
- ❑ Basic radio communications and the 5 W's.
- ❑ Air traffic control services.
- ❑ Wake turbulence, collision, and runway incursion avoidance.

Student Actions

Answer questions related to the lesson topics.

Completion Standards

The student will be able to answer questions about and discuss operations in the airport environment.

Weight & Balance

Objectives

In this lesson, the student will gain a thorough understanding of the importance of weight and balance, as well as how to use the weight and balance data in the Airplane Flight Manual / Pilot's Operating Handbook to safely operate the airplane.

References

- Pilot's Handbook of Aeronautical Knowledge; Ch. 10 (Weight and Balance)
- Airplane Flight Manual / Pilot's Operating Handbook
  - POH Section 6 (Weight and Balance)

Materials

- Whiteboard and markers
- Airplane Flight Manual / Pilot's Operating Handbook
- Calculator
- Weight and balance worksheet

Schedule

1 hour

Instructor Actions

The instructor will setup a typical cross-country scenario, guide the student through the weight and balance calculations, and discuss the following topics with the student:

- ❑ The center of gravity (CG).
- ❑ Where to find the CG limits and weight and balance data for an airplane.
- ❑ Adverse effects of operating overweight or outside CG limits.
- ❑ Weight and balance calculation concepts and methods.
- ❑ Accounting for fuel.
- ❑ Weight-shift and weight-addition/-subtraction.

Student Actions

- Answer questions related to the lesson topics.
- Demonstrate ability to work through weight and balance calculations.

Completion Standards

The student will be able to answer questions about and discuss the principles of weight and balance. The student will also know how to find weight and balance limitations and data for an airplane, and use that information to determine if an airplane has been safely loaded.

Performance

Objectives

In this lesson, the student will learn what factors affect the performance of an airplane, and how to use the airplane's Airplane Flight Manual / Pilot's Operating Handbook to determine take off, cruise, and landing performance.

References

- Pilot's Handbook of Aeronautical Knowledge; Ch. 11 (Aircraft Performance)
- FAR Part 91; §§ 3, 103
- Airplane Flight Manual / Pilot's Operating Handbook
  - POH Section 5 (Performance)

Materials

- Whiteboard and markers
- Airplane Flight Manual / Pilot's Operating Handbook

Schedule

1 hour

Instructor Actions

The instructor will setup a typical cross-country scenario and guide the student through determining take off, cruise, and landing performance. While working through the scenario, the instructor will discuss the following topics with the student:

- ❑ The atmosphere and the different types of altitude.
- ❑ How density altitude affects performance.
- ❑ Performance in straight and level flight.
- ❑ Climb performance.
- ❑ Determining take off, climb, range / endurance, and landing performance.
- ❑ Interpolating or rounding.

Student Actions

- Answer questions related to the lesson topics.
- Demonstrate ability to use performance data for planning.

Completion Standards

The student will be able to answer questions about and discuss the factors that affect the performance of an airplane. The student will also know how to find the performance data for an airplane and use that data for planning.

Navigation

Objectives

In this lesson, the student will learn about the different methods of navigation and the navigational aids available to pilots.

References

- Pilot's Handbook of Aeronautical Knowledge; Ch. 16 (Navigation)
- FAR Part 91; § 119

Materials

- Whiteboard and markers
- Sectional chart and AFD
- Plotter and E6-B
- Navigation log

Schedule

1 hour

Instructor Actions

The instructor will setup a typical cross-country scenario and guide the student through developing a navigation plan. While working through the scenario, the instructor will discuss the following topics with the student:

- ❑ Sectional and terminal area charts.
- ❑ Latitude, longitude, and measurement of direction.
- ❑ Magnetic variance and deviation.
- ❑ Calculating wind correction and ground speed.
- ❑ Pilotage and dead reckoning.
- ❑ Minimum safe altitudes and maximum elevation figures.
- ❑ ADF navigation.
- ❑ VOR / DME navigation, identification, time / distance to station.
- ❑ GPS.

Student Actions

- Answer questions related to the lesson topics.
- Demonstrate ability to create a navigation plan.

Completion Standards

The student will be able to answer questions about and discuss using navigation charts and aids to develop a navigation plan.

Lost Procedures

Objectives

In this lesson, the student will first learn about the common errors that lead to getting lost. The student will then learn about how to recover from getting lost.

References

- Pilots Handbook of Aeronautical Knowledge; Ch. 16 (Navigation)

Materials

- Whiteboard and markers
- Sectional chart
- AFD

Schedule

1 hour

Instructor Actions

Discuss the following topics with the student:

- ❑ Common errors that lead to getting lost.
- ❑ Attitude and action.
- ❑ The Five C's.
- ❑ Information available to the pilot.
- ❑ Determining position with navigation facilities.
- ❑ Emergency frequency and transponder setting.

Student Actions

Answer questions related to the lesson topics.

Completion Standards

The student will be able to discuss the common errors that lead to getting lost, and how to avoid them, as well as how to recover from getting lost.

Diversion

Objectives

In this lesson, the student will learn about how to quickly and safely divert to an alternate destination when the flight cannot be continued.

References

- Pilot's Handbook of Aeronautical Knowledge; Ch. 16 (Navigation)

Materials

- Sectional chart
- Plotter and E6-B

Schedule

1 hour

Instructor Actions

The instructor will setup a typical cross-country scenario and guide the student through making quick measurements and calculations to quickly and safely divert to an alternate destination. The instructor will discuss the following topics with the student:

- ❑ Preparing for a diversion during pre-flight planning.
- ❑ Maintaining situational awareness during the flight.
- ❑ Recognizing a change that requires a diversion.
- ❑ Choosing a reasonable alternate.
- ❑ Quickly determining direction, distance, time, and fuel required for the diversion.
- ❑ Using all available tools.

Student Actions

- Answer questions related to the lesson topics.
- Demonstrate ability to quickly work through a diversion scenario.

Completion Standards

The student will be able to answer questions about and discuss how to plan ahead for a diversion, how to maintain situational awareness during the flight, how to quickly determine a reasonable alternate destination, and how to quickly and safely determine all of the necessary information to perform the diversion.

Night Operations

Objectives

In this lesson, the student will review the aeromedical factors related to night flying, and learn about the special equipment and operational considerations of night flying.

References

- Airplane Flying Handbook; Ch. 10 (Night Operations)
- FAR Part 91; §§ 155, 157, 205, 209

Materials

- Whiteboard and markers
- FAR / AIM

Schedule

1 hour

Instructor Actions

Discuss the following topics with the student:

- ❑ Night vision, adapting, oxygen effects, scanning off center.
- ❑ Autokenesis, flicker vertigo, black-hole approaches, lighting illusions.
- ❑ Personal equipment.
- ❑ Airplane equipment.
- ❑ Pre-flight and planning considerations.
- ❑ Startup, taxiing, and run-up considerations.
- ❑ Navigation and flight into IMC considerations.
- ❑ Approach and landing considerations.
- ❑ Night emergency considerations.

Student Actions

Answer questions related to the lesson topics.

Completion Standards

The student will be able to answer questions about and discuss the special aeromedical, equipment, and operational considerations of night flying.

Flight Planning

Objectives

In this lesson, the student will bring together all the skills learned in the Airspace, Weight & Balance, Performance, and Navigation lessons to plan a real cross-country flight. After planning the flight, the student will learn about filing flight plans and obtaining a briefing from a Flight Service Station.

References

- Pilot's Handbook of Aeronautical Knowledge; Ch. 16 (Navigation)
- FAR Part 91; §§ 3, 103
- AC 61-84B (Role of Preflight Preparation)

Materials

- Whiteboard and markers
- Sectional chart and AFD
- Plotter and E6-B
- Telephone

Schedule

1 hour

Instructor Actions

The instructor will review the student's flight plan and discuss the following topics with the student:

- ❑ External pressures and passengers.
- ❑ Key checkpoints.
- ❑ Emergency and diversion considerations.
- ❑ Airspace considerations including special use airspace and TFR's.
- ❑ NOTAM's.
- ❑ Special airport considerations including LAHSO.
- ❑ Radio frequencies.
- ❑ Weight & balance.
- ❑ Performance considerations including runway length requirements.
- ❑ Fuel considerations.
- ❑ Weather considerations, planning for changing conditions, and in-flight resources.
- ❑ Lost procedures and diversions.
- ❑ Making a go / no-go decision and sticking to personal minimums.

Student Actions

The student will have a cross-country flight plan completed before the lesson, and discuss the flight plan and risk management with the instructor. The student will also review the procedures for activating a flight plan in the air, using flight following, and closing a flight plan. After discussing the flight plan and receiving the instructor's approval, the student will call Flight Service, obtain a standard briefing, and file a flight plan.

Completion Standards

The student will be able to develop a flight plan, discuss risk management before and during the flight, understand how to file the flight plan and obtain a standard briefing, and understand how to use the flight plan en route.

Flight Modules

Pre-Solo Module 1

Ground School Review

- ❑ Airplane axes
- ❑ Weight, Lift, Thrust, and Drag
- ❑ Airfoils
- ❑ Bernoulli and Newton
- ❑ Laminar vs. turbulent flow
- ❑ Angle-of-Attack (AoA) and its relationship with airspeed and weight
- ❑ Center-of-Pressure (CP)
- ❑ Center-of-Gravity (CG)
- ❑ Skin-friction, form, and interference drag
- ❑ Induced drag and AoA
- ❑ Lift-to-Drag ratio
- ❑ Wing flaps and leading edge devices
- ❑ Spoilers
- ❑ Propeller design
- ❑ Torque effects
- ❑ P-factor effects
- ❑ Gyroscopic effects
- ❑ Spiraling slipstream effects
- ❑ Static vs. dynamic stability
- ❑ Design features for stability
- ❑ Flight controls and surfaces
- ❑ Documents, inspections, and equipment

Maneuver References

- Airplane Flying Handbook
  - Ch. 2 (Ground Operations)
  - Ch. 3 (Basic Flight Maneuvers)
- Aircraft Flight Manual / Pilot's Operating Handbook
- Checklists

Risk Management

- PAVE and IMSAFE
- Using checklists
- Positive exchange of flight controls
- Sterile cockpit procedures
- Propeller safety
- Proper taxi technique
- Collision and runway incursion avoidance

Flight Scenario

The best time to find a problem with an airplane is on the ground before you even start the engine. Let's take our time and learn the proper way to inspect and airplane, then we'll tour the area around the training airport to discover the terrain, nearby airports, and landmarks surrounding the field.

Objectives

- Introduce the student to the preflight inspection, checklist usage, engine start / shutdown, taxiing, and the use of flight controls.
- HAVE FUN!

Lesson Schedule

- 30 minutes of review
- 1 hour of flight instruction
- 15-minute post-flight review

In Flight

- ❑ Preflight inspection
- ❑ Required documents and inspections
- ❑ Starting procedures
- ❑ Pre-taxi brake check
- ❑ Wind correction during taxi
- ❑ Proper power settings during taxi
- ❑ Minimal use of brakes during taxi
- ❑ Checklist usage
- ❑ Normal takeoff (assisted)
- ❑ Fundamental maneuvers
- ❑ Using pitch, power, and trim
- ❑ Normal landing (demonstrated)
- ❑ Shutdown procedures
- ❑ Post-flight procedures

Completion Standards

The student will be capable of conducting a preflight inspection with supervision, understand the importance of using checklists and how to use them, and begin to develop the skills to taxi and perform the fundamental maneuvers.

Altitude ± 200'
Heading ± 20°
Indicated airspeed ± 10 knots

Common Preflight Inspection Mistakes

- Not referencing the appropriate checklist.
- Becoming distracted and skipping steps.
- Not using a methodical flow.

Common Taxi Mistakes

- Attempting to turn with the yoke.
- Taxiing too fast or relying on brakes.
- Focusing attention inside the airplane.
- Inattention to obstacle clearance.
- Not clearing intersections before crossing.
- Not positioning controls for wind conditions.

Common Straight-and-Level Mistakes

- Abrupt pushing or pulling on flight controls.
- Inattention to sensory input and airplane feel.
- Using instruments to correct attitude.
- Chasing instruments.
- Improper use of attitude references.
- Improper or insufficient scanning.
- Tight grip leading to over-controlling.
- Not making timely, measured control inputs.
- Using the rudder to maintain direction.
- Habitually flying with one wing low.
- Fixation on the nose.
- Unnecessary or inappropriate control inputs.

Common Turn Mistakes

- Failure to adequately clear the area.
- Gain or loss of altitude in the turn.
- Ground shyness at low altitudes.
- Proficient at turning in only one direction.
- Holding the rudder in the turn.
- Inability to feel slips and skids.
- Attempting to turn using only instruments.
- Fixation on the nose.
- Sitting straight up in relation to the ground.
- Failure to use the throttle with other controls.

Common Climb Mistakes

- Failure to adequately clear the area.
- Applying elevator pressure aggressively.
- Inability to maintain pitch and bank.
- Attempting to exceed the airplane's limits.
- Using airspeed to establish a climb.
- Inadequate or inappropriate rudder use.
- Fixation on the nose.
- Improper coordination.

Common Descent Mistakes

- Failure to adequately clear the area.
- Using flight instruments to establish glide.
- Inability to maintain pitch and bank.
- Ground shyness at low altitudes.
- Steep glide due to inadequate elevator use.
- Lowering the nose before slowing down.
- Not lowering the nose to maintain airspeed.
- Using the elevator to control altitude.
- Inability to sense airspeed changes by feel.
- Inability to stabilize the glide.
- Uncoordinated turns during descent.
- Inadequate pitch control during recovery.

Pre-Solo Module 2

Ground School Review

- ❑ Major airframe components
- ❑ Airframe construction
- ❑ Emergency Locator Transmitter
- ❑ Monitoring engine instruments
- ❑ Over-priming & engine fire during start
- ❑ Pitot-static system
- ❑ Airspeed indicator
- ❑ Altimeter
- ❑ Vertical speed indicator
- ❑ Gyroscopes
- ❑ Attitude indicator
- ❑ Heading indicator
- ❑ Turn coordinator
- ❑ Magnetic compass
- ❑ Traffic patterns
- ❑ V_X vs. V_Y
- ❑ Airspeed limitations

Maneuver References

- Airplane Flying Handbook
  - Ch. 5 (Takeoffs and Departure Climbs)
  - Ch. 7 (Airport Traffic Patterns)
- Aircraft Flight Manual / Pilot's Operating Handbook

Risk Management

- PAVE and IMSAFE
- Sterile cockpit procedures
- Proper scanning technique
- Collision and runway incursion avoidance
- Wake turbulence avoidance
- Rejected takeoff procedures

Flight Scenario

Landings have a lot of intuitive hazards, so much so that it's easy to overlook the hazards of getting into the air in the first place. If a person or animal ran out onto the runway, the airplane starts making funny noises, or the engine fails during your takeoff roll, what would you do?

Objectives

- Increase the student's fundamental flight maneuver proficiency.
- Introduce the student to flight solely by reference to the instruments.
- Introduce the student to radio communications.
- HAVE FUN!

Lesson Schedule

- 30 minutes of review
- 1.5 hours of flight instruction
- 0.3 hours of simulated instrument flight
- 15-minute post-flight review

Content

- ❑ Radio communications (5 W's)
- ❑ Normal / crosswind takeoff
- ❑ Rejected takeoff procedures
- ❑ Using pitch, power, and trim
- ❑ Simulated instrument flight
  - Straight and level flight
  - Climbs
  - Turns
  - 90°, 180°, and 360° turns
  - Descents
- ❑ Traffic patterns (discussed and assisted)
- ❑ Normal / crosswind landings (assisted)
- ❑ Post-flight procedures

Completion Standards

The student will improve at performing the fundamental flight maneuvers, gain a basic understanding of flight solely by reference to the flight instruments, and begin to develop radio communication skills

Altitude ± 200'
Heading ± 20°
Indicated airspeed ± 10 knots

Common Takeoff Mistakes

- Failure to clear the runway.
- Abrupt use of throttle.
- Failure to verify engine instruments.
- Failure to anticipate left-turning tendency.
- Overcorrecting for left-turning tendency.
- Relying on airspeed for rotation.
- Not attaining proper climb attitude.
- Inadequate compensation for P-factor.
- Over-controlling pitch during climb-out.
- Focusing directly ahead and dropping wings.
- Failure to attain V_Y.

Common Crosswind Takeoff Mistakes

- Failure to clear the runway.
- Using less than full aileron deflection.
- Rote use of aileron input during takeoff roll.
- Early lift-off resulting in side-skipping.
- Excessive aileron input after lift-off.
- Inadequate drift correction after lift-off.

Common Traffic Pattern Mistakes

- Failure to make appropriate radio calls.
- Inadequate visual lookout for traffic.
- Inappropriate spacing between aircraft.
- Drift due to inadequate wind correction.
- Gaining or losing altitude.
- Overshooting or undershooting base to final.

Common Radio Mistakes

- Speaking before thinking through radio call.
- Speaking too quickly or too loudly.
- Incorrect phraseology.
- Incorrect sequence of information.

Common Instrument Flight Mistakes

- Relying on feel rather than the instruments.
- Fixating on one instrument.
- Misinterpreting the instruments.

Pre-Solo Module 3

Ground School Review

- ❑ The SAFETY passenger briefing
- ❑ Engine type and operation
- ❑ Constant-speed propeller operation
- ❑ Ignition system
- ❑ Starter system
- ❑ Exhaust system
- ❑ Carburetor
- ❑ Accelerator pump
- ❑ Idling system
- ❑ Fuel / air mixture control
- ❑ Detonation and pre-ignition
- ❑ Carburetor icing and heating
- ❑ Fuel system
- ❑ Oil system
- ❑ Cooling system
- ❑ Electrical system
- ❑ Vacuum system
- ❑ AoA, airspeed, & weight review
- ❑ Traffic pattern review

Maneuver References

- Airplane Flying Handbook
  - Ch. 4 (Maintaining Aircraft Control)
  - Ch. 8 (Approaches and Landings)

Risk Management

- PAVE and IMSAFE
- Collision and runway incursion avoidance
- Choosing appropriate altitudes
- Environmental effects on performance
- Cockpit management
- Automation management
- Workload management
- Distractions during ground operations
- Confirmation and expectation bias
- Obstacles to communication
- Departure briefing

Flight Scenario

Flying an airplane requires understanding how the airplane handles throughout the range of its limits. Let's try simulating the traffic pattern at a safe altitude and see how the airplane and controls react at progressively slower airspeeds and increased drag.

Objectives

- Improve the student's proficiency at the fundamental flight maneuvers.
- Introduce the student to flight at various airspeeds and configurations.
- Improve the student's radio proficiency.
- HAVE FUN!

Lesson Schedule

- 30 minutes of ground instruction
- 1.5 hours of flight instruction
- 15-minute post-flight review

In Flight

- ❑ Radio communications
- ❑ Normal / crosswind takeoff
- ❑ Using pitch, power, and trim
- ❑ Introduction to the practice area
- ❑ Collision avoidance
- ❑ Choosing appropriate altitudes
- ❑ Clearing before maneuvers
- ❑ Flight at various airspeeds & configurations
- ❑ Slow flight
- ❑ Traffic patterns
- ❑ Discuss rejected landing procedures (5 C's)
- ❑ Normal / crosswind landing (assisted)

Completion Standards

The student will improve airplane control, and have a more thorough understanding of the airplane's flight characteristics at various airspeeds and configurations. The student will thoroughly understand the importance of clearing the area before and collision avoidance during maneuvers and normal flight.

Altitude ± 200'
Heading ± 20°
Indicated airspeed ± 10 knots

Common Slow Flight Mistakes

- Failure to adequately clear the area.
- Inadequate back elevator pressure initially.
- Excessive back elevator pressure.
- Inadequate rudder coordination.
- Fixation on the airspeed indicator.
- Failure to anticipate changes due to flaps.
- Inadequate power management.
- Inability to divide attention.

Common Normal Landing Mistakes

- Inadequate drift correction on base leg.
- Overshooting or undershooting base to final.
- Uncoordinated turns.
- Untimely use of checklists.
- Unstable approach.
- Failure to anticipate changes due to flaps.
- Poor trim technique.
- Using elevator to control altitude.
- High round-out due to close-in focus.
- Low round-out due to far focus.
- Touching down with incorrect attitude.
- Inadequate elevator pressure in roll out.
- Excessive braking.

Common Crosswind Landing Mistakes

- Exceeding crosswind limitations.
- Overshooting or undershooting base to final.
- Inadequate compensation for wind.
- Unstable approach.
- Failure to compensate for sideslip drag.
- Touchdown while drifting.
- Excessive airspeed on touchdown.
- Inappropriate control input during roll out.
- Failure to maintain directional control.
- Excessive braking.

Pre-Solo Module 4

Ground School Review

- ❑ Turning, load factor, & AoA
- ❑ Thrust in a turn
- ❑ Shallow vs. medium vs. steep turns
- ❑ Stalls and the Critical AoA
- ❑ Power-off and power-on stalls
- ❑ Turning stalls
- ❑ Typical stall scenarios
- ❑ AoA, airspeed, & weight review
- ❑ V_S vs. V_{S0} and the factors that affect them
- ❑ Design Maneuvering Speed (V_A)
- ❑ Stall warning devices
- ❑ Wing design and the stall
- ❑ Stall recovery procedures
- ❑ Uncoordinated stalls leading to spins
- ❑ Spin aerodynamics
- ❑ Spin recovery (PARE)
- ❑ Typical spin scenarios

Maneuver References

- Airplane Flying Handbook
  - Ch. 4 (Maintaining Aircraft Control)

Risk Management

- PAVE and IMSAFE
- Collision and runway incursion avoidance
- Choosing appropriate altitudes
- Environmental effects on performance
- Developing maximum performance
- Understanding stall warnings
- Emergency planning

Flight Scenario

We learned how to handle unsafe situations that require rejecting a takeoff. But what about landings? What if we are too high or too low to make the runway, another airplane or vehicle enters the runway environment, the crosswind is too strong?

How would you safely reject the landing as quickly as possible without losing control of the airplane in the process? What hazards does a rejected landing pose?

Objectives

- Review slow flight and introduce the student to the concept, flight characteristics, and recovery procedures for power-off, power-on, and turning stalls.
- Improve the student's landing proficiency.
- Continue simulated instrument flight work.
- HAVE FUN!

Lesson Schedule

- 30 minutes of ground instruction
- 1.5 hours of flight instruction
- 0.3 hours of simulated instrument flight
- 15-minute post-flight review

In Flight

- ❑ Normal / crosswind takeoff
- ❑ Collision avoidance
- ❑ Choosing appropriate altitudes
- ❑ Slow flight
- ❑ Power-off stalls
- ❑ Power-on stalls
- ❑ Turning stalls
- ❑ Demonstrated stalls
- ❑ Simulated instrument flight
  - Straight and level
  - Climbs and descents
  - Extended turns
  - Usual attitudes
- ❑ Traffic patterns
- ❑ Rejected landing procedures
- ❑ Normal / crosswind landing

Completion Standards

The student's control of the airplane during slow flight and simulated instrument conditions will improve, and the student will have a basic understanding of the concept, flight characteristics, and recovery procedures for each type of stall.

Altitude ± 200'
Heading ± 20°
Indicated airspeed ± 10 knots

Common Power-off Stall Mistakes

- Failure to adequately clear the area.
- Inability to recognize impending stall by feel.
- Premature recovery.
- Over-reliance on airspeed.
- Unintentional bank during entry.
- Excessive nose up attitude during entry.
- Inadequate use of rudder.
- Inadvertent secondary stall during recovery.
- Failure to maintain constant bank angle.
- Excessive nose low attitude during recovery.
- Excessive airspeed build-up during recovery.
- Failure to take timely action to recover.

Common Power-on Stall Mistakes

- Failure to adequately clear the area.
- Inability recognize impending stall by feel.
- Premature recovery.
- Over-reliance on airspeed.
- Unintentional bank during entry.
- Excessive nose up attitude during entry.
- Inadequate use of rudder.
- Inadvertent secondary stall during recovery.
- Failure to maintain constant bank angle.
- Excessive nose low attitude during recovery.
- Excessive airspeed build-up during recovery.
- Failure to take timely action to recover.

Common Rejected Landing Mistakes

- Failure to recognize unsafe conditions.
- Indecision or delay of action.
- Failure to apply maximum allowable power.
- Abrupt application of power.
- Improper pitch attitude.
- Failure to configure the airplane properly.
- Premature climb out of ground effect.
- Failure to compensate for torque / P-factor.

Pre-Solo Module 5

Ground School Review

- ❑ Max Lift-to-Drag ratio and $V_{L/D}$
- ❑ Engine fire during start
- ❑ Engine failure on takeoff roll
- ❑ Engine failure in flight
- ❑ Engine fire during flight
- ❑ Cabin fire during flight
- ❑ Electrical fire during flight
- ❑ Carburetor icing
- ❑ Emergency descents
- ❑ Engine roughness or overheat
- ❑ Partial power loss
- ❑ Oil pressure loss
- ❑ Flap malfunction
- ❑ Loss of ailerons
- ❑ Loss of elevator
- ❑ Declaring emergencies

Maneuver References

- Airplane Flying Handbook
  - Ch. 17 (Emergency Procedures)
- Aircraft Flight Manual / Pilot's Operating Handbook
- Checklists

Risk Management

- Selecting suitable landing areas
- Planning descent to landing
- Managing energy
- Task management and division of attention
- Checklist usage
- Startle response
- Wire strike avoidance
- Collision and runway incursion avoidance
- Right-of-way
- Stall / spin awareness

Flight Scenario

Emergencies in flight are quite rare with today's very reliable airplanes, but they do happen. We will simulate various emergencies under safe conditions to prepare you to handle an emergency.

Objectives

- Thoroughly brief simulated emergencies.
- Practice emergency procedures under safe, simulated conditions.
- Combine previously learned skills to maintain airplane control while dividing attention.
- Develop flows to quickly manage an emergency.
- Learn to manage startle response, and learn to react calmly, deliberately, and expediently.
- HAVE FUN!

Lesson Schedule

- 30 minutes of ground instruction
- 1.5 hours of flight instruction
- 15-minute post-flight review

In Flight

- ❑ Normal / crosswind takeoff
- ❑ Review procedures before each simulation
- ❑ Collision avoidance
- ❑ Rejected landing procedures
- ❑ Simulated engine fire during start
- ❑ Simulated engine failure on takeoff
- ❑ Simulated engine failure in flight
- ❑ Simulated engine fire in flight
- ❑ Simulated partial power loss
- ❑ Landing with partial power
- ❑ Landing with zero power
- ❑ Landing without flaps
- ❑ Maneuvering without ailerons
- ❑ Maneuvering without elevator
- ❑ Declaring emergencies
- ❑ Normal / crosswind landing

Completion Standards

The student will learn the basics of dividing attention between control of the airplane and managing several different types of emergencies. The student will begin to develop a memory flow for each type of emergency.

Altitude ± 200'
Heading ± 20°
Indicated airspeed ± 10 knots

Common Emergency Mistakes

- Failure to adequately clear the area.
- Failure to maintain situational awareness.
- Failure to remain calm and deliberate.
- Failure to maintain control of the airplane.
- Failure to maintain best glide speed.
- Not using checklists.
- Inappropriate use of bank.
- Not maintaining positive load on the airplane.
- Inadequate planning for the forced landing.
- Inadequate airspeed control.

Pre-Solo Module 6

Ground School Review

- ❑ IMSAFE review
- ❑ Physical fitness
- ❑ Mental fitness
- ❑ Medical checks
- ❑ Corrective lenses
- ❑ Medication
- ❑ Common illnesses
- ❑ Ear infections and blockages
- ❑ Alcohol
- ❑ Smoking
- ❑ Fatigue
- ❑ Blood donation
- ❑ Altitude and hypoxia
- ❑ Carbon monoxide poisoning
- ❑ Hyperventilation
- ❑ Decompression sickness
- ❑ The inner ear and balance
- ❑ Spatial disorientation and illusions
- ❑ Structure of the eye
- ❑ Scanning for traffic
- ❑ Visual illusions

Maneuver References

- Airplane Flying Handbook
  - Ch. 6 (Ground Reference Maneuvers)

Risk Management

- Collision avoidance
- CFIT avoidance
- Division of attention
- Positive control of the airplane
- Wire strike avoidance
- Emergency planning
- Weather

Flight Scenario

Whether you realize it or not, flying traffic patterns has started teaching you how to maintain a ground track by dividing your attention between the airplane and a reference point on the ground.

After you earn your pilot's license, your family and friends are going to want to fly with you and take pictures. How do you think you would extend your traffic pattern skills to fly around an interesting landmark at a constant altitude and distance safely?

Objectives

- Introduce the student to obtaining weather information and making an informed go- / no-go decision.
- Improve the student's ability to divide attention between airplane control, collision avoidance, and other tasks.
- HAVE FUN!

Lesson Schedule

- 30 minutes of ground instruction
- 1.5 hours of flight instruction
- 0.3 hours of simulated instrument flight
- 15-minute post-flight review

In Flight

- ❑ Obtain weather information
- ❑ Make a go- / no-go decision
- ❑ Normal / crosswind takeoff
- ❑ Collision avoidance
- ❑ Turns around a point
- ❑ S-turns
- ❑ Slow flight and selected stall review
- ❑ Selected emergency procedure review
- ❑ Unusual attitudes
- ❑ Rectangular course (traffic pattern)
- ❑ Forward slip (demonstrated)
- ❑ Normal / crosswind landing

Completion Standards

The student's ability to divide attention between airplane control, collision avoidance, and other tasks will improve. The student will have an improved understanding of selected emergency procedures, slow flight, and stalls. The student will have a basic understanding of compensating for winds to create a desired ground track.

Altitude ± 150'
Heading ± 15°
Indicated airspeed ± 10 knots

Common Rectangular Course Mistakes

- Failure to adequately clear the area.
- Failure to attain proper altitude before entry.
- Failure to use appropriate wind correction.
- Gaining or losing altitude.
- Poor coordination.
- Abrupt control usage.
- Inability to divide attention.
- Improperly timed turns.
- Inadequate visual scanning for traffic.

Common Turns Around a Point Mistakes

- Failure to adequately clear the area.
- Failure to attain proper altitude before entry.
- Failure to recognize wind drift.
- Failure to use appropriate wind correction.
- Skidding turns from downwind to crosswind.
- Slipping turns from upwind to crosswind.
- Gaining or losing altitude.
- Inadequate visual scanning for traffic.
- Inability to divide attention.

Common S-turn Mistakes

- Failure to adequately clear the area.
- Poor coordination.
- Gaining or losing altitude.
- Inability to visual the half-circle ground track.
- Improperly timed turns.
- Failure to recognize wind drift.
- Inadequate visual scanning for traffic.

Pre-Solo Module 7

Ground School Review

- ❑ Review airworthiness requirements
- ❑ Airplane weight and load factor limitations
- ❑ Density altitude and performance
- ❑ Structural icing types and effects
- ❑ Induction icing types and effects
- ❑ Instrument icing
- ❑ Atmosphere, stability, air masses, and fronts
- ❑ Pressure systems and characteristics
- ❑ Inversions and visibility
- ❑ Fog types and conditions
- ❑ Turbulence types and classification
- ❑ Thunderstorms, wind shear, microbursts
- ❑ Weather briefings and information sources
- ❑ Making a go- / no-go decision

Maneuver References

Review previous reading assignments.

Risk Management

- Dynamic weather conditions
- Limitations of weather equipment
- Limitations of forecast products
- Limitations of in-flight weather information
- Personal weather minimums
- Learning seasonal weather patterns
- Identifying alternate airports
- Mitigating weather risks
- Hazardous attitudes

Flight Scenario

By now, you are getting a pretty good feel for landings from a typical traffic pattern. If you were too high to safely land the airplane by reducing power, you probably just chose to reject the landing.

Consider the possibility that you might one day have to start the approach high due to an obstruction. Or the possibility of being high with and engine failure.

How would you safely dissipate altitude with gaining airspeed?

Objectives

- Introduce the student to forward slips.
- Begin reviewing pre-solo maneuvers and tightening the required standards.
- Increase the student's ability to divide attention.
- Increase the student's ability to think ahead of the airplane and make decision as a Pilot in Command.
- HAVE FUN!

Lesson Schedule

- 30 minutes of ground instruction
- 1.5 hours of flight instruction
- 15-minute post-flight review

In Flight

- ❑ Obtain weather information
- ❑ Make a go- / no-go decision
- ❑ Normal / crosswind takeoff
- ❑ Checklist usage
- ❑ Collision avoidance
- ❑ Slow flight review
- ❑ Selected stall review
- ❑ Selected emergency review
- ❑ Turns around a point review
- ❑ S-turns review
- ❑ Traffic pattern review
- ❑ Rejected landing review
- ❑ Forward slip
- ❑ Normal / crosswind landing

Completion Standards

The student will begin combining all previously learned skills to perform the pre-solo maneuvers to tighter standards, think ahead of the airplane, and make decisions as a Pilot in Command. The student's ability to fly precise ground tracks by compensating for wind will improve.

Altitude ±150'
Heading ±15°
Indicated airspeed ±10 knots
Completes most takeoffs, landings, and maneuvers with minimal to no assistance. Maintains centerline throughout all takeoffs and landings.

Common Forward Slip Mistakes

- Inadequate airspeed control.
- Beginning too low.
- Beginning too high.
- Failure to maintain directional control.
- Failure to maintain slip until round-out.
- Excessive speed when exiting the slip.
- Delaying a decision to reject the landing.

Pre-Solo Module 8

Ground School Review

- ❑ Airspace
  - Purpose, uncontrolled vs. controlled
  - Class G
  - Class E
  - Class D
  - Class C
  - Class B
  - Class A
  - Temporary Flight Restrictions (TFR's)
  - Special Use airspace
- ❑ Towered airport operations
- ❑ Radio procedures with a tower
- ❑ Tower controller limitations
- ❑ Radio failure and tower light signals
- ❑ Taxiway and runway markings
- ❑ Taxi diagrams and hot spots
- ❑ Airport signs
- ❑ Progressive taxi assistance
- ❑ Land and Hold Short Operations (LAHSO)
- ❑ Wake turbulence avoidance
- ❑ ATIS vs. ASOS / AWOS

Maneuver References

Review previous reading assignments.

Risk Management

- Class B, C, and D airport considerations
- Controller limitations
- Avoiding complacency under ATC control
- Workload considerations
- Using taxi diagrams
- Hot spot awareness
- LAHSO risks and considerations
- Personal limitations at unfamiliar airports
- Use of progressive taxi assistance
- Confirmation and expectation bias
- Runway incursion avoidance
- Wake turbulence avoidance

Flight Scenario

Even if you have been learning at a towered airport, chances are you have not been exposed to the full range of services a tower can offer. Let's explore some of those services.

Objectives

- Introduce the student to tower radio communications.
- Introduce the student to progressive taxi instructions and tower light signals.
- Continue to improve pre-solo maneuver performance and decision-making ability.
- HAVE FUN!

Lesson Schedule

- 30 minutes of ground instruction
- 1.5 hours of flight instruction
- 0.3 hours of simulated instrument flight
- 15-minute post-flight review

In Flight

- ❑ Obtain weather information
- ❑ Make a go- / no-go decision
- ❑ Takeoff emergency review
- ❑ Normal / crosswind takeoff
- ❑ Checklist usage
- ❑ Collision avoidance
- ❑ Runway incursion avoidance
- ❑ Taxi diagram and airport sign usage
- ❑ Tower radio communications
- ❑ Progressive taxi instructions
- ❑ Tower light signals
- ❑ Slow flight review
- ❑ Selected stall review
- ❑ Selected emergency review
- ❑ Simulated instrument review
- ❑ Forward slip review
- ❑ Rejected landing review
- ❑ Normal / crosswind landing

Completion Standards

The student will continue improving maneuver and decision-making abilities. The student will have a basic understanding of towered airport operations.

Altitude ±100'
Heading ±10°
Indicated airspeed ±10 knots
Completes takeoffs, landings, and maneuvers with minimal to no assistance. Maintains centerline throughout all takeoffs and landings.

Common Towered Airport Mistakes

- Incorrect phraseology.
- Not obtaining ATIS before making radio calls.
- Calling too close to the airspace boundary.
- Not copying down taxi instructions.
- Incorrect taxi read-back.
- Not referencing taxi diagram before taxiing.
- Not paying attention to airports signs.
- Being complacent about collision avoidance.
- Incorrectly interpreting light signals.

Solo Module 1

Ground School Review

❑ Regulations
- Student pilot solo requirements
- Student pilot limitations
- Student pilot endorsements
- Required personal documents
- Pilot in Command responsibilities
- Required preflight actions
- Right of way rules
- VFR requirements

❑ Review practice area procedures

❑ Review airplane rental procedures

❑ Review approved airports

❑ Review airspace and airport procedures

❑ Review airplane procedures, characteristics, and limitations

❑ Review weather information sources

❑ §61.87(b) Pre-Solo exam

Maneuver References

Review previous reading assignments.

Risk Management

- PAVE and IMSAFE
- Proper scanning technique
- Collision avoidance
- Runway incursion avoidance
- Wake turbulence avoidance
- Personal weather minimums
- Hazardous attitudes
- Emergency planning
- Confirmation and expectation bias

Flight Scenario

This is it! You will remember this day for the rest of your life. This is the day you fly an airplane all by yourself!

Today, you will combine all the flight and decision-making skills you have learned so far to startup, taxi, takeoff, land, and shutdown an airplane.

Your instructor will supervise you from the ground, but you are the Pilot in Command and you will finally get to log some hours in that "PIC" column!

Objectives

- Complete the §61.87(b) Pre-Solo exam.
- Complete the Pre-Solo phase of training by allowing the student to perform supervised solo takeoffs and landings.
- HAVE FUN!

Lesson Schedule

- 1 hour of ground instruction
- 30 minutes of flight instruction
- 30 minutes of solo flight

In Flight

❑ Obtain weather information

❑ Make a go- / no-go decision

❑ Dual instruction
- Takeoff emergency review
- Normal / crosswind takeoff
- Collision avoidance
- Traffic pattern review
- Rejected landing review
- Forward slip review
- Simulated engine failure
- Simulated engine fire
- Normal / crosswind landing

❑ Solo
- Perform at least three takeoffs and landings with a flight in the traffic pattern between each takeoff and landing.

Completion Standards

The student will complete the §61.87(b) Pre-Solo exam and correct the exam to 100% with the instructor.

The student will demonstrate the ability to competently act as Pilot in Command and operate the airplane safely without assistance.

Altitude ±100'
Heading ±10°
Indicated airspeed ±10 knots
Completes takeoffs, landings, and maneuvers with no assistance. Maintains centerline throughout all takeoffs and landings.

Solo Module 2

Suggested Ground Review

❑ Regulations
- Student pilot solo requirements
- Student pilot limitations
- Required personal documents
- Pilot in Command responsibilities
- Required preflight actions
- VFR requirements

❑ Review approved airports

❑ Review taxi diagrams and hot spots

❑ Review airspace and airport procedures

❑ Review airplane procedures, characteristics, and limitations

❑ Review weather information sources

❑ Review EMERGENCY PROCEDURES

Suggested Maneuver References

Review all maneuvers you plan to practice before the flight.

Risk Management

- PAVE and IMSAFE
- Proper scanning technique
- Collision avoidance
- Runway incursion avoidance
- Wake turbulence avoidance
- Personal weather minimums
- Hazardous attitudes
- Emergency planning
- Confirmation and expectation bias

Flight Scenario

Learning occurs even when your instructor is not present! In fact, some say the Private Pilot License is a "license to learn." While this is true, solo learning begins now. This is your chance to start making your first completely unassisted flights.

You get to decide what you practice during these flights, but here are some suggestions:

- Take it easy on your first flight. The flight alone is its own lesson.
- Don't try to fit the flights in to a busy schedule. Take your time, and always be ready to land at an alternate airport.

Objectives

- Practice what you like. Try to practice one or two maneuvers per flight only. Try to get at least three landings and a rejected landing per flight.
- PERFECT practice makes perfect. Be honest with yourself about your performance.
- HAVE FUN!

Schedule

§61.109(a) requires 40 hours of total flight time, 20 hours of instruction, and 10 hours of solo flight time that must *include* five hours of solo cross-country time.

How much time you spend on this module is up to you, however I recommend 10 hours of solo flight time *in addition* to the five hours of solo cross-country time. Solo time is valuable experience that should not be underappreciated.

In Flight

❑ Obtain weather information

❑ Consider aeromedical factors

❑ Make a go- / no-go decision

❑ Collision avoidance

❑ Normal / crosswind takeoff practice

❑ Normal / crosswind landing practice

❑ Fundamental maneuvers practice

❑ Reject landing practice

❑ Ground reference maneuver practice

❑ Slow flight practice

❑ Stall practice

❑ Forward slip practice

❑ Towered airport practice

❑ Emergency procedure practice

Completion Standards

Complete at least 10 hours of solo flight and practice all solo maneuvers.

Altitude ±100'
Heading ±10°
Indicated airspeed ±10 knots

Performance Maneuvers Module 1

Ground School Review

- ❑ Center-of-Gravity (CG)
  - Empty and Gross weight
  - Limitations
  - Effects of CG location
- ❑ Weight & Balance data
- ❑ Determining weight
- ❑ Determining CG location
  - Tabular methods
  - Graphical methods
- ❑ Solving CG problems
- ❑ Accounting for CG shift in flight
- ❑ Density altitude review
- ❑ Factors affecting takeoff performance
- ❑ Calculating takeoff performance
- ❑ Factors affecting landing performance
- ❑ Calculating landing performance
- ❑ Ground effect
- ❑ V_X vs. V_Y review

Maneuver References

- Airplane Flying Handbook
  - Ch. 5 (Takeoff and Departure Climbs)
  - Ch. 6 (Approaches and Landings)

Risk Management

- Short-field and soft-field considerations
- Takeoff and landing performance
- Developing maximum performance
- Rejected takeoff procedures
- Rejected landing procedures
- Tailwinds and wind shear
- Obstacle avoidance
- Personal limitations at unfamiliar airports

Flight Scenario

Up until now, you have likely been taking off from and landing on relatively long, paved runways. Runways come in a variety of lengths and some are not paved. Sometimes, a paved runway might be covered in snow or water. What will you do differently to operate from such runways?

Objectives

- Introduce the student to performance take-offs and landings.
- Continue to improve maneuver performance and decision-making ability.
- HAVE FUN!

Lesson Schedule

- 30 minutes of ground instruction
- 1.5 hours of flight instruction
- 0.3 hours of simulated instrument flight
- 15-minute post-flight review

In Flight

- ❑ Obtain weather information
- ❑ Make a go- / no-go decision
- ❑ Takeoff emergency review
- ❑ Collision avoidance
- ❑ Short field takeoff
- ❑ Soft field takeoff
- ❑ Short field landing
- ❑ Soft field landing
- ❑ Rejected landing review
- ❑ Forward slip review
- ❑ Selected emergency review
- ❑ Simulated instrument review

Completion Standards

The student will understand calculating takeoff and landing performance, being developing performance takeoff and landing skills, and an understanding of personal and airplane limitations.

Altitude ±100'
Heading ±10°
Indicated airspeed +10 / -5 knots
Touchdown during short field landings will be within 300' beyond a selected point on the runway.

Common Short Field Takeoff Mistakes

- Failure to utilize all available runway.
- Improper takeoff trim.
- Failure to crosscheck engine instruments.
- Premature lift-off.
- Holding the airplane on the ground.
- Inadequate rotation.
- Inability to maintain V_X.
- Fixation on the airspeed indicator.
- Premature retraction of gear or flaps.

Common Soft Field Takeoff Mistakes

- Insufficient back elevator pressure.
- Failure to crosscheck engine instruments.
- Poor directional control.
- Abrupt elevator control when leveling off.
- Attempt to climb out of ground effect early.
- Failure to correct pitch leaving ground effect.

Common Short Field Landing Mistakes

- Unstable approach.
- Delay making glide path corrections.
- Improper airspeed control.
- Improper power control.
- Excessive braking on touchdown.
- Failure to maintain directional control.

Common Soft Field Landing Mistakes

- Excessive descent rate on final approach.
- Excessive airspeed on final approach.
- Unstable approach.
- Rounding out too high.
- Poor power management during round out.
- Hard touchdown.
- Inadequate control of weight transfer.
- Allowing nose wheel to fall to the runway.

Performance Maneuvers Module 2

Ground School Review

- ❑ Stall and load factor review
- ❑ Design Maneuvering Speed (V_A) review
- ❑ Latitude and Longitude
- ❑ Magnetic variance and deviation
- ❑ Pilotage
- ❑ Dead reckoning
- ❑ Radio navigation
- ❑ True airspeed
- ❑ Wind correction, heading, course
- ❑ Nautical mile and knots
- ❑ Altitude versus flight level
- ❑ VFR cruising altitudes
- ❑ Minimum safe altitude
- ❑ Calculating cruise performance
- ❑ Planning for emergencies
- ❑ UTC versus local time
- ❑ VFR flight following

Maneuver References

- Airplane Flying Handbook
  - Ch. 9 (Performance Maneuvers)

Risk Management

- Appropriate entry speed for steep turns
- Accelerated stalls
- Maintaining situational awareness
- Maintaining airplane control
- Managing energy
- Spin awareness
- Collision avoidance

Flight Scenario

Imagine flying into a relatively confined area, such as a canyon, that lacks the space for a normal shallow or medium banked turn. Without the option of climbing out of the terrain, you may need to execute a steep turn.

What is different about a steep turn versus a medium or shallow banked turn? How will lift, load factor, stall speed, and turn radius be affected?

Objectives

- Introduce the student to steep turns in both directions.
- Continue developing short and soft field takeoff and landings skills.
- Continue improving the student's instrument flying skills.
- HAVE FUN!

Lesson Schedule

- 30 minutes of ground instruction
- 1.5 hours of flight instruction
- 0.3 hours of simulated instrument flight
- 15-minute post-flight review

In Flight

- ❑ Obtain weather information
- ❑ Make a go- / no-go decision
- ❑ Collision avoidance
- ❑ Short field takeoff review
- ❑ Soft field takeoff review
- ❑ Short field landing review
- ❑ Steep turns
- ❑ Selected emergency review
- ❑ Simulated instrument review

Completion Standards

The student will understand calculating takeoff and landing performance, being developing performance takeoff and landing skills, and an understanding of personal and airplane limitations.

Altitude ±100'
Heading ±10°
Indicated airspeed +10 / -5 knots
Touchdown during short field landings will be within 200' beyond a selected point on the runway.

Common Steep Turn Mistakes

- Failure to adequately clear the area.
- Excessive pitch change during entry.
- Excessive pitch change during recovery.
- Attempting to start recovery too early.
- Failure to stop the turn on a precise heading.
- Excessive rudder during recovery.
- Inadequate power management.
- Inadequate airspeed control.
- Poor coordination.
- Gaining altitude in right turns.
- Losing altitude in left turns.
- Failure to maintain constant bank angle.
- Disorientation.
- Using instrument references.
- Failure to scan for traffic.

Cross-Country Module 1

Ground School Review

- ❑ Flight planning
- ❑ Maintaining situational awareness en route
- ❑ Common errors leading to being lost
- ❑ Lost procedures
- ❑ Determining location using sectional
- ❑ Determining location using navigation aids
- ❑ Requesting help from ATC or FSS
- ❑ Recognizing situations requiring a diversion
- ❑ Preparing for a diversion
- ❑ Pre-planning for a diversion
- ❑ Choosing an appropriate alternate airport
- ❑ Shortcuts for determining heading, distance, time, and fuel required to reach an alternate

Maneuver References

Review previous reading assignments.

Risk Management

- PAVE and IMSAFE
- Hazardous attitudes and personal minimums
- Dynamic weather and seasonal patterns
- Planning for unfamiliar airports, airspace, and terrain
- Confirmation and expectation bias
- Selecting appropriate altitudes
- Fuel planning
- ATC services and limitations

Flight Scenario

Now that you are thoroughly familiar with the immediate area around the training airport, we are going to stretch your wings a little and get you back into the unfamiliar.

You are going to plan a flight to an airport roughly one hour away. Pretend you have one passenger, and your passenger must be back in three hours.

How will you get there and how long will the roundtrip take? Can you make it? Is there any chance of a delay for, say, refueling or weather? How will you manage environmental changes en route? What will you discuss with your passenger?

Objectives

- Bring all the information the student has learned about flight planning and risk management together to successfully complete a cross-country flight.
- Learn how to make a go- / no-go decision based on all four risk areas.
- Learn how to plan for unfamiliar airports, airspace, and terrain.
- Learn how to use ATC and FSS services.
- HAVE FUN!

Lesson Schedule

- 1 hour reviewing your flight plan
- 2 hours of flight instruction
- Optional 30-minute break before returning
- 0.3 hours simulated instrument flight
- 15-minute post-flight review

In Flight

- ❑ Obtain weather briefing and file a flight plan
- ❑ Make a go- / no-go decision
- ❑ Fly to an airport at least 50nm away
- ❑ Visit at least two unfamiliar airports
- ❑ Visit at least one unfamiliar towered airport
- ❑ Use VFR flight following and FSS
- ❑ Determine position using visual references
- ❑ If equipped, use radio navigation aids
- ❑ Maintain situational awareness and flight log
- ❑ Collision avoidance
- ❑ Simulated instrument review
- ❑ Selected maneuver and emergency review

Completion Standards

The student will make a competent go / no-go decision based on all factors, maintain situational awareness during the whole flight, correctly track the airplane's location, continuously consider a diversion plan should a diversion be necessary, and correctly use ATC and FSS services.

Altitude ±100'
Heading ±10°
Indicated airspeed +10 / -5 knots
The student will recognize deviations in course and actual flight time, then take appropriate actions to correct the deviation or amend the flight plan.

Cross-Country Module 2

Ground School Review

- ❑ Night vision
- ❑ Oxygen effects on night vision
- ❑ Scanning off-center
- ❑ Autokenesis
- ❑ Flicker vertigo
- ❑ Somatogravic illusion
- ❑ Black-hole approaches
- ❑ Person equipment for night flight
- ❑ Airplane equipment for night flight
- ❑ Night flight planning considerations
- ❑ Airport operations and lighting at night
- ❑ Navigation at night
- ❑ Flight into IMC at night
- ❑ Approach and landing and night
- ❑ Night emergency considerations

Maneuver References

- Airplane Flying Handbook
  - Ch. 10 (Night Operations)

Risk Management

- Collision avoidance at night
- Use of lights at night
- Airport operations at night
- Planning for terrain avoidance at night
- Maintaining situational awareness at night
- Maintaining VFR at night
- Aeromedical factors at night
- Night illusions

Flight Scenario

Now that you have surely become comfortable with the approach, flare, and landing during the day, let's try it at night and learn those things all over again!

Night flying is great. The air is usually smooth, you can see other airplane strobes and navigation lights miles away. All that aside, night is just beautiful.

Beautiful…but challenging. What will you do if the engine fails? What about terrain? Disorientation and illusions are dangerous issues, how will you handle them?

Objectives

- Introduce the student to airport operations at night.
- Introduce the student to planning a safe night flight by considering factors unique to night flying.
- Help the student experience night illusions in a safe way.
- Allow the student to gain first-hand experience at night flying that he or she can apply to planning a night cross-country flight.
- HAVE FUN!

Lesson Schedule

- 30 minutes of ground instruction
- 1.5 hours of flight instruction
- 15-minute post-flight review

In Flight

- ❑ Obtain weather information
- ❑ Make a go- / no-go decision
- ❑ Observe proper use of lights
- ❑ Taxi safety
- ❑ Collision avoidance
- ❑ Takeoff emergency review
- ❑ Normal / crosswind takeoffs
- ❑ Navigating visually at night
- ❑ Landing pattern review
- ❑ Stabilized approach review
- ❑ Normal / crosswind landings
- ❑ Simulated electrical failure
- ❑ Simulated engine failure

Completion Standards

The student will begin to develop the skills and judgement to safely operate an airplane at night. The student will be able to navigate, handle simulated emergencies, and safely perform takeoffs and landings at night.

Complete at least seven *full-stop* landings.

Altitude ±100'
Heading ±10°
Indicated airspeed +10 / -5 knots

Cross-Country Module 3

Ground School Review

- ❑ Flight planning review
- ❑ Maintaining situational awareness en route
- ❑ Lost procedures at night
- ❑ Determining location using sectional at night
- ❑ Determining location using navigation aids
- ❑ Preparing for a diversion at night
- ❑ Pre-planning for a diversion at night
- ❑ Choosing an appropriate alternate airport for a cross-country at night
- ❑ Person equipment for night flight review
- ❑ Airplane equipment for night flight review
- ❑ Night flight planning considerations review
- ❑ Airport operations and lighting at night
- ❑ Flight into IMC at night
- ❑ Approach and landing and night review
- ❑ Night emergency considerations review

Maneuver References

Review previous reading assignments.

Risk Management

- PAVE and IMSAFE
- Hazardous attitudes and personal minimums
- Dynamic weather and seasonal patterns
- Planning for unfamiliar airports, airspace, and terrain
- Confirmation and expectation bias
- Selecting appropriate altitudes
- Fuel planning
- ATC services and limitations
- Collision avoidance at night
- Use of lights at night
- Airport operations at night
- Maintaining situational awareness at night
- Maintaining VFR at night
- Aeromedical factors at night
- Night illusions

Flight Scenario

You flew with some passengers to your favorite airport on the beach for the day. The sun has gone down and everyone is ready to go home. You knew this was coming. What did you do to prepare for a night cross-country?

Objectives

- Bring the student's experience with night flying together with the student's first cross-country experience to plan a night cross-country.
- Continue developing cross-country planning and en route skills.
- Continue developing night takeoff, landing, and en route skills.
- HAVE FUN!

Lesson Schedule

- 1 hour reviewing your flight plan
- 2 hours of flight instruction
- Optional 30-minute break before returning
- 0.3 hours simulated instrument flight
- 15-minute post-flight review

In Flight

- ❑ Obtain weather briefing and file a flight plan
- ❑ Make a go- / no-go decision
- ❑ Fly to an airport at least 50nm away
- ❑ Visit at least two unfamiliar airports
- ❑ Use VFR flight following and FSS
- ❑ Determine position using visual references
- ❑ Choose highly visible checkpoints
- ❑ If equipped, use radio navigation aids
- ❑ Maintain situational awareness and flight log
- ❑ Collision avoidance
- ❑ Simulated instrument review
- ❑ Selected emergency and maneuver review

Completion Standards

The student will make a competent go / no-go decision based on all factors, maintain situational awareness during the whole flight, correctly track the airplane's location, and continuously consider a diversion plan should a diversion be necessary.

Complete at least three *full-stop* landings.

Altitude ±100'
Heading ±10°
Indicated airspeed +10 / -5 knots
The student will recognize deviations in course and actual flight time, then take appropriate actions to correct the deviation or amend the flight plan.

Solo Cross-Country Module 1

Ground School Review

❑ Regulations review
- Student pilot solo requirements
- Student pilot limitations
- Required personal documents
- Pilot in Command responsibilities
- Required preflight actions

❑ VFR requirements review

❑ Flight planning review

❑ Airspace review

❑ Common errors leading to being lost

❑ Lost procedures review

❑ ATC and FSS services review

❑ Recognizing situations requiring a diversion

❑ Preparing for a diversion review

❑ Pre-planning diversions and alternates

❑ Weather information sources review

Maneuver References

Review all maneuvers you plan to practice before the flight.

Risk Management

- PAVE and IMSAFE
- Hazardous attitudes and personal minimums
- Dynamic weather and seasonal patterns
- Planning for unfamiliar airports, airspace, and terrain
- Confirmation and expectation bias
- Selecting appropriate altitudes
- Fuel planning
- ATC services and limitations
- Collision avoidance
- Maintaining situational awareness

Flight Scenario

This is your first chance to really stretch your wings. Your first solo cross-country is a big step, but don't let it overwhelm you. Plan it carefully, execute it professionally, and everything will be fine.

Don't be afraid of making small mistakes, just rely on your training, fly safe, and remember the services available to help.

Objectives

- Continue developing cross-country planning and en route skills.
- Continue improving decision-making skills.
- Continue solo maneuver practice. Practice performance takeoffs and landings, rejected landings, and forward slips at a minimum.
- HAVE FUN!

Schedule

- 1 hour reviewing your flight plan
- 2 hours of solo flight
- 15-minute post-flight review (may be done over the phone)

In Flight

❑ Obtain weather briefing and file a flight plan

❑ Make a go- / no-go decision

❑ Fly to an airport at least 50nm away

❑ Visit at least two airports, one towered

❑ Use VFR flight following and FSS

❑ Determine position using visual references

❑ If equipped, use radio navigation aids

❑ Maintain situational awareness and flight log

❑ Collision avoidance

❑ Selected emergency review

❑ Selected maneuver review

Completion Standards

The student will make a competent go / no-go decision based on all factors, maintain situational awareness during the whole flight, correctly track the airplane's location, and continuously consider a diversion plan should a diversion be necessary.

Altitude ±100'
Heading ±10°
Indicated airspeed +10 / -5 knots
The student will recognize deviations in course and actual flight time, then take appropriate actions to correct the deviation or amend the flight plan.

Solo Cross-Country Module 2

Ground School Review

- ❑ Regulations review
  - Student pilot solo requirements
  - Student pilot limitations
  - Required personal documents
  - Pilot in Command responsibilities
  - Required preflight actions
- ❑ VFR requirements review
- ❑ Flight planning review
- ❑ Airspace review
- ❑ Common errors leading to being lost
- ❑ Lost procedures review
- ❑ ATC and FSS services review
- ❑ Recognizing situations requiring a diversion
- ❑ Preparing for a diversion review
- ❑ Pre-planning diversions and alternates
- ❑ Weather information sources review

Maneuver References

Review all maneuvers you plan to practice before the flight.

Risk Management

- PAVE and IMSAFE
- Hazardous attitudes and personal minimums
- Dynamic weather and seasonal patterns
- Planning for unfamiliar airports, airspace, and terrain
- Confirmation and expectation bias
- Selecting appropriate altitudes
- Fuel planning
- ATC services and limitations
- Collision avoidance
- Maintaining situational awareness

Flight Scenario

This is it, the final milestone before your check ride: your long cross-country!

The long cross-country will likely be your longest flight so far, but it seems like just more of the same, doesn't it?

What are the challenges and hazards posed by this flight that you likely have not encountered yet? What will you do to mitigate them?

Objectives

- Continue improving cross-country planning and en route skills.
- Continue improving decision-making skills.
- Complete a cross-country flight of at least 150 nm total distance with *full-stop* landings at three points and one segment of at least 50 nm between takeoff and landing locations.
- Continue solo maneuver practice. Practice performance takeoffs and landings, rejected landings, and forward slips at a minimum.
- HAVE FUN!

Schedule

- 1 hour reviewing your flight plan
- 4 hours of solo flight
- 15-minute post-flight review (may be done over the phone)

In Flight

- ❑ Obtain weather briefing and file a flight plan
- ❑ Make a go- / no-go decision
- ❑ Visit at least two unfamiliar airports
- ❑ Visit at least one unfamiliar towered airport
- ❑ Use VFR flight following and FSS
- ❑ Determine position using visual references
- ❑ If equipped, use radio navigation aids
- ❑ Maintain situational awareness and flight log
- ❑ Collision avoidance
- ❑ Selected emergency review
- ❑ Selected maneuver review

Completion Standards

The student will make a competent go / no-go decision based on all factors, maintain situational awareness during the whole flight, correctly track the airplane's location, and continuously consider a diversion plan should a diversion be necessary.

Altitude ±100'
Heading ±10°
Indicated airspeed +10 / -5 knots
The student will recognize deviations in course and actual flight time, then take appropriate actions to correct the deviation or amend the flight plan.

Check Ride Prep Module 1

The first check ride prep module should be conducted by an instructor other than the student's normal instructor and should follow the format of a typical practical test.

Knowledge Review

The student shall be prepared to discuss all ground topics.

Risk Management

The student shall brief the instructor conducting the lesson on all risk management areas applicable to the flight and any scenarios presented by the instructor.

Flight Scenario

The instructor conducting the lesson should present the student with a typical cross-country flight scenario to touch on knowledge, regulations, and risk management.

Objectives

- Obtain a third-party assessment of the student's knowledge and flight skills.
- Familiarize the student with the practical test process.
- HAVE FUN!

Schedule

- 2 hours of ground review
- 2 hours of flight instruction
- 15-minute post-flight review

In Flight

The student shall be prepared to simulate starting a cross-country flight, execute a diversion, and then demonstrate a representative set of flight maneuvers.

Completion Standards

The student should have no major gaps in knowledge and should be able to perform most maneuvers to the Airman Certification Standards with no major concerns.

Check Ride Prep Module 2

The remaining check ride prep work should be conducted by the student's instructor.

Knowledge Review

The student shall be prepared to discuss any ground topics not covered in Module 1 as well as any weaknesses found.

Risk Management

The student shall brief the instructor conducting the lesson on all risk management areas applicable to the flight and any scenarios presented by the instructor.

Flight Scenario

This flight will focus on briefly reviewing all maneuvers with an emphasis on any weaknesses found in Module 1.

Objectives

- Complete one final review of all maneuvers and ground topics.
- Emphasize any ground or flight maneuver weaknesses found in Module 1.
- HAVE FUN!

Schedule

- 2 hours of ground review
- 2 hours of flight instruction
- 15-minute post-flight review

In Flight

Briefly review all flight maneuvers and emphasize any weaknesses.

Completion Standards

The student should have no gaps in knowledge and should be able to perform all maneuvers to the Airman Certification Standards.

FLIGHT PLAN CLOSED