Coyote Flight and Training Center

Private Pilot Syllabus

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Assistant Chief Ground Instructor – N/A

List of Effective Pages/Index

Private Pilot Flight and Ground School Course

List of Revisions

Private Pilot Flight and Ground School Course

Section(s)	Rev	Date	Description
i-iii, 1-28	1	1/28/2018	Initial release of all documents/sections
14b	2	3/18/2018	Added unusual attitudes and vacuum failures.
4a	2	3/28/2018	Added summary of minimum total hours to first page. Changed F11 I.R. to F11 A. Changed B02 I.R. to B02 A, added note “unusual attitudes”, and changed B02 lesson time from 1.0 hours flight to 1.5 hours flight. Clarified “simulator or aviation training device” for basic attitude instruction lessons B01 and B02.
18	2	3/28/2018	Added section titled “Best Practices” to accident/incident reporting.
29	1	5/16/2018	Added section, “Introduction to the E6B”
21	2	6/13/2018	Added section, “3. Use of checklists and flows”.
i	2	6/25/2018	Added revision and revision dates.
ii	2	6/25/2018	Added revision and revision dates. Corrected revision date of listed section 4a to Rev 2, 3/28/2018. Updated revision nos and date for section 21, i, ii, iii, and 6a.
iii	2	6/25/3018	Added revisions and revision date.
6a	2	6/25/2018	Moved “Radio Communications” and “Use of checklists” from Ground Ops and placed in Miscellaneous category. Added areas - “Sterile cockpit”, “Traffic pattern(s)”, “Configuration and Approach” (to landing), and “Go-arounds”. Revised grading system to state, “N/A - Not applicable to current lesson, IC - Incomplete, V - Verbally discussed, NP - Needs practice, S - Satisfactorily demonstrates maneuver w/o assistance”

Coyote Flight and Training Center
Private Pilot – Airplane TCO

Flight School
Coyote Flight Centers, LLC located at Amarillo International Airport in Amarillo, TX.

Course Title
Private Pilot Certification Course Airplane Single-Engine Land (ASEL) and Private Pilot Ground School.

1. This TCO meets the curriculum requirements for the Private Pilot Certification Course contained in part 141 appendix B.
2. The training syllabus provided contains serperate ground and training courses, which will be taught consecutively.

Course Objective
The ground portion of the course will provide the student with the aeronautical knowledge necessary to meet the requirements for a private pilot certificate with an airplane category rating and a single-engine land class rating.

The flight portion of the course will provide the student with the aeronautical experience necessary to meet the requirements for a private pilot certificate with an airplane category rating and a single-engine land class rating.

Completion Standards
The student must demonstrate through written tests, practical tests, and appropriate records that he or she meets the knowledge, skill, and experience requirements necessary to obtain a private pilot certificate with an airplane category rating and a single-engine land class rating. Each individual must satisfactorily complete at least one stage of training within each training period of not more than 90 days.

Ground Instruction Facilities
Ground instruction facilities are housed in three rooms, described below. The rooms are located in the operations offices attached to the Coyote Flight Centers, LLC hangar on Amarillo International Airport.

- Training room 1: Dimensions are 14'x28' with two entry/exit doors. The room contains 2 tables and 4 chairs to accommodate up to 4 students. This room also contains a 48"x72" whiteboard and a television with a media playback system.
- Training room 2: Dimensions are 10’ x 10’ closeable door. The room contains 1 table and two chairs and can accommodate up to 1 student. The room also contains a computer with internet access.

- Training room 3: Dimensions are 40’x10’ with one entry/exit door. The room is divided into two sections with a 6’ tall partition.
    - The first section is 28’ x 10’ and contains three main tables, three smaller tables, and 14 chairs and can accommodate up to 14 students. The room also contains two 24”x36” white boards, a television, and three computers with internet access.
    - The second partition is 12'x10' and contains a certificated Frasca 131 BATD, and a computer based procedures trainer.
    - Training room 3 may be used for simulator training, classroom ground school, or FAA testing. Use of Training room 3 shall be exclusive to only one type of activity at a time.

The training rooms are well lighted and the temperature is thermostatically controlled. Each room is well ventilated and conforms to the city of Amarillo building, sanitation and health codes. The rooms are designed and located so that students will not be distracted by instruction conducted in the other rooms or by flight and maintenance operations at the airport.

Airport

The Amarillo International Airport is the main base of operations for training in this course and where training flights originate. Flight training operations, including the dispatching of flights, will be solely at this airport. The airport has hard-surfaced runways and meets § 141.38 requirements for day and night flight operations. Both airports have fuel and maintenance services available.

Facility Descriptions

The airport is equipped with lounge and a pilot briefing room for Coyote Flight Centers, LLC’s students. The briefing area has a computer with Internet access for weather briefings, a telephone, cell phone, and Internet connections dedicated to contacting Flight Standards Service (AFS) facilities used exclusively by Coyote Flight Centers, LLC’s students. The briefing room is equipped with tables for planning purposes. The briefing area has electronic access to current aeronautical charts, including the current Aeronautical Information Manual (AIM). A large, physical wall map in the lounge area depicts an area of Northern Texas with Amarillo at its center. The local practice areas are displayed along with the local tower frequencies and airport dimensions on a bulletin board in the lounge.

Ground Trainers

Coyote Flight Centers, LLC has Frasca 131 BATD that will be used to provide training as described in the approved training course syllabus. The specific lessons will be identified when using the BATD for pilot training. Each trainer is FAA approved and is accompanied by a valid letter of authorization (LOA) and Qualification and Approval Guide (QAG). These training devices meet the requirements as described in § 141.41.

Airplanes

This course of training will utilize two Piper Cherokee 180’s. This aircraft will meet the

requirements of 14 CFR Part 141.39. Radio equipment will consist of at least one 360 channel transceiver, at least one VOR navigational receiver, and a 4096 code transponder with Mode C capability. These airplanes are equipped for day and night VFR flying as specified in 14 CFR Part 91.205. IFR flying in these aircraft is prohibited.

Chief Instructor Qualifications
The chief instructor for the flight and ground portions of this course will be Thomas Hickman.

His qualifications meet or exceed the following:

- Hold a current flight instructor's certificate (airplane single engine land)
- Have at least 1000 hours PIC time in an airplane
- 2 years flight training experience with a minimum of 500 hours of flight instructor experience

Assistant Chief Flight Instructor
The assistant chief flight instructor for the flight portion of this course will be Joshua A. Collier

His qualifications meet or exceed the following:

- A minimum of 500 hours PIC
- 1 year of flight training experience with a minimum of 250 hours of flight instructor experience

Flight Instructor Qualifications
Each instructor assigned to the flight portion of this course must hold at least a Commercial pilot certificate with an instrument rating, and a current Flight Instructor certificate.

Each instructor assigned to the ground portion of this course must be the holder of at least a Basic Ground Instructor Certificate.

Training Syllabus
For the flight portion of the course, see section 4a – Private Pilot Flight Training Syllabus.

For the ground portion of the course, see section 4b – Private Pilot Ground Training Syllabus.

Student Enrollment and Records
Each student shall be provided with an electronic copy of the training course syllabus and lesson plans. The student shall be required to keep and maintain a physical binder or folder with the training syllabus and any completed lessons. The student shall have the binder available during any and all flight or ground training.

Each enrolling student shall provide a birth certificate and either a passport or a valid driver's license. Student records shall be stored electronically in a database. The program shall be password protected to prevent unauthorized users from tampering with records. Authorized users shall be granted varying levels of access to prevent students from tampering with records. The program shall keep a dated record of each flight, hours logged, a grade sheet, and an

electronic signature to verify the integrity of each record.

Safety Policies, Procedures, and Limitations

1. No aircraft may be flown or operated unless its status in the Aeroledger program reads "In-progress". If the aircraft is to be flown by a solo student or any place other than a designated practice area, the comment section of the Aeroledger reservation must contain a summary of the flight's intended locations.
2. Prior to any flight, the aircraft binder must be reviewed. Copies of all required documents and inspections must be in the binder and must be current.
3. Preflight and starting procedures will be carried out in accordance with the checklist provided with the aircraft.
4. While taxiing near other aircraft a speed akin to a slow walk shall be maintained. No faster than a moderate walk shall be maintained when away from other aircraft.
5. A fire extinguisher is located in the lobby area of the front office. Additional fire extinguishers are located throughout the hangar. These are for use of all students or instructors in case of fire. Flight instructors will ensure all students know the locations.
6. Any aircraft discrepancies are to be noted in the "Squawk" section of the Aeroledger program. Students and their instructors will review these squawks prior to each flight. If any discrepancy is deemed to be an airworthiness or safety issue, by either the student or instructor, the aircraft is to be grounded until maintenance personnel return the aircraft to service.
7. Any aircraft undergoing maintenance must be marked as "grounded" or as "maintenance" in the Aeroledger program, and the key placed in the maintenance shop until after the aircraft is returned to service.
8. No flight may be made unless the present and forecast weather exceeds the company weather minimums as published and posted in the main office. If the weather minimums are not posted then no flights shall be made until they are.
9. After each flight the aircraft shall be parked into the wind, and the student shall ensure the security of the aircraft with chocks, tie-downs, and/or by having the aircraft hangared. The student shall also return the aircraft key to the lockbox.
10. No aircraft shall be flown for more than three cumulative hours without a refueling stop. No flight shall begin without at least two hours of fuel in the fuel tanks. All flights should be terminated with at least one hour of fuel remaining in the fuel tanks.
11. All flights will avoid other aircraft using the right-of-way procedures in FAR 91.67. All pilots must review and be familiar with this regulation prior to any flight.
12. After takeoff, V_x or V_y may be used for the first 100'AGL. Afterwards, a less dramatic climb attitude should be used to allow the pilot to see over the nose of the aircraft. Shallow s-turns and other collision avoidance maneuvers should be used as necessary to prevent collisions.
13. Prior to each and every flight maneuver, clearing turns shall be performed.
14. Flight following and radar services shall be obtained and used during each and every flight.
15. Except for take-offs and landings, students shall perform all upper air work above three thousand feet AGL. Ground reference maneuvers may be practiced at nine hundred feet AGL.

16. The aircraft fuel boost pump shall be used during all maneuvers, when switching tanks, or when operating below one thousand feet AGL.
17. No student shall conduct any solo flight unless his/her primary instructor is available. If the student's primary instructor is not available, then the chief pilot may authorize another instructor to act in place of the primary instructor.
18. Students not actively involved in an authorized cross country must remain within 25NM of Amarillo International Airport, be transiting to or from designated practice areas, or within designated practice areas. Designated practice areas will be published in the main office and a copy will be placed in the aircraft binder.
19. Landings at unauthorized airports are not allowed except in case of an emergency. If a landing is made at an unauthorized airport, the aircraft should be taxied to a safe position on the ground, shut-down, and then secured. The student shall notify either the primary instructor or the chief pilot and await instructions.
20. No person may perform or authorize any maintenance except under supervision or direction from Coyote maintenance personnel. In the event an aircraft requires maintenance while away from Amarillo International Airport, the student is to secure the aircraft in a safe position, away from any runways, and contact either the Chief Flight Instructor or the Assistant Chief Flight Instructor for instructions.
21. Simulated emergency landings shall not be practiced unless an authorized instructor is on board. No simulated emergency shall proceed below 500 ft AGL unless over an airport runway where a normal landing can be made.
22. All flights must remain at least 1NM outside of the lateral boundaries of Pantex Nuclear Plant (P-47) unless at or above 5000' MSL.
23. Except in case of an emergency, students may only fly to approved airports. Approved airports include:
    a. Dalhart Municipal
    b. Hereford Municipal
    c. Hale County Municipal
    d. Lubbock International
    e. Clovis Municipal
24. All students and pilots must read and be familiar with the most current copy of Coyote Company Policies as published on www.coyoteflight.com

Company Weather Limitations

Operation	Ceilings (AGL)	Visibility	Crosswind comp.	Gust factor	Maximum winds
VFR takeoffs and landings for **solo students**	3000 feet	20 statute miles	5 knots or as written in logbook by instructor	5 knots or as written in logbook by instructor	15 knots or as written in logbook by instructor
VFR takeoffs and landings for **certificated pilots** (not including approved flight instructors)	2000 feet	10 statute miles	No more than 50% of maximum demonstrated crosswind component	5 knots	No more than 25 knots including gusts
VFR takeoff and landings for **approved flight instructors**	1500 feet	5 statute miles	No more than maximum demonstrated crosswind component	9 knots	No more than 30 knots including gusts
IFR flight of any kind, including flight training with an **approved flight instructor**	1000 feet	5 statute miles	No more than 50% of maximum demonstrated crosswind component	9 knots	No more than 25knots including gusts

Situation Specific Limitations

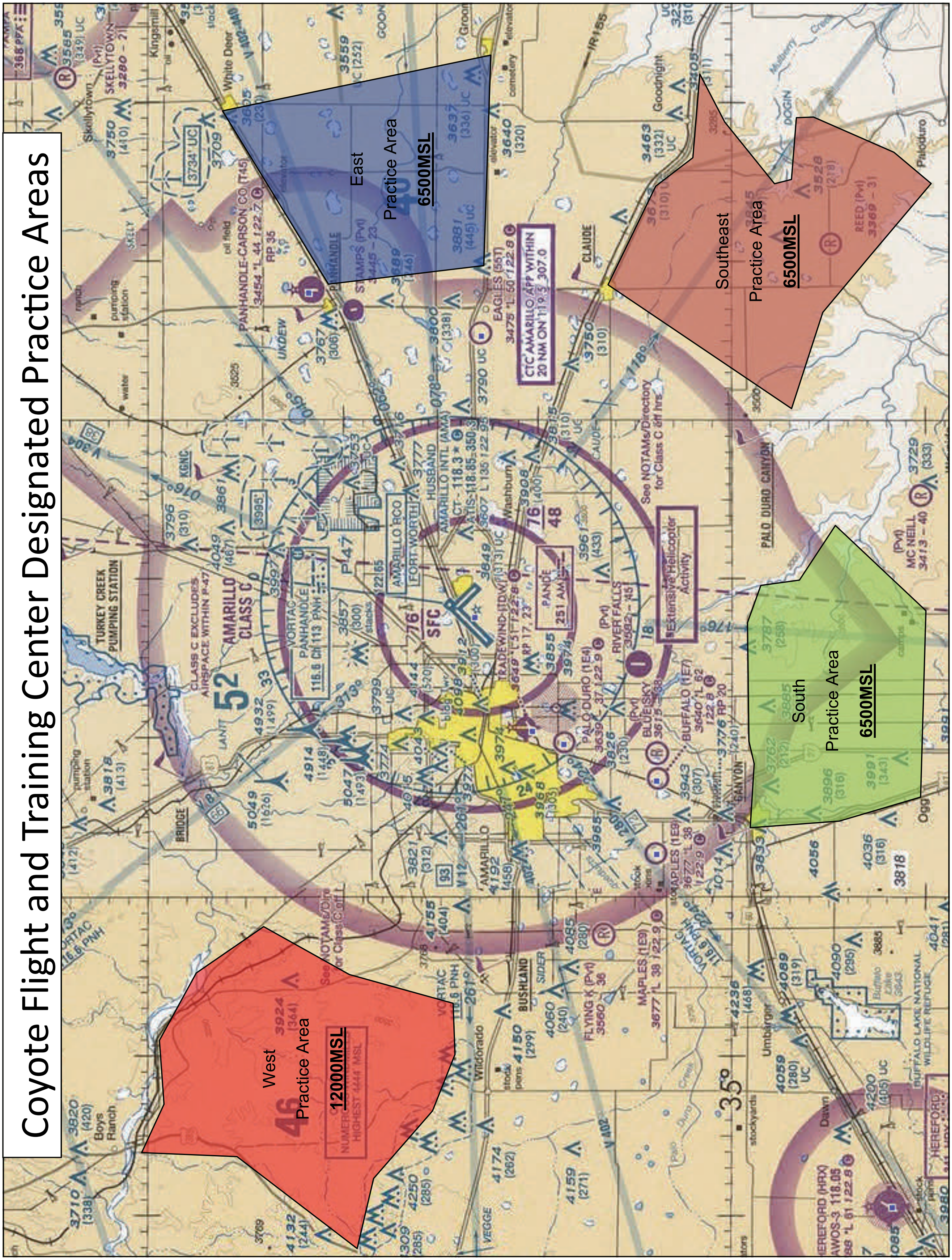
Situation	Special restrictions	Crosswind comp.	Gust factor	Maximum winds
Taxiing	10 knots maximum taxi speed			
Upper air maneuvers	All upper air maneuvers shall be performed a minimum of 2500 feet AGL			
Spins	Spins shall be performed a minimum of 5000 feet AGL, in **approved aircraft**, and an **approved instructor** must be on board			
Thunderstorms	No flight within 20NM of any convective activity present or forecast			

Aircraft Specific Limitations

Aircraft	Special restrictions	Crosswind comp.	Gust factor	Maximum winds
Decathlon	No student pilots allowed	5 knots	5 knots	15 knots

Deviation from all or part of these limitations and requirements requires flight specific permission from Coyote administration. Failure to abide by these limitations and requirements will result in a loss of flight privileges and/or legal action.

Coyote Flight and Training Center Designated Practice Areas



Private Pilot Flight Training Syllabus

Minimum Total Hours

Total flight:	40.0	Night:	3.0
Total ground:	35.0	Solo:	10.0
Dual received:	30.0	Solo xctry:	5.0
Dual xctry (day):	4.0		
Dual xctry (night):	2.0		
Instrument:	3.0		

Flight lesson | Ground lesson | Stage check | Solo flight | Simulator

Sect No	Title	Specific topics	Notes/Special emphasis	Ground	Flight	Pass?[i]
07	Introduction to flight training	• Process for becoming a pilot • Registering for a student's pilot license • Registering for a medical • How to read a METAR and a TAF • Pre-flight inspection techniques • Taxiing • Engine run-up, including leaning for density altitude and fuel management • Take-offs • Collision avoidance		2.0	1.0	
08	Airports and operational safety	• Airport signs and markings • Aeronautical decision making • The five hazardous attitudes • Wake turbulence avoidance	• Student should be able to read signs and marking • Student should memorize the PAVE and IM SAFE checklists • Student may elect to use the APE checklist in lieu of the PAVE checklist. • Student should memorize hazardous attitudes and antidotes	2.0	0.0	
09	Four fundamental flight maneuvers	• Climbs • Straight and level • Turns • Descents, in a normal low-drag configuration		0.5	1.0	
10	Aerodynamics, stability, and turning tendencies			4.0	0.0	
11	Combined fundamental flight maneuvers	• Climbs and climbing turns • Airspeed control in straight and level • Reconfiguring the aircraft for high and low drag • Descents and descending turns, in various drag configurations		0.5	1.0	
12	Ground reference maneuvers	• Turns around a point • Rectangular course • S-turns across a road		0.5	2.0	
13	Aircraft Systems		• Student should understand that alternator failure does not necessarily mean loss of engine power • Leaning of mixture for density altitude and best power • Signs of an engine overheating and how to cool an engine	4.0	0.0	
14a	Basic Attitude Instruction Pt. 1 (Four fundamental flight maneuvers)	• Basic attitude instruction • Cross referencing of instruments • Four fundamental flight maneuvers while using instruments	• May use simulator or approved aviation training device • Control airspeed with pitch • Control altitude with power	0.5	1.0	
14b	Basic Attitude Instruction Pt. 2 (VOR tracking)	• Radio aids to navigation • Compass/timed turns • Unusual attitudes	• May use simulator or approved aviation training device	0.5	1.5	
15a	Traffic patterns and the stabilized	• Airport traffic patterns • Traffic pattern entry and exit • Stabilized approaches		1.5	0.0	

	approach (Pt. 1, Ground)	• Slips • Go-arounds				
15b	Traffic patterns and the stabilized approach Pt. 2, Flight)	• Airport traffic patterns • Traffic pattern entry and exit • Stabilized approaches • Slips • Go-arounds	• Student should not be allowed to land until able to fly a traffic pattern and initiate a go-around unaided	0.0	2.0	
15c	Introduction to landings	• Rounding out • Flaring • Landing	• The landing and the approach should be considered two separate maneuvers.	0.5	2.0	
16	Airspace			2.0	0.0	
28	Aeronautical charts and supplements			2.0	0.0	
17	Flying to other airports and refueling	• Operations at non-towered airports • Refueling procedures		0.5	1.0	
18	Federal aviation regulations			4.0	0.0	
	Stage No. 1 checkflight	• At least 3 circuits around the traffic pattern	• Focus should be on aircraft startup and operations, traffic pattern, and landings • Emphasis items should include proper leaning of mixture	0.5	0.5	
19	Upper air maneuvers	• Steep turns • Flight at minimum controllable airspeed		0.5	1.5	
20	Stalls	• Approach to landing stalls, straight ahead and turning with no more than 30° of bank • Departure stalls straight ahead and turning		0.5	1.5	
21	Emergency procedures and equipment malfunctions	• Emergency procedures and equipment malfunctions • Use of light gun signals for takeoff/landing • Approaches to landing with simulated engine failures • Appropriate use of memorized flows and checklists	• Appropriate use of memorized flows and checklists	2.0	1.0	
	Solo flight No. 1		• Student should have completed the pre-solo knowledge exam prior to completion of this lesson • Flight should begin with at least three circuits around the pattern with an instructor on board • Student should make no more than three solo landings without an instructor on board	0.5	1.0	
	Stage No. 2 checkflight	• Ground reference maneuvers • Upper air maneuvers • Emergency procedures	• Student should have completed the ground exam no. 1 or the FAA knowledge exam with a minimum passing score of 70% prior to completion of this lesson • Student must be able to act as PiC in order to progress to the cross country phase of training.	1.0	1.0	
22	Aircraft Performance, Weight, and Balance			2.0	0.0	
	Solo flight No. 2	• Normal takeoffs and landings		0.5	1.0	
	Solo flight No. 3	• Normal takeoffs and landings		0.5	1.0	
23	Weather Theory			2.0	0.0	
24	Short and soft field operations	• Short field takeoffs and landings • Soft field takeoffs and landings		0.5	1.0	
	Solo flight No. 4	• Four fundamental maneuvers • Ground reference maneuvers • Steep turns		0.5	1.0	
25	Weather			2.0	0.0	

	Services					
26	Cross country navigation, and flight planning		• Flight planning may be taught in conjunction with weather services • Flight plan should emphasize pilotage while utilizing calculations for determining the effects of wind • Student should be introduced to the E6B	3.0	0.0	
	Dual cross country No. 1 (day time)	• Pilotage and choosing checkpoints • Dead reckoning • Radio navigation/GPS • Optional: operations in class B airspace	• In lieu of multiple dual cross countries, the student may elect to fly one single cross country into Class B airspace. The route of flight shall be Amarillo, TX -> Arlington, TX -> Addison, TX -> Amarillo, TX. The first portion of this flight should be done during the daytime, and the return trip should be accomplished at night time. In this case, all of the objectives, tasks, and notes of the individual cross country flight lessons must be met.	0.5	2.0	
	Solo flight No. 5	• Four fundamental maneuvers • Ground reference maneuvers • Steep turns		0.0	1.0	
	Dual cross country No. 2 (day time)	• Pilotage and choosing checkpoints • Dead reckoning • Radio navigation/GPS		1.0	2.0	
27	Aeromedical factors			2.0	0.0	
	Night flight No. 1	• 10 Takeoffs and landings		0.5	1.0	
	Cross country No. 2 (night time)	• Pilotage • Dead reckoning • GPS • Basic attitude instruction	• Instructor should review student's logbook and ensure at least 3 hours of simulated instrument have been completed prior to the end of this flight. • Night flight should include at least 0.5 hours of simulated instrument including unusual attitudes	0.5	2.0	
	Solo cross country No. 1	• Amarillo, TX -> Dalhart, TX -> Dumas, TX -> Amarillo, TX		0.5	2.0	
	Solo cross country No. 2	• Amarillo, TX -> Lubbock, TX -> Clovis, NM -> Amarillo, TX		0.5	3.0	
	Test prep No. 1	• Review any and all of the following o Ground reference maneuvers o Takeoffs and Landings		0.5	1.0	
	Test prep No. 2	• Review any and all of the following o Upper air maneuvers o Takeoffs and Landings		0.5	1.0	
	Test prep No. 3	• Review any and all of the following o Takeoffs and Landings o Basic attitude instruction		0.5	1.0	
	Stage No. 3 checkflight		• Student should have completed the ground school exam no. 2 or the FAA knowledge exam with a minimum passing score of at least 70% prior to completion of this lesson • Phase check 3 should be comparable to the check ride itself.	1.0	1.0	

Notes:

I. Ground lessons may be skipped if student has already taken the FAA Private Pilot Knowledge Exam and passed with a minimum score of 80%.
II. If additional solo cross countries are needed, student may with instructors permission fly to an approved airport
III. Each flight may be broken up into multiple flights if necessary, however the ground and flight time minimums published in this syllabus must be met.

Private Pilot Ground Training Syllabus

Minimum Total Hours

Total flight: N/A
Total ground: 37.0

Flight lesson | Ground lesson | Stage check | Solo flight | Simulator

Sect No	Title	Specific topics	Notes/Special emphasis	Ground	Flight	Pass?[i]
07	Introduction to flight training	• Process for becoming a pilot • Registering for a student's pilot license • Registering for a medical • How to read a METAR and a TAF • Usage of a checklist • Pre-flight inspection techniques	• Complete only the ground portion of the lesson and tasks.	2.0	N/A	
08	Airports and operational safety	• Airport signs and markings • Aeronautical decision making • The five hazardous attitudes • Wake turbulence avoidance	• Student should be able to read signs and marking • Student should memorize the PAVE and IM SAFE checklists • Student may elect to use the APE checklist in lieu of the PAVE checklist. • Student should memorize hazardous attitudes and antidotes	2.0	N/A	
10	Aerodynamics, stability, and turning tendencies			4.0	N/A	
13	Aircraft Systems		• Student should understand that alternator failure does not necessarily mean loss of engine power • Leaning of mixture for density altitude and best power • Signs of an engine overheating and how to cool an engine	4.0	N/A	
16	Airspace			2.0	N/A	
28	Aeronautical charts and supplements			2.0	N/A	
18	Federal aviation regulations			4.0	N/A	
5a	Written exam No. 1			2.0	N/A	
21	Emergency procedures and equipment malfunctions		• Complete only the ground portion of the lesson and tasks.	2.0	N/A	
22	Performance, Weight, and Balance			2.0	N/A	
23	Weather Theory			2.0	N/A	
25	Weather Services		• Weather services may be taught in conjunction with creating a flight plan	2.0	N/A	
26	Cross country navigation, and flight planning		• Flight planning may be taught in conjunction with weather services • Flight plan should emphasize pilotage while utilizing calculations for determining	3.0	N/A	

			the effects of wind • Student should be introduced to the E6B			
27	Aeromedical factors			2.0	N/A	
5b	Written exam No. 2			2.0	N/A	

Ground School Exam No. 1

- Topics:
  - Airports and operational safety
  - Aerodynamics, stability, and turning tendencies
  - Aircraft systems
  - Airspace
  - Federal regulations

1. The numbers 8 and 26 on the approach end s of the runway indicate that the runway is oriented approximately
   a. 008° and 026° true
   b. 080° and 206° true
   c. 080° and 250° true

2. When approaching taxiway holding lines from the side with continuous lines, the pilot
   a. May continue taxiing
   b. Should not cross the lines without ATC clearance
   c. Should continue taxiing until all parts of the aircraft have crossed the lines

3. Red signs with white lettering indicate
   a. Areas on an airport where aircraft may not go
   b. Areas on an airport where aircraft may proceed only after obtaining permission
   c. Areas on an airport where aircraft may proceed but should use extreme caution

4. Yellow signs with black lettering indicate
   a. Directions to another taxiway or runway
   b. Areas where caution must be used to avoid collisions with other aircraft
   c. Areas where taxi speed should be kept to a minimum

5. Black signs with yellow lettering indicate
   a. The location of the aircraft
   b. Sections of the airport for ground operations
   c. Places where larger aircraft can pass smaller aircraft

6. Wingtip vortices are created only when an aircraft is
   a. Operating at high airspeeds
   b. Heavily loaded
   c. Developing lift

7. How does wake turbulence vortex circulate around each wing
   a. Inward, upward, and around each wingtip
   b. Inward, upward, and counter clockwise
   c. Outward, upward, and around each tip

8. During a night flight, you observe a steady red light and a flashing red light ahead and at the same altitude. What is the general direction of movement of the other aircraft?
    a. The other aircraft is crossing to the left
    b. The other aircraft is crossing to the right
    c. The other aircraft is approaching head-on

9. Prior to each maneuver, pilots should
    a. Check altitude, airspeed, and heading indications
    b. Visually scan the entire area for collision avoidance
    c. Announce intentions on the nearest CTAF

10. The most effective method for scanning for other aircraft for collision avoidance during daylight hours is to use
    a. Regularly spaced concentration on the 3, 9, and 12 o'clock positions
    b. A series of short, regularly spaced, eye movements to search each 10-degree sector
    c. Peripheral vision by scanning small sectors and utilizing off center viewing

11. A blue segmented circle on a sectional chart depicts which class of airspace?
    a. Class B
    b. Class C
    c. Class D

12. When a control tower at an airport within class D airspace ceases operation for the day, what happens to the airspace designation?
    a. The airspace designation normally will not change
    b. The airspace remains class D airspace as long as weather observer or automated weather systems are available
    c. The airspace reverts to Class E or a combination of Class E and G airspace during the hours the tower is not in operation

13. The radius of the outer area of Class C airspace is normally
    a. 10 NM
    b. 20 NM
    c. 30 NM

14. Who has the final authority to accept or decline land and hold short operations (LAHSO)?
    a. Pilot-in-command
    b. Owner/operator
    c. Second-in-command

15. With respect to the certification of airmen, which is a category of aircraft?
    a. Gyroplane, helicopter, airship, and free-balloon
    b. Airplane, rotorcraft, glider, lighter-than-air
    c. Single-engine land, single-engine sea, multi-engine land

16. The definition of nighttime is
    a. Sunset to sunrise
    b. 1 hour after sunset to 1 hour before sunrise
    c. The time between the end of evening civil twilight and the beginning of morning civil twilight

17. What is the duration of a standard aircraft registration in the U.S.?
    a. It never expires
    b. 2 years
    c. 3 years

18. What regulation governs aircraft maintenance?
    a. 14 CFR part 91
    b. 14 CFR part 43
    c. 14 CFR part 61

19. Preventative maintenance has been performed on an aircraft, what paperwork is required?
    a. A full, detailed description of the work done must be entered in the airframe logbook
    b. The date the work was completed, and the name of the person who did the work must be entered in the airframe and engine logbooks
    c. The signature, certificate number, and kind of certificate held by the person approving the work and a description of the work must be entered in the aircraft maintenance records

20. Which operation would be described as preventative maintenance?
    a. Servicing landing gear bearings
    b. Alteration of main seat support brackets
    c. Engine adjustments to allow automotive gas to be used

21. Is it legal to fly on the dealer's registration after purchasing an aircraft?
    a. Yes, the aircraft can be flown by the buyer for 30 days
    b. No, the aircraft cannot be flown by the buyer and has to be registered
    c. Yes the airplane can be flown by the buyer for 120 days

22. What documents must be in your personal possession or readily accessible in the aircraft while operating as PiC
    a. Certificates showing accomplishment of a checkout in the aircraft and a current biennial flight review along with a photo ID
    b. A pilot certificate with an endorsement showing accomplishment of annual flight review and a pilot logbook showing recency of experience
    c. An appropriate pilot certificate, a photo ID, and an appropriate current medical certificate if required

23. To act as pilot in command of an aircraft carrying passengers, the pilot must have made at least three takeoffs and three landings in an aircraft of the same
    a. Make and model
    b. Category and class, but not type
    c. Category, class, and type if a type rating is required

24. If a certificated pilot changes permanent mailing address and fails to notify the FAA airmen certification branch of the new address, the pilot is entitled to exercise the privileges of the pilot certificate for a period of only
    a. 30 days after the date of the move
    b. 60 days after the date of the move
    c. 90 days after the date of the move

25. In regard to privileges and limitations, a private pilot may
    a. Act as PiC of an aircraft carrying a passenger for compensation if the flight is in connection with a business or employment
    b. Not pay less than the pro rata share of the operating expenses of a flight with passengers provided the expenses involve only fuel, oil, airport expenditures, or rental fees
    c. Not be paid in any manner for the operating expenses of the flight

26. Where may an aircraft's operating limitations be found?
    a. On the airworthiness certificate
    b. In the current, FAA approved flight manual, approved manual material, markings, and placards, or any combination thereof
    c. In the aircraft airframe and engine logbooks

27. Safety belts are required to be properly secured about which persons in an aircraft and when?
    a. Pilots only, during takeoffs and landings
    b. Pilots during all phases of flight and passengers during taxi, takeoffs, and landings only
    c. Each person on board the aircraft during the entire flight

28. When two or more aircraft are approaching an airport for the purpose of landing, the right-of-way belongs to the aircraft
    a. That has the other to its right
    b. That is the least maneuverable
    c. At the lower altitude, but it shall not take advantage of this rule to cut in front of or overtake another

29. For VFR operations, a clearance must be obtained prior to entering which airspace?
    a. Class C
    b. Class E during VFR weather
    c. Class B

30. For VFR operations, two way radio communications must be established with the ATC facility having jurisdiction over the area prior to entering which class of airspace?
    a. Class C
    b. Class E
    c. Class G

31. What documentation must be on board an aircraft before it is legal to fly?
    a. Airworthiness, radio operator's certificate, and applicable service manuals
    b. Airworthiness, operating limitations, registration, weight and balance data
    c. Airworthiness, operating limitations, checklists, and applicable service manuals

32. What inspection(s) are required in order for an aircraft to be considered airworthy?
    a. Annual inspection, 100 hour inspection (if applicable), and the pitot/static inspection
    b. Annual inspection and pre-flight inspection
    c. Annual inspection, pre-flight inspection, and avionics inspection

33. If an aircraft is involved in an accident or an incident, where would a person find information pertaining to the proper course of action?
    a. NTSB 830
    b. FAR 43
    c. FAR 91

34. What is the purpose of wing flaps
    a. To enable the pilot to make steeper approaches to a landing without increasing the airspeed
    b. To relieve the pilot of maintaining continuous pressure on the controls
    c. To decrease wing area to vary lift

35. What is true concerning the primary flight controls?
    a. The effectiveness of each control surface increases with airspeed because there is more flow over them
    b. Only when all three primary flight controls move in sequence do the airflow and pressure distribution change over and around the airfoil
    c. Primary flight controls include ailerons, rudder, elevator, and trim systems

36. The term "angle of attack" is defined as the angle between
    a. The chord line of the wing and the relative wind
    b. Airplanes longitudinal axis and that of the air striking the airfoil
    c. Airplanes center line and relative wind

37. During a spin to the left, which wings are stalled?
    a. Both wings are stalled
    b. Neither wing is stalled
    c. Only the left wing is stalled

38. In what flight condition are the left-hand turning tendencies of an airplane the most pronounced?
    a. Low airspeed, high power, high angle of attack
    b. Low airspeed, low power, low angle of attack
    c. High airspeed, high power, high angle of attack

39. Which basic maneuver increases the load factor on an airplane?
    a. Climbs
    b. Turns
    c. Stalls

40. During flight, when are the indications of a magnetic compass accurate?
    a. Only in straight and level unaccelerated flight
    b. As long as the airspeed is constant
    c. During turns if the bank does not exceed 18°

41. The pitot system provides impact air pressure for which instrument?
    a. Altimeter
    b. Vertical speed indicator
    c. Airspeed indicator

42. An abnormally high engine temperature indication may be caused by
    a. The oil level being too low
    b. Operating with a too high viscosity oil
    c. Operating with an excessively rich mixture

43. What action(s) can a pilot take to cool an overheating engine?
    a. Re-lean the mixture, climb to a colder altitude, and reduce power
    b. Reduce power, increase airspeed, enrichen the mixture
    c. Reduce rate of climb and add power to increase airspeed

44. During the run-up at a high elevation airport, a pilot notices a slight engine roughness that is not affected by the magneto check but grows worse during the carburetor heat check. Under these circumstances, what would be the most logical initial action?
    a. Check the results obtained with a leaner mixture
    b. Taxi back to the flight lines for a maintenance check
    c. Reduce manifold pressure to control detonation

45. An electrical system failure (battery and alternator) occurs during flight. In this situation, you would
    a. Experience avionics equipment failure
    b. Probably experience failure of the engine ignition system, fuel gauges, aircraft lighting system, and avionics system
    c. Probably experience engine failure due to the loss of the engine-driven fuel pump and also failure of all radio equipment, lights, and all instruments requiring electrical current

Ground School Exam No. 2

- Topics:
  - Aircraft performance, weight, and balance
  - Weather theory
  - Weather services
  - Cross country flight planning and navigation
  - Aeromedical factors

1. What are the standard temperature and pressure values for sea level?
   a. 15°C and 29.92 inHg
   b. 59°C and 1013.2 millibars
   c. 59°F and 29.92 millibars

2. What effect does high density altitude have on performance?
   a. It increases engine performance
   b. It decreases climb performance
   c. It increases takeoff performance

3. A pilot and two passengers landed on a 2,100 foot east-west gravel strip with an elevation of 1,800 feet. The temperature is warmer than expected and after computing density altitude it is determined the takeoff distance over a 50 foot obstacle is 1,980 feet. The airplane is 75 pounds under gross weight. What would be the best choice?
   a. Takeoff to the west because the headwind will give the extra climb-out time needed
   b. Try a takeoff without passengers to make sure the climb is adequate
   c. Wait until the temperature decreases, and recalculate the takeoff performance

4. Determine the density altitude for these conditions: Altimeter setting 29.95 inHG, Runway temperature 81°F, Airport elevation 5250ft MSL.
   a. 4600 feet MSL
   b. 5877 feet MSL
   c. 8500 feet MSL

5. Determine the ground roll distance required for takeoff: OAT 100°F, Press altitude 2000ft, Takeoff weight 2750 lbs, Headwind comp Calm
   a. 1150 feet
   b. 1300 feet
   c. 1800 feet

6. What is the headwind component for a landing on runway 18 if the tower reports the wind as 220° at 30 knots?
   a. 19 knots
   b. 23 knots
   c. 26 knots

7. What items are included in the empty weight of an aircraft?
   a. Unuseable fuel and undrainable oil
   b.

c. Only the airframe, powerplant, and optional equipment
d. Full fuel tanks and engine oil to capacity

8. An aircraft is loaded 110 pounds over maximum gross weight. If fuel is drained to bring the aircraft weight within limits, how much fuel should be drained?
   a. 15.7 gallons
   b. 16.2 gallons
   c. 18.4 gallons

9. Refer to fig 35 below. What is the expected fuel consumption for a 1,000 nautical mile flight under the following conditions?

   a. 60.2 gallons
   b. 70.1 gallons
   c. 73.2 gallons

   Pressure altitude ..... 8,000 ft
   Temperature..... 22°C
   Manifold pressure .....20.8 inHg
   Wind .....Calm

FIGURE 35.—Airplane Power Setting Table.

Cruise power settings
65% Maximum continuous power (or full throttle 2,800 pounds)

Press ALT.	ISA −20 °C (−36 °F)								Standard day (ISA)								ISA +20 °C (+36 °F)							
	IOAT		Engine speed	MAN. press	Fuel flow per engine		TAS		IOAT		Engine speed	MAN. press	Fuel flow per engine		TAS		IOAT		Engine speed	MAN. press	Fuel flow per engine		TAS	
Feet	°F	°C	RPM	IN HG	PSI	GPH	KTS	MPH	°F	°C	RPM	IN HG	PSI	GPH	KTS	MPH	°F	°C	RPM	IN HG	PSI	GPH	KTS	MPH
SL	27	−3	2,450	20.7	6.6	11.5	147	169	63	17	2,450	21.2	6.6	11.5	150	173	99	37	2,450	21.8	6.6	11.5	153	176
2,000	19	−7	2,450	20.4	6.6	11.5	149	171	55	13	2,450	21.0	6.6	11.5	153	176	91	33	2,450	21.5	6.6	11.5	156	180
4,000	12	−11	2,450	20.1	6.6	11.5	152	175	48	9	2,450	20.7	6.6	11.5	156	180	84	29	2,450	21.3	6.6	11.5	159	183
6,000	5	−15	2,450	19.8	6.6	11.5	155	178	41	5	2,450	20.4	6.6	11.5	158	182	79	26	2,450	21.0	6.6	11.5	161	185
8,000	−2	−19	2,450	19.5	6.6	11.5	157	181	36	2	2,450	20.2	6.6	11.5	161	185	72	22	2,450	20.8	6.6	11.5	164	189
10,000	−8	−22	2,450	19.2	6.6	11.5	160	184	28	−2	2,450	19.9	6.6	11.5	163	188	64	18	2,450	20.3	6.5	11.4	166	191
12,000	−15	−26	2,450	18.8	6.4	11.5	162	186	21	−6	2,450	18.8	6.1	10.9	163	188	57	14	2,450	18.8	5.9	10.6	163	188
14,000	−22	−30	2,450	17.4	5.8	10.5	159	183	14	−10	2,450	17.4	5.6	10.1	160	184	50	10	2,450	17.4	5.4	9.8	160	184
16,000	−29	−34	2,450	16.1	5.3	9.7	156	180	7	−14	2,450	16.1	5.1	9.4	156	180	43	6	2,450	16.1	4.9	9.1	155	178

Note: 1. Full throttle manifold pressure settings are approximate.
2. Shaded area represents operation with full throttle.

10. Refer to fig 38 below. Determine the total distance to land.

    a. 850 feet
    b. 1400 feet
    c. 1750 feet

OAT ..... 32°C
Pressure altitude ..... 8,000 ft
Weight 2600lbs
Headwind comp ..... 20 kts
Obstacle..... 50 ft

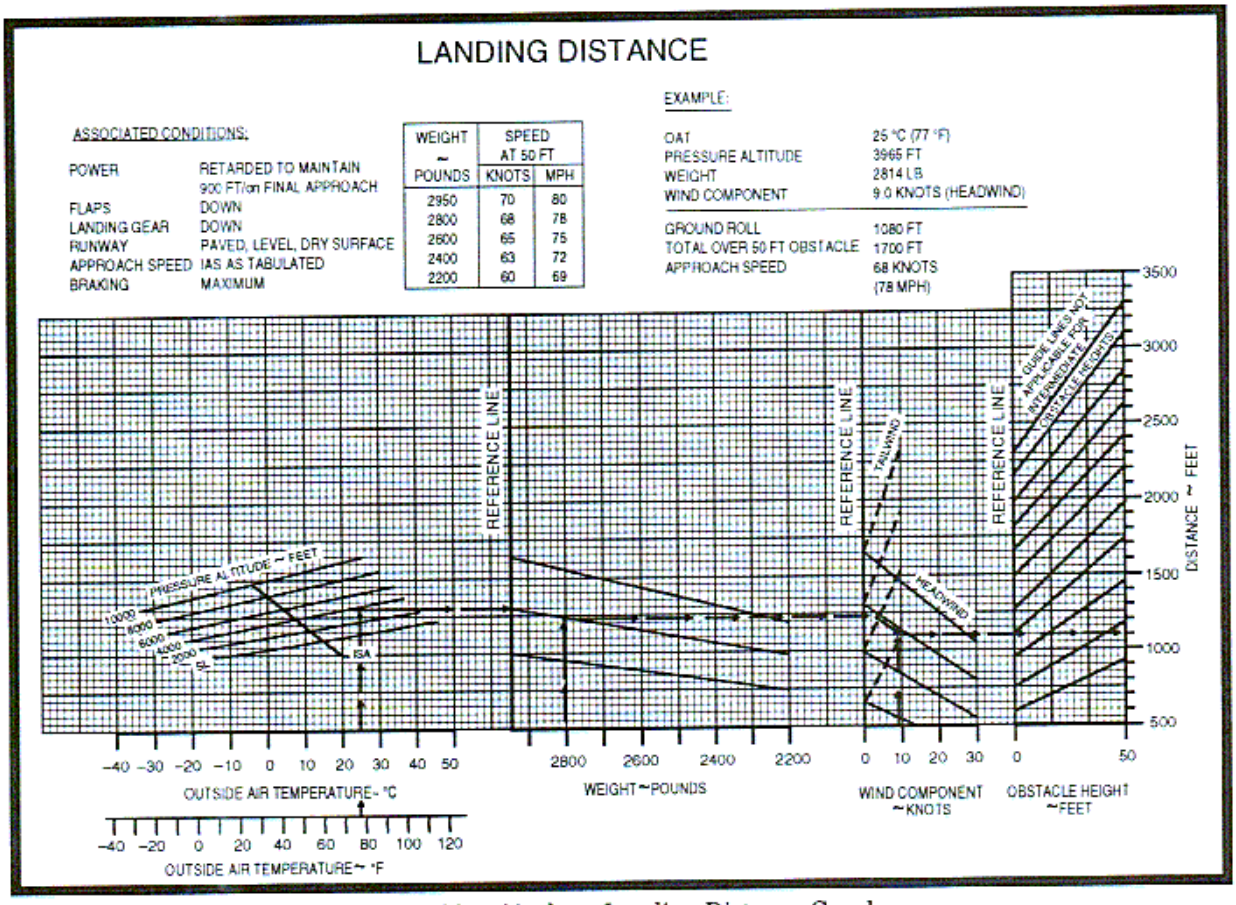


FIGURE 38.—Airplane Landing Distance Graph.

11. If an emergency situation requires a downwind landing, the pilot should expect a faster
    a. Airspeed at touchdown, a longer ground roll, and better control throughout the landing roll
    b. Groundspeed at touchdown, a longer ground roll, and the likelihood of overshooting the desired touchdown point
    c. Groundspeed at touchdown, a shorter ground roll, and the likelihood of undershooting the desired touchdown point

12. As a result of weight and balance, an aft loaded aircraft may
    a. Be more stable at all airspeeds, and in the event of a stall recovery will be easier
    b. Be less stable at all airspeeds, and in the event of a stall may have difficulty recovering
    c. Be more easily controlled at slow airspeeds, and in the event of a stall the aircraft will recover normally

13. Which statement best defines hypoxia?
    a. A state of oxygen deficiency in the body
    b. An abnormal increase in the volume of air breathed
    c. A condition of gas bubble formation around the joints or muscles

14. A pilot should be able to overcome the symptoms or avoid future occurrences of hyperventilation by
    a. Closely monitoring the flight instruments to control the airplane
    b. Slowing the breathing rate, breathing into a bag, or talking aloud
    c. Increasing the breathing rate in order to increase lung ventilation

15. Pilots are more subject to spatial disorientation if
    a. They ignore the sensations of muscles and inner ear
    b. Visual cues are taken away, as they are instrument meteorological conditions (IMC)
    c. Eyes are moved often in the process of cross-checking the flight instruments

16. What effect does haze have on the ability to see traffic or terrain features during flight?
    a. Haze causes the eyes to focus at infinity
    b. The eyes tend to overwork in haze and do not detect relative movement easily
    c. All traffic or terrain features appear to be farther away than their actual distance

17. Effects of carbon monoxide poisoning include
    a. Dizziness, blurred vision, and loss of muscle power
    b. Sweating increased breathing, and paleness
    c. Motion sickness, tightness across the forehead, and drowsiness

18. What is one of the neglected items when a pilot relies on short and long term memory fr repetitive tasks
    a. Checklists
    b. Situational awareness
    c. Flying outside the envelope

19. In the aeronautical decision making (ADM) process, what is the first step in neutralizing a hazardous attitude?
    a. Recognizing hazardous thoughts
    b. Recognizing the invulnerability of the situation
    c. Making a rational judgment

20. Every physical process of weather is accompanied by, or is the result of, a
    a. Movement of air
    b. Pressure differential
    c. Heat exchange

21. The wind at 5,000 AGL is southwesterly while the surface wind is southerly. This difference in direction is primarily due to
    a. Stronger pressure gradient at higher altitudes
    b. Friction between the wind and the surface
    c. Stronger Coriolis force at the surface

22. The boundary between two different air masses is referred to as a
    a. Frontolysis
    b. Frontogenesis
    c. Front

23. If there is a thunderstorm in the vicinity of an airport at which you will operate, which azardous atmospheric phenomenon might be expected on the landing approach?
    a. Precipitation static
    b. Wind-shear turbulence
    c. Steady rain

24. What conditions are necessary for formation of a thunderstorm?
    a. High humidity, lifting force, and unstable air
    b. High humidity, high temperature, and cumulus clouds
    c. Lifting force, moist air, and extensive cloud cover

25. The conditions necessary for the formation of ice on an aircraft are
    a. A small temperature and dew point spread
    b. Freezing temperatures and a high dew point
    c. Freezing temperatures and visible moisture

26. Crests of mountain waves may be marked by stationary, lens shaped clouds known as
    a. Mammatocumulus clouds
    b. Standing lenticular clouds
    c. Roll clouds

27. Where does wind shear occur?
    a. At all altitudes, in all directions
    b. Only at higher altitudes
    c. Only at lower altitudes

28. Clouds, fog, or dew will always form when
    a. Water vapor condenses
    b. Water vapor is present
    c. Relative humidity reaches 100 percent

29. Which clouds have the greatest turbulence?
    a. Towering cumulus
    b. Cumulonimbus
    c. Nimbostratus

30. What are characteristics of unstable air?
    a. Turbulence and good surface visibility
    b. Turbulence and poor surface visibility
    c. Nimbostratus clouds and good surface visibility

31. When there is a temperature inversion you would expect to experience
    a. Clouds with extensive vertical development
    b. Good visibility in the lower levels of the atmosphere and poor visibility above an inversion aloft
    c. An increase in temperature as altitude increases

32. To get a complete weather briefing for the planned flight the pilot should request
    a. A standard briefing
    b. An abbreviated briefing
    c. A general briefing

33. For aviation purposes, ceiling is defined as the height above the earth's surface of the
    a. Lowest reported obscuration and the highest layer of clouds reported as overcast
    b. Lowest broken or overcast layer or vertical visibility into an obscuration
    c. Lowest layer of clouds reported as scattered, broken, or thin

34. Refer to the following METAR, what are the wind conditions?
    a. Calm
    b. 110° at 12 knots, gusts to 18 knots
    c. 111° at 2 knots, gusts 18 knots

35. Refer to the METAR above. The remarks section for KMDW shows RAB35. This entry means
    a. Blowing mist has reduced the visibility to 1 1/12 SM
    b. Rain began at 1835Z
    c. The barometer has risen .35 in HG

36. To best determine general forecast weather conditions covering a flight information region, the pilot should refer to
    a. Aviation area forecasts
    b. Weather depiction charts
    c. Satellite maps

37. Refer to the TAF below. What is the forecast wind for KMEM from 1600Z until the end of the forecast?
    a. No significant wind
    b. Variable in direction at 6 knots
    c. Variable in direction at 4 knots

TAF

KMEM 121720Z 1218/1324 20012KT 5SM HZ BKN030 PROB40 2022 1SM TSRA OVC008CB
FM2200 33015G20KT P6SM BKN015 OVC025 PROB40 2202 3SM SHRA
FM0200 35012KT OVC008 PROB40 0205 2SM-RASN BECMG 0608 02008KT BKN012
BECMG 1310/1312 00000KT 3SM BR SKC TEMPO 1212/1214 1/2SM FG
FM131600 VRB06KT P6SM SKC=

KOKC 051130Z 0512/0618 14008KT 5SM BR BKN030 TEMPO 0513/0516 1 1/2SM BR
FM051600 18010KT P6SM SKC BECMG 0522/0524 20013G20KT 4SM SHRA OVC020
PROB40 0600/0606 2SM TSRA OVC008CB BECMG 0606/0608 21015KT P6SM SCT040=

38. Refer to the TAF above. In the forecast for KOKC, what should the forecast winds between the hours of 1600Z and 2200Z?
    a. 160° at 10 knots
    b. 180° at 10 knots
    c. 180° at 10 knots becoming 200° at 13 knots

39. A flag symbol on a sectional chart represents?
    a. A VFR reporting checkpoint
    b. A flight service station
    c. A weather balloon launching position

40. When a tower is denoted on a sectional
    a. The first number is the altitude at the top of the tower and the number in parenthesis is the height of the tower
    b. Blue towers are radio towers and red towers are lighted towers
    c. The tallest tower will always be denoted by the letters “UC”

41. Refer to the airport data block below. What is the identifier for the airport?
    a. WDG
    b. CT
    c. RP

ENID WOODRING RGNL (WDG)
CT – 118.9 * ©
AWOS-3 120.625
1167 *L 86 122.9
RP 31, 35

42. Refer to the airport data block above. When the tower closes, what frequency would be used to announced position and intentions to other traffic?
    a. 118.9
    b. 120.625
    c. 122.9

43. Refer to the airport data block above. What is the length of the runway at Enig regional Airport?
    a. 1167 ft
    b. 8600 ft
    c. 3500 ft with 3100 ft useable for landing

44. Refer to the airport data block above. What does the “RP 31, 35” mean?
    a. The longest runway is 3500 feet long, but only 3100 feet is available for use
    b. The traffic pattern for runways 31 and 35 is non-standard
    c. Regional procedures 31 and 35 are in use when approaching this airport

45. When approaching a radar controlled airport while on a cross country flight, the pilot should
    a. Establish radio communications when the aircraft is over a prominent checkpoint approximately 20 miles away
    b. Approach the airport cautiously and request a clearance at least 5 NM prior to entering controlled airspace
    c. Squawk 7500 prior to entering controlled airspace and then establish and maintain two way communications on the appropriate frequency

Pre-solo Knowledge Test

1. Who is responsible for ensuring an aircraft is in airworthy condition prior to any flight?

2. If two aircraft of the same category are converging on a head-on collision course with one another, what action should be taken by which pilot?

3. Describe the minimum safe altitudes at which you may operate an aircraft.

4. What is the purpose of adjusting the fuel to air mixture for density altitude?

5. Describe the pitot/static system and which instruments would be affected by a clog in either system's port.

6. What are the purpose of wing flaps and describe how they work?

7. Why is it important to stay coordinated during a stall?

8. In the event of an engine failure while in-flight, what is the first thing you should do?

9. What certificate(s) are required to be on board the aircraft prior to flight in order for the aircraft to be considered airworthy?

10. What are the indications of carburetor icing and what can a pilot expect when applying carburetor heat to alleviate or prevent ice?

11. Who controls which areas of an airport?
    a) Taxiways at a towered airport?
    b) Taxiways at an untowered airport?
    c) Runways at a towered airport?
    d) Runways at an untowered airport?
    e) Local airspace above a towered airport?
    f) Local airspace above an untowered airport?

12. What is a hold short line, what does it look like, and where is it located?

13. What actions must be performed prior to crossing any hold short lines at an airport?

14. To legally operate in the following airspaces, what equipment is needed?
    a) Class A
    b) Class B
    c) Class C
    d) Class D
    e) Class E

15. What actions are required prior to entering the following airspaces
    a) Class A
    b) Class B
    c) Class C
    d) Class D
    e) Class E

16. During a landing, when should a pilot go-around and what is the proper procedure for doing so?

17. What is the proper procedure to recover from a stall? A spin?

18. How should a pilot address an engine fire on the ground during engine start?

19. What should a pilot do if an engine failure occurs immediately after takeoff with no usable runway remaining?

20. What action(s) can be taken to cool an overheating engine while in-flight?

21. Describe detonation and pre-ignition and list possible causes of each.

22. When can a student pilot log PIC time?

23. What limitations are placed on a student pilot's operating privileges?

24. What pre-flight information/action is required before any flight?

25. What certificates and documents must a person have in his/her possession to act as pilot-in-command? Where should they be kept?

26. List the following information for your aircraft:
    a) Aircraft make and model _____
    b) Empty weight _____ Gross weight _____
    c) Total fuel _____ Useable fuel _____
    d) Oil minimum _____ Oil maximum _____

V-speed	How is it marked?	What is it?
V_{s0}		
V_{s1}		
V_r		
V_y		
V_g		
V_{fe}		
V_{no}		
V_{ne}		

27. What is the maximum demonstrated crosswind component for your aircraft and what does that mean?

28. When are you required to have the following light systems operating?
    a) Beacon?
    b) Strobes?
    c) Position lights?
    d) Landing light?

29. Describe the electrical system on your aircraft.

30. Who has the final authority in determining whether it is safe to fly?

31. What limitations will you set for yourself when solo flying?

32. How do you determine whether or not you are physically and mentally fit to fly?

Coyote Flight and Training Center

Private Pilot Ground School Course

Name: _____

_____

DOB: ____/____/_____

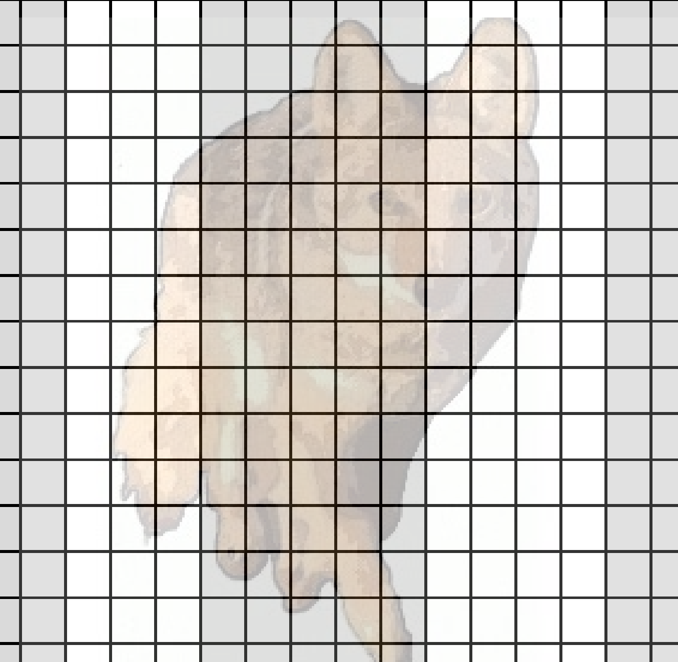
Date	Sect.	Lesson	Ground		Exam scores	Instructor Signture
	07	Introduction to flight training				
	08	Airports and operational safety				
	10	Aerodynamics, stability, and turning tendencies				
	13	Aircraft systems				
	16	Airspace				
	28	Aeronautical charts and supplements				
	18	Federal aviation regulations				
	5a	Written exam no. 1				
	21	Emergency procedures and equipment malfunctions				
	22	Performance, weight, and balance				
	23	Weather theory				
	25	Weather services				
	26	Cross country navigation and flight planning				
	27	Aeromedical factors				
	5b	Written exam no. 2				
Total time:						

Coyote Flight and Training Center

Private Pilot Flight School Course

Name: ____________________________
____

DOB: ____/____/________



						Pre-flight				Ground Ops				Takeoffs				Ground ref.			Upper air maneuvers					Basic Att. Instruction				Night Ops.		Cross country						Emer. Procs.				Approaches			Landings					Misc.				
Date	Lesson	Flight		Ground		Weather briefing for flight	Certificates and documents	Visual inspection of aircraft	Passenger & crew briefing	Engine start-up	Taxiing	Engine operations/run-up	Signs and markings	Normal takeoff	Shortfield takeoff	Softfield takeoff	Crosswind takeoff	Turns around a point	Rectangular course	S-turns along a road	Four fundamental flight mar	Slow flight including turns t	Steep turns	Approach to landing stalls	Departure stalls	Four fundamental flight mar	Compass turns	VOR Tracking	Recovery from unusual attit	Takeoffs and landings	Navigation	Flight planning	Pilotage	Dead reckoning	Radio navigation	Diversions	Lost procedures	POH boldface knowledge	Use of checklists	Emergency descents	Simulated engine outs	Flying a traffic pattern	Configuration and approach	Go-arounds	Normal landings	Shortfield landings	Softfield landigns	Crosswind landings	Forward slips to landing	Use of checklists	Radio communications	Sterile cockpit procedures	Exam scores	Instructor Signature
	Total time:																																																					

N/A - Not applicable to current lesson, VD - Verbally discussed/demonstrated, NP - Needs practice, S - Satisfactorily demonstrates maneuver w/o assistance

General	
Date:	/ /
Tail No:	
Time Off:	AM/PM

Engine	
Hobbs:	Start / End
Tach:	Start / End

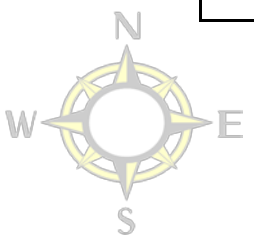
Fold here

Instructions

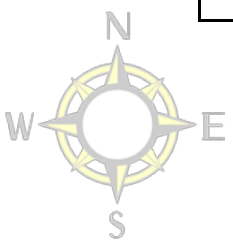
1. Draw course on a sectional chart
2. Select waypoints along the course and record true course, distance, and altitude
3. Obtain a weather breifing to determine temperature, density altitude, and winds aloft
4. Use performance tables to establish power settings and true airspeed
5. Calculate wind correction angle and ground speed
6. Calculate compass heading, leg times, and fuel burn
7. Draw diagrams of any airport(s) and recorded winds

Waypoint	True Crse	Dist (NM)	Route Altitude	Comp Hdg	Leg Est. Time	Enroute Est. Time	Enroute Act. Time	Enroute Fuel	Temp (C°)	Density Altitude	Power settings MP/RPM	Power settings TAS	Power settings GPH	Winds Aloft Dir	Winds Aloft Vel	WCATH	Var^{MH}	Dev^{CH}	G Spd (Kts)
1																			
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
	Total:					Total:		Total:											

Airport:	Elev:
	Wind
	Wx
	Appr
	Twr
	Gnd
	CTAF
	Clnc Dlv



Airport:	Elev:
	Wind
	Wx
	Appr
	Twr
	Gnd
	CTAF
	Clnc Dlv



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Airport:	Elev:
	Wind
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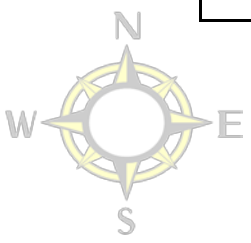
	CTAF
	Clnc Dlv



Airport:	Elev:
	Wind
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	Twr
	Gnd
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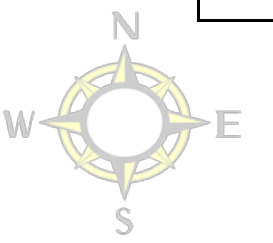

Enroute Graphical Weather Depiction

Weight and Balance

Item/Station	Weight	Arm	Moment
Total:	Total Weight	C.G.	Total Moment

C.G. = Total Moment / Total Weight

Risk Evaluation

		High risk					Low risk	
Pilot	Illness/Medications	Sick or on medication(s)			Perfect health			Illness/Medications
	Stressfull events	Stressfull event sometime in the last few days			No stressfull events noted			Stressfull events
	Alcohol	Within last 8 hours or BAC > .04%		Within 8-24 hours and BAC < .04%		None in the last 24 hours		Alcohol
	Fatigue (Hours since last rest/sleep)	more than 12	10 - 12	8 - 10	6 - 8	4 - 6	less than 4	Fatigue (Hours since last rest/sleep)
	Hours since last healthy meal	more than 4		2 - 4		less than 2		Hours since last healthy meal
Aircraft	Weight and balance	Out of limits		Near edge of limits		Well within limits		Weight and balance
	Performance data	Above limits or off the chart		Near the limits or top of the chart		Well within limits		Performance data
	Familiarity with A/C	Never flown aircraft before		< 5 flights within the pre 30 days		> 5 flights in pre 30 days		Familiarity with A/C
Environment	Ceilings (AGL)	1000 or less		1000 - 3000		3000 or greater		Ceilings (AGL)
	Visibility (statute miles)	less than 10		10 - 20		greater than 20		Visibility (statute miles)
	Significant WX	Thunderstorms		Icing		IFR conditions (need IFR cert)		Significant WX
	Terrain	Mountainous		Hilly		Flat		Terrain
Ext. Press.	Allowance for delays in arrival	less than 30 mins		30 - 60 mi ns		more than 60 mins		Allowance for delays in arrival
	Allowance for delays in departure	None		Able to stay overnight		Able to stay multiple nights		Allowance for delays in departure

This risk evaluation matrix is NOT conclusive and cannot replace the use of good personal judgement. ***Red indicates EXTREMELY HIGH risk/no fly scenarios.***

Certificate of Enrollment

Part 141 - Private Pilot Flight School Course

This is to acknowledge that

_____

Student name

Has enrolled in the Private Pilot Flight School training program.

conducted by

Coyote Flight and Training Centers 5YTS307L

_____ _____

Chief Flight Instructor *Date*

"Aviation omnius"

Rick Husband Amarillo International Airport 11001 Baker Street Amarillo, Texas 79111
Office (806)335-9763 Fax (806)335-9221

Graduation Certificate

Part 141 Private Pilot Flight Training Course
This is to certify that

_____

Student name

Has satisfactorily completed each required stage of the approved course of training, including tests for those stages, and he has received _____ hours of cross country training.

He/she has graduated from the Federal Aviation Administration approved Private Pilot Rating Certification course, conducted by

Coyote Flight and Training Centers 5YTS307L

_____ _____

Chief Flight Instructor *Date*

"Aviation omnius"

Rick Husband Amarillo International Airport 11001 Baker Street Amarillo, Texas 79111
Office (806)335-9763 Fax (806)335-9221

Certificate of Enrollment

Part 141 - Private Pilot Ground School Course

This is to acknowledge that

_____

Student name

Has enrolled in the Private Pilot Ground School training program.

conducted by

Coyote Flight and Training Centers 5YTS307L

_____ _____

Chief Flight Instructor *Date*

"Aviation omnius"

Rick Husband Amarillo International Airport 11001 Baker Street Amarillo, Texas 79111
Office (806)335-9763 Fax (806)335-9221

Graduation Certificate

Part 141 Private Pilot Ground School Course
This is to certify that

_____

Student name

Has satisfactorily completed each required stage of the approved course of training, including tests for those stages.

He/she has graduated from the Federal Aviation Administration approved Private Pilot Ground School course, conducted by

Coyote Flight and Training Centers 5YTS307L

_____ _____

Chief Flight Instructor *Date*

"Aviation omnius"

Rick Husband Amarillo International Airport 11001 Baker Street Amarillo, Texas 79111
Office (806)335-9763 Fax (806)335-9221

Introduction to Flight Training

Objective	Prepare the student for flight training and teach the student to have confidence in the aircraft's stability.
Prerequisites	• None
Approx. Time	**Ground:** 2.0 **Flight:** 1.0
Materials	☐ Pilot's Handbook of Aeronautical Knowledge (PHAK) ☐ Computer with Internet ☐ Airplane ☐ Pilot's Logbook ☐ Student's driver's license and birth certificate
Ground Work	☐ Personal well-being o Personal well-being is important to the safe outcome of the flight o IM SAFE (Illness, medication, stress, alcohol, food, exhaustion) ☐ Pre-flight inspection (Airworthiness and safety) o An aircraft is considered airworthy if it is both safe to fly and is in compliance with FAA regulations o Checklists are intended to reduce mistakes by creating a list of items that need to be accomplished in order to ensure the aircraft and its operations are conducted in a safe manner. o All aircraft are required to have the following items on board in order to be airworthy (ARROW): ▪ Airworthiness certificate (Original as issued from the FAA) ▪ Registration certificate (Must be original, and must not have expired) ▪ Radio operators license (N/A within the United States) ▪ Operating limitations (Includes Operating Handbook, Flight Manual Supplements, placards, etc.) ▪ Weight and balance (of the aircraft as done by the mechanic) o Some things to look for when inspecting the airframe: ▪ Cracks around rivets, along hinges, or in the skin of the aircraft ▪ Loose rivets, bolts, or screws ▪ Wrinkles in the skin of the aircraft (aka oil canning) ▪ Leaking fluids such as avgas, hydraulic fluid, or oil ▪ Low or poorly inflated tires or oleo struts ▪ Nicks in the propeller ▪ Anything that would affect the structural integrity of the airframe ☐ Radio calls (ref. PHAK 14-22 thru 14-23) o Most people are worried about saying the wrong things on the radio o Pilots should focus on flying the airplane first and responding to the radio as the workload permits o Tuning the radio ▪ Most radios have an "active" frequency and a "standby" frequency • Use the little knob to tune in the numbers to the right side of the decimal • Use the big knob to tune in the numbers to the left side of the decimal • Press the white button with the arrows (flip-flop button) to switch the active frequency

	o Characteristics of a good radio call ▪ A good radio call communicates 'intent' in as few words as possible ▪ A good radio call contains the following elements • Who – Who you are talking to and who you are • Where – Where you are • What – What you want to do o Example of a good radio call: *"Amarillo ground, Cherokee niner three five one Juliet with Whiskey at Coyote. I would like to go to the south-east practice area, and I am ready to taxi."* o Making the radio call ▪ Think about what to say before making the call ▪ Depress the transmit button and hold it down ▪ Make the radio call ▪ Release the transmit button ☐ Taxiing and braking o Driving the aircraft across the ground is called taxiing o Turns are accomplished through use of the rudder pedals o The bottom of the pedal turns the rudder and/or the nose wheel o The top of the pedal activates the brake on that side of the aircraft o The brakes on either side of the aircraft are independent of each other and can be used to assist with turning o One hand should be on the yoke to prevent wind from moving the control surfaces o The other hand should be on the throttle o Taxi speed should be no faster than a fast walk or a slow jog (approx 12Kts max) ☐ Engine run-up o Should be considered part of the pre-flight inspection o Mixture should be leaned for density altitude in order to provide maximum power for takeoff unless otherwise stated in the POH.
Tasks	☐ Administrative o Verify student's citizenship for TSA (copies of driver's license and birth certificate) o Create an account with iacra.faa.gov and apply for student pilot's certificate o Create an account with medxpress.faa.gov, apply for 3rd class medical, and set-up medical appointment o Create an account with www.faasafety.gov o Create a scheduling account for dispatch o Dispatch the aircraft out and check for squawks ☐ Review aeronautical knowledge ☐ Pre-flight o Check personal well-being with IM SAFE o Check local weather and learn to read a METAR and TAF o Discuss the difference between VFR and IFR o Discuss the anatomy of an airplane (Nose, fuselage, wings, empennage, and control surfaces/controls) o Student is introduced to the concept of a checklist and conducts a pre-flight inspection under the direction of the instructor

	o Instructor explains concept of taxiing and takeoff In-flight o Student performs aircraft start-up, taxi, and take-off under the direction of the instructor o Instructor teaches turns and straight/level flight using the nose as a reference, while directing the student to fly to the practice area o Instructor should demonstrate the following at or above 2500ft AGL: ▪ Aircraft should be trimmed straight and level and then flown hands off to demonstrate stability in level flight ▪ Instructor should perform a steep turn to demonstrate stability in turning flight ▪ Instructor should perform a power-off stall to demonstrate stability at slower airspeeds ▪ Induce the student to experience mild spatial disorientation • have the student close his/her eyes • roll the airplane gently into a 30° left bank followed by a 45° right bank • roll the airplane back to 30° right bank • student should feel as if the airplane is in a left-hand turn • explain to student that this is what happens in the clouds without the proper training o Student flies airplane back to base o Upon returning to the airport, instructor performs a simulated engine out to a full stop on the runway o Student performs after-landing checklist, after exiting runway and aircraft is stopped o Student taxis back to hangar o Student performs aircraft shut down Post-flight o Securing aircraft (chocks, tie-downs, or inside hangar as appropriate) o Dispatch the aircraft back in o Discuss stability of the aircraft o Discuss students observations and actions during the flight Student fills out logbook and instructor signs
Notes	None
Completion	The lesson is considered complete when the student has accomplished the tasks set forth in the lesson plan. Student must also demonstrate a basic understanding of the flight controls, parts of an aircraft, and stability of an aircraft while in-flight. Student must understand the difference between VFR and IFR flight.

Airports, operational safety, and decision making

Objective	Introduce the student to decision making procedures in the aviation environment.			
Pre-requisites	• N/A			
Approx. Time	**Ground:**	2.0	**Flight:**	N/A
Materials	☐ Pilot's Handbook of Aeronautical Knowledge FAA-H-8083-25B (PHAK) ☐ Video: Runway Incursion at Francis Green			
Ground work	☐ Federal Aviation Regulation 91.3 – The pilot in command is the ultimate authority and the sole responsibility for the safe outcome of the flight. In the event of an emergency the pilot in command may deviate from any rule in this part to the extent necessary to ensure the safe outcome of the flight. ☐ Airport operations .....PHAK 14-1 o Airport types .....PHAK 14-2 ▪ Towered ▪ Un-towered o Sources for airport information .....PHAK 14-3 ▪ Aeronautical charts ▪ Chart supplement U.S. (AFD) ▪ Notices to airmen (NOTAMs) ▪ Automated terminal information systems o Runway markings and signs .....PHAK 14-5 thru 14-11 ▪ Runway designation markings ▪ Runway safety area ▪ Runway holding position sign ▪ Runway holding position marking ▪ Runway distance remaining signs ▪ Relocated runway threshold ▪ Displaced threshold ▪ Land and hold short operations (LAHSO) o Taxiway markings and signs .....PHAK 14-11 thru 14-16 ▪ Direction signs (A yellow array points the way) ▪ Location signs (A black square you're there) ▪ Holding position signs and markings ▪ Non-movement line ▪ Enhanced taxiway centerline ▪ ILS critical areas ▪ Closed runways and taxiways (temporarily/permanently) o Airport lighting .....PHAK 14-16 ▪ Airport beacon ▪ Taxiway lights ▪ Runway lights ▪ Visual glideslope indicators ▪ Obstruction lights ▪ Runway guard lights ▪ Stop bar lights ▪ Runway end identifier lights (REIL) o Control of airport lighting .....PHAK 14-18			

- Wind direction indicators .....PHAK 14-20
- Wake turbulence .....PHAK 14-26
  - Generation
  - Behavior
  - Avoidance
- Collision avoidance
  - Clearing procedures
  - Pilot deviations (PDs)
  - Runway incursion
  - Runway confusion

- Aeronautical Decision Making.....PHAK 2-1
  - Introduction.....PHAK 2-1
  - History of ADM .....PHAK 2-2
  - Risk management .....PHAK 2-3
  - Crew resource management and Single pilot resource management ..PHAK 2-4
  - Hazard and risk .....PHAK 2-4
    - Hazardous attitudes and antidotes .....PHAK 2-5
    - Risk .....PHAK 2-6
      - Assessing risk
        - Likelihood of an event
          - Probable – an event will occur several times
          - Occasional – an event will probably occur some time
          - Remote – an event is unlikely to occur but is possible
          - Improbable – an event is highly unlikely to occur
        - Severity of an event
          - Catastrophic – results in fatalities, total loss
          - Critical – severe injury, major damage
          - Marginal – minor injury, minor damage
          - Negligible – less than minor injury or damage
      - Mitigating risk
        - Wait for the weather to improve
        - Take an instrument rated pilot
        - Delay or cancel the flight
        - Drive
    - The PAVE checklist .....PHAK 2-8
      - P = pilot
      - A = aircraft
      - V = environment
      - E = external pressures
    - Human factors .....PHAK 2-10
      - Human behavior .....PHAK 2-11
    - Decision making processes .....PHAK 2-12
      - Single pilot resource management .....PHAK 2-13
      - The 5 P's .....PHAK 2-14
        - Plan
        - Plane
        - Pilot
        - Passengers

	o Programming • 3P Model .....PHAK 2-15 • CARE Checklist .....PHAK 2-16 • DECIDE Model .....PHAK 2-18 ▪ Decision making in a dynamic environment .....PHAK 2-21 • Automatic decision making .....PHAK 2-21 • Operational pitfalls .....PHAK 2-21 ▪ Stress management .....PHAK 2-21 ▪ Use of resources .....PHAK 2-21 ▪ Situational awareness .....PHAK 2-24 • Obstacles to maintaining situational awareness • Workload management • Managing risks ▪ Automation .....PHAK 2-25 • Results of the study .....PHAK 2-27 • Equipment use .....PHAK 2-27 o Autopilot systems o Familiarity o Respect for onboard systems o Getting beyond rote workmanship o Understanding the platform • Managing aircraft automation .....PHAK 2-29 • Enhanced situational awareness .....PHAK 2-30 • Risk management .....PHAK 2-31
Tasks	☐ Review the aeronautical knowledge ☐ Watch and discuss Video: Runway incursion at Francis Green
Notes	• Student should be able to differentiate between the areas of an airport (apron/ramp, taxiways, and runways) and be able to find their assigned radio frequencies. • Student should understand that there many decision making process models, and he/she needs to incorporate the one that is most useful for their type of flying. • Student should understand that LAHSO operations are NOT permitted for students nor are they mandatory for certificated pilots. • Emphasis should be put on using either the PAVE or the APE model prior to each flight o PAVE ▪ P = pilot • IM SAFE • Hazardous attitudes ▪ A = aircraft • Can the aircraft perform the mission? • Can I proficiently operate the aircraft and all of its onboard equipment? • Is the aircraft legal and airworthy? ▪ V = enVironment • Is the weather along and around the route of flight safe? And will it remain safe for my return trip? • What am I flying over? Am I prepared to survive in the case of an unscheduled landing?

	▪ E = external pressures • Why am I going? • Am I prepared to spend the night in case of delays? • Get 'er duns, Get-home-itis, etc. • Did I bring grandma's medications? o APE (Avoid the big APE) ▪ A = aircraft • Can the aircraft perform the mission? • Can I proficiently operate the aircraft and all of its onboard equipment? • Is the aircraft legal and airworthy? ▪ P = pilot • IM SAFE • Hazardous attitudes • External pressures o Why am I going? o Am I prepared to spend the night in case of delays? o Get 'er duns, Get-home-itis, etc. o Did I bring grandma's medications? ▪ E = environment • Is the weather along and around the route of flight safe? And will it remain safe for my return trip? • What am I flying over? Am I prepared to survive in the case of an unscheduled landing?
Completion	The lesson is considered complete when the student passes the stage 1 written exam (E01 I.R.) or the FAA Private Pilot Airplane Knowledge Exam with a minimum passing grade of 70%

Four Fundamental Flight Maneuvers

Objective	Teach the student the basics of controlling the aircraft via visual reference to the nose, throughout the regimes of flight			
Pre-requisites	• F01. Introduction to flight training			
Approx. Time	**Ground:**	0.5	**Flight:**	1.0
Materials	□ Model aircraft □ Airplane			

Ground work

1. Attitude control (the position of the aircraft in relation to horizontal)
    a. Yoke
        i. Pitch
            1. Rotation about the lateral axis of the airplane
            2. Raising the nose slows the aircraft down, lowering the nose makes it speed up
        ii. Roll
            1. Rotation about the longitudinal axis of the aircraft
            2. Wings generate lift which has a horizontal component and a vertical component. As the wings roll to either side, the vertical component decreases while the horizontal component increases and pulls the aircraft in the direction of the turn
                a. In a turn the outer wing moves faster than the inner wing resulting in more lift from the outer wing. This creates an overbanking tendency.
                b. In a turn the outer wing moves faster than the inner wing resulting in more drag on the outer wing. This creates an adverse yawing effect which is controlled by the rudder.
    b. Rudder
        i. Yaw
            1. Rotation about the vertical axis of the airplane
            2. Rudder is used to pull the nose back in line with the turn
2. Climbs
    a. Add power and raise the nose to just below the horizon
    b. Apply right rudder to counter the left hand turning tendencies created by the propeller
    c. To level off after the climb
        i. Lower the nose
        ii. Trim for level flight
        iii. Decrease power after airspeed has increased
3. Straight and level
    a. Pick a point ahead, about halfway between the aircraft and the horizon
    b. Fly to the point
    c. Monitor the ground in order to correct for wind (crab if necessary)
4. Descents
    a. Decrease power
    b. Lower and raise the nose to control airspeed during the descent
    c. To level off after the descent
        i. Lead the level off by about 10% of the descent rate
        ii. Add power and return the nose to level
        iii. Trim if necessary

	5. Turns a. Step on the appropriate rudder and simultaneously roll into the turn b. Exit the bank by reversing the previous procedure c. 30° of bank is considered a standard angle for most VFR turns
Tasks	☐ Complete the ground lesson ☐ In-flight o Climbs o Turns o Straight-and-level o Descents
Notes	• All descent will be made by reducing throttle, without the use of flaps • Emphasis should be placed on o Watching the nose while making only occasional glances at the instruments o Pitching for airspeed, adjusting power for altitude o Proper use of rudder
Completion	The lesson is considered complete when the student can successfully complete each of the four fundamental flight maneuvers without help from the instructor. Student should be able to hold altitude within 100 feet and heading within 10° with only occasional deviations.

Aerodynamics, stability, and turning tendencies

Objective	To help the student understand the forces that act upon an aircraft in-flight so that he/she may better control them.
Pre-requisites	• None
Approx. Time	**Ground:** 4.0 **Flight:** N/A
Materials	☐ Pilot's Handbook of Aeronautical Knowledge FAA-H-8083-25B (PHAK) ☐ Model aircraft
Ground work	☐ The four forces acting on an aircraft ..... PHAK 5-1 o Weight ..... PHAK 5-1 o Lift ..... PHAK 5-3 ▪ Theories in the production of lift ..... PHAK 4-5 • Newton's law (creating lift thru angle of attack) • Bernoulli's law (creating lift thru camber) ▪ Airfoil design ..... PHAK 4-6 • Airfoil cross section ..... PHAK 4-7 fig. 4-5 o Chord line o Camber o Leading edge o Trailing edge • Pressure distribution ..... PHAK 4-7 o Low pressure above (Bernoulli's law) o High pressure below (Newton's law) o Thrust ..... PHAK 5-2 o Drag ..... PHAK 5-6 ▪ Parasite drag ▪ Induced drag ▪ Lift/drag ratio (L/D_{Max}) ☐ Wingtip Vortices ..... PHAK 5-8 o Formation o Avoiding wake turbulence ☐ Ground effect ..... PHAK 5-11 ☐ Axes of an aircraft ..... PHAK 5-12 o Roll about the longitudinal o Pitch about the lateral o Yaw about the vertical ☐ Aircraft design characteristics ..... PHAK 5-14 o Stability ..... PHAK 5-14 ▪ Static vs. Dynamic ▪ Longitudinal ▪ Lateral • Dihedral • Sweepback and wing location • Keel effect and weight distribution ▪ Directional ▪ Free directional oscillations (Dutch roll) ▪ Spiral

- Effect of wing planform ..... PHAK 5-20
  - Aspect ratio
  - Wing designs
- Aerodynamic forces in flight maneuvers ..... PHAK 5-22
  - Forces in turns ..... PHAK 5-22
    - Components of lift
    - Adverse yaw
    - Overbanking tendency
  - Forces in climbs ..... PHAK 5-23
    - Climb entry
    - Thrust vs. drag in a climb
  - Forces in descents ..... PHAK 5-24
- Stalls and spins ..... PHAK 5-25
- Angle of attack indicators ..... PHAK 5-26
- Basic propeller principles (Left hand turning tendencies) ..... PHAK 5-28
  - Torque
  - Corkscrew effect (spiraling slipstream)
  - Gyroscopic action
  - Asymmetric loading (P-factor)
- Load factors ..... PHAK 5-33
  - In aircraft design
  - In steep turns
  - Effect on stalling speed
  - Flight maneuvers
  - Rough air and maneuvering speed (V_A)
  - V_g diagram
  - Rate of turn
- Flight controls ..... PHAK 6-1
  - Flight control systems ..... PHAK 6-2
    - Primary flight controls
      - Ailerons ..... PHAK 6-3
        - Purpose
        - Adverse yaw
        - Differential ailerons
        - Frise type ailerons
        - Coupled ailerons and rudder
        - Flaperons
      - Elevator ..... PHAK 6-5
        - Purpose
        - T-tail
        - Stabilator
        - Canard
      - Rudder ..... PHAK 6-8
        - Purpose
        - V-tail (rudder-vator)
    - Secondary flight controls
      - Flaps and types of flaps ..... PHAK 6-8, PHAK 3-6
      - Leading edge devices (slots) ..... PHAK 6-9

	• Spoilers..... PHAK 6-10 • Trim systems..... PHAK 6-10 o Trim tabs o Balance tabs o Servo tabs o Anti-servo tabs o Ground adjustable tabs o Autopilots
Tasks	□ Review aeronautical knowledge
Notes	• N/A
Completion	The lesson is considered complete when the student passes the stage 1 written exam (E01 I.R.) or the FAA Private Pilot Airplane Knowledge Exam with a minimum passing grade of 70%

Combined Fundamental Flight Maneuvers

Objective	Teach the student the basics of configuring the aircraft for different drag configurations while flying via visual reference to the nose.
Pre-requisites	• F01. Introduction to flight training • F02. Four fundamental flight maneuvers
Approx. Time	**Ground:** 0.5 **Flight:** 1.0
Materials	☐ Model aircraft ☐ Airplane flying handbook
Ground work	1. Slips a. Cross controlling the airplane changes the effective profile of the aircraft and causes an increase in drag b. Can be used during a descent to steepen the descent c. Can be used during landings to fight crosswinds d. Airspeed should be monitored as a cross controlled stall should be avoided e. Some aircraft should avoid slipping when the flaps are deployed 2. Flaps a. Change the curvature of the wing i. Increase lift at lower airspeeds ii. Increase drag to help slow down b. Usage i. Do not deploy outside of the white arc ii. The first 20° of flaps provides mainly lift iii. After about 20° the flaps provide mainly drag 3. Minimum controllable airspeed (slow flight) a. High RPM's produce stronger left hand turning tendencies, while low airspeed requires more right rudder to over come them b. Low airspeed and high drag configurations can put the aircraft behind the power/drag curve resulting in an inability to accelerate
Tasks	☐ Complete the ground lesson ☐ In-flight o Practice climbing and descending turns o Practice slipping during level flight and during descents o Practice straight and level flight at minimum controllable airspeed (slow flight) ▪ Start at cruise and decrease speed in 10 knot increments as allowable by operating limitations ▪ Practice controlling airspeed both with and without flaps ▪ Practice turning with full flaps at minimum controllable airspeed (slow flight) o Practice descending with and without flaps
Notes	• Descents and descending turns will be made in various drag configurations • Flaps may not be deployed outside of white arc • Student should understand the relationship between thrust and drag, and recognize that high drag configurations may create a situation where the thrust cannot overcome the drag of the aircraft • Emphasis should be placed on o Transitioning between various flap configurations while maintaining controlof the

	airplane o Watching the nose while making only occasional glances at the instruments o Pitching for airspeed, adjusting power for altitude o Proper use of rudder
Completion	The lesson is considered complete when the student can successfully control the aircraft's speed and attitude while configuring and reconfiguring the aircraft without help from the instructor. Student should be able to consistently hold altitude within 100 feet and heading within 10°.

Ground Reference Maneuvers

Objective	Teach the student the effects of wind on the aircraft as it maneuvers over the ground in preparation for traffic pattern work.			
Pre-requisites	• F01. Introduction to flight training • F02. Four fundamental flight maneuvers • F03. Combined fundamental flight maneuvers			
Approx. Time	**Ground:**	0.5	**Flight:**	2.0
Materials	☐ Model aircraft ☐ Airplane flying handbook			

Ground work

1. Ground reference maneuvers are designed to prepare a student for maneuvering under the effects of wind
2. Two methods of dealing with wind
3. Crabbing
    a. Pointing the nose into the wind allows some of the thrust to counteract the wind and fly in a straight line towards the intended point
4. Banking and slipping
    a. Lowering the upwind wing allows the lift generated by the wings to oppose the force of the wind
    b. Applying opposite rudder in a bank results in a slip which can be used to align the aircraft with a runway
5. Each maneuver should be prefaced with:
    a. Configuring the aircraft (ABC GUMP – Autopilot, Boost pumps, Cowl flaps, Gas, Undercarriage, Mixture, Power/Prop)
    b. Executing a clearing turn to a downwind heading
        i. Purpose is to check the surrounding area for other aircraft and obstacles
        ii. Should consist of two 90° turns, one 180° turn, or any combination of turns necessary to ensure collision avoidance
6. Turns around a point
    a. Configure the aircraft and execute a clearing turn to a downwind heading
    b. Choose a point ahead and to the left
    c. Entry should be made abeam the chosen point
    d. When flying a circle around a point, wind will effect an aircraft in two ways
        i. On the downwind side the wind will blow the aircraft away from the point requiring a steeper angle of bank
        ii. On the upwind side the wind will blow the aircraft towards the point requiring shallower angle of bank
    e. Circle the point twice and then exit on a downwind heading
7. Rectangular course
    a. Configure the aircraft and execute a clearing turn to a downwind heading
    b. Rectangular course has four legs – Downwind, Base, Upwind, and Crosswind
    c. Entry and exit should be made into and out of the downwind leg at a 45° angle
    d. Use crabbing to maintain the appropriate distance from each leg of the rectangular course
8. S-turns across a road
    a. Configure the aircraft and execute a clearing turn to a downwind heading
    b. Select a road perpendicular the current heading

	c. Entry and exit should be made on a downwind heading d. Appropriate amounts of bank should be used on the upwind and downwind side of the road to ensure that both sides of the 'S' are similar in size
Tasks	☐ Complete the ground lesson ☐ In-flight o Practice turns around a point o Practice rectangular course o Practice S-turns across a road
Notes	• All maneuvers should begin with configuring the airplane (ABC GUMP), followed by a clearing turn to a downwind heading • Student by now should be able to operate the airplane and instructor should introduce the radio • Emphasis should be placed on o Watching the nose while making only occasional glances at the instruments o Pitching for airspeed, adjusting power for altitude o Proper use of rudder
Completion	The lesson is considered complete when the student can successfully preform each ground reference maneuver without help from the instructor. Student should be able to consistently hold altitude within 100 feet and heading within 10°.

Aircraft systems

Objective	Give the student the knowledge necessary to understand the systems he/she will be operating, and assist with diagnosing and troubleshooting unforeseen, in-air emergencies.
Pre-requisites	• All previous lessons
Approx. Time	**Ground:** 4.0 **Flight:** N/A
Materials	☐ Pilot's Handbook of Aeronautical Knowledge (FAA-H-8083-25B) (PHAK)
Aeronautical knowledge	Aircraft construction ☐ Design certification and airworthiness ..... PHAK 3-1 ☐ Major components ..... PHAK 3-2 o Fuselage o Wings o Empennage o Landing gear o Powerplant ☐ Subcomponents ..... PHAK 3-8 o Airframe o Electrical system o Flight controls o Etc. ☐ Types of aircraft construction ..... PHAK 3-8 o Truss structure o Monocoque and semimonocoque (metal) o Composite construction ▪ Advantages and disadvantages ▪ Fluid spills ▪ Lightning strike protection ☐ Aircraft Systems ☐ Powerplant o Reciprocating engines ..... PHAK 7-1 o Propeller ..... PHAK 7-4 ▪ Fixed pitch ▪ Adjustable pitch ▪ Propeller overspeed o Induction systems ..... PHAK 7-7 o Carburetor systems ..... PHAK 7-8 ▪ Mixture control ▪ Carburetor icing ▪ Carburetor heat ▪ Carburetor air temperature gauge o Outside air temperature gauge ..... PHAK 7-11 o Fuel injection system ..... PHAK 7-11 ☐ Super chargers and turbochargers ..... PHAK 7-12 o System operation o High altitude performance ☐ Ignition system ..... PHAK 7-15 ☐ Oil system ..... PHAK 7-16 ☐ Engine cooling systems ..... PHAK 7-17

- ☐ Exhaust system ..... PHAK 7-18
- ☐ Starting system ..... PHAK 7-18
- ☐ Combustion ..... PHAK 7-18
- ☐ Full authority digital engine control (FADEC) ..... PHAK 7-20
- ☐ Turbine engines ..... PHAK 7-20
  - o Types of turbine engines ..... PHAK 7-20
  - o Turbine engine instruments ..... PHAK 7-22
  - o Turbine engine operational considerations ..... PHAK 7-23
  - o Performance comparison of turbine engines ..... PHAK 7-24
- ☐ Airframe systems ..... PHAK 7-25
- ☐ Fuel systems ..... PHAK 7-25
  - o Gravity feed system
  - o Fuel pump system (engine driven/electric boost pump)
  - o Fuel primer
  - o Fuel tanks
  - o Fuel gauges
  - o Fuel selectors
  - o Fuel strainers, sumps, and drains
  - o Fuel grades
  - o Fuel contamination
  - o Fuel system icing
- ☐ Refueling procedures ..... PHAK 7-29
- ☐ Heating system ..... PHAK 7-29
  - o Fuel fired heaters
  - o Exhaust heating systems
  - o Combustion heater systems
  - o Bleed air heating systems
- ☐ Electrical system ..... PHAK 7-30
- ☐ Hydraulic systems ..... PHAK 7-31
  - o Landing gear
    - ▪ Tricycle vs. tailwheel
    - ▪ Fixed vs. retractable
  - o Brakes
- ☐ Pressurized aircraft ..... PHAK 7-34
- ☐ Oxygen systems ..... PHAK 7-37
  - o Oxygen masks
  - o Cannulas
  - o Pressure demand systems
  - o Continuous flow systems
  - o Electrical pulse demand systems
  - o Pulse oximeters
  - o Servicing of oxygen systems
- ☐ Anti-ice and de-ice systems ..... PHAK 7-40
  - o Airfoil anti-ice and de-ice
  - o Wind screen anti-ice
  - o Propeller anti-ice
  - o Other anti-ice

Tasks	☐ Review the aeronautical knowledge
Notes	• Student should be aware that the ignition system and the electrical system of most aircraft are two separate systems and that the engine will continue to run in the event of an alternator failure.
Completion	The lesson is considered complete when the student passes the stage 1 written exam (E01 I.R.) or the FAA Private Pilot Airplane Knowledge Exam with a minimum passing grade of 70%

Basic Attitude Instruction Pt. I

Objective	Teach the student to control the airplane without reference to either the horizon or the ground.			
Pre-requisites	• F01. Introduction to flight training • F02. Four fundamental flight maneuvers			
Approx. Time	**Ground:**	0.5	**Flight:**	1.5
Materials	Model aircraft			
Ground work	The human body uses three systems to maintain its balance o Somatogravic – knowing where down is due to feeling the effects of gravity on the body o Somatogyral – fluid in the semicircular canals responds to changes in motion o Ocular – our sense of sight overrides sensations from the other two systems If the ocular system is removed, we become subject to certain illusions which cause spatial disorientation o In the presence of an imperceptibly slow change in motion, such as a roll at a rate of less than approximately 2° per second, a change in aircraft attitude will not be felt o After sustained acceleration/motion in any one direction (10 to 20 seconds), it may be perceived that the acceleration/motion has stopped o When sensory stimulation from the angular motion of the head and of the aircraft occur simultaneously in two different planes - for example looking up to an overhead panel whilst the aircraft is also in angular motion Inadvertent entry into IMC o 76% of inadvertent VFR into IMC results in fatalities. Maintaining control of the aircraft for the first 60 seconds dramatically increases the likelihood of survival o Initial reaction of the pilot upon inadvertently entering the clouds is one of surprise which causes a momentary lapse in aircraft control o Initial reaction should instead be to focus immediately on the aircraft instruments and begin scanning them before the aircraft can change its attitude o If an auto pilot is available, activate it and use it while IMC. o Once the aircraft is under control exit the IMC as quickly as is reasonably possible ▪ Notify ATC of the situation and ask for vectors ▪ Make a note of the heading and initiate 180° turn ▪ Climb or descend Scanning and cross checking instruments o The six primary flight instruments operate off of three separate power sources ▪ The pitot/static system powers the airspeed indicator, altimeter, and vertical speed indicator ▪ The vacuum system powers the attitude indicator and the heading indicator ▪ Electricity powers the turn coordinator o Bank is denoted through the attitude indicator, heading indicator, turn coordinator, and magnetic compass o Pitch is denoted through the airspeed indicator, attitude indicator, altimeter, and VSI possibly the altimeter o Power is denoted through the airspeed indicator, M.P., and tachometer Tips and limitations o The VSI lags by about 2-3 seconds, so avoid chasing it o The turn coordinator shows a standard rate (3° per sec) turn when the wings are at the			

	either of the lower tick marks o The magnetic compass is susceptible to errors and is only accurate during straight and level un-accelerated flight ▪ ODVD – oscillation, deviation, variation, dip ▪ ANDS – accelerate north, decelerate south ▪ UNOS – undershoot north, overshoot south □ Unusual attitudes can develop if the pilot falls victim to spatial disorientation o Nose low ▪ Reduce power ▪ Level the wings ▪ Raise the nose ▪ Set power as appropriate o Nose high ▪ Apply full power ▪ Lower the nose ▪ Level the wings ▪ Set power as appropriate
Tasks	□ Review the ground knowledge □ Practice the four fundamental flight maneuvers in either the simulator or in the aircraft with foggles □ Practice making turns at standard rate, with 30° of bank, and with 45° of bank □ Practice recovery from unusual attitudes
Notes	• This lesson may be accomplished either in an aircraft or in a certificated aviation training device or device of equal or greater abilities • Emphasis should be placed on avoiding IMC. Private pilots are not trained to operate under IFR and good decision making should prevent inadvertent IMC prior to takeoff • All turns should be standard rate unless the instructor specifies otherwise • If lesson is conducted in an aircraft, instructor should avoid the temptation to place the student in extreme unusual attitudes where bank angle exceeds 45° and pitch exceeds 15°
Completion	The lesson is considered complete when the student can successfully complete each of the four fundamental flight maneuvers and recover from unusual attitudes while under simulated instrument conditions.

Basic Attitude Instruction Pt. II

Objective	Teach the student to control the airplane without reference to either the horizon or the ground.			
Pre-requisites	• F01. Introduction to flight training • F02. Four fundamental flight maneuvers • B01. Basic Attitude Instruction Pt. I			
Approx. Time	**Ground:**	0.5	**Flight:**	1.5
Materials	☐ Model aircraft ☐ Airplane			
Ground work	☐ Unusual attitudes o Unusual attitudes can occur when the pilot fails to maintain control of the aircraft o Recovery from unusual attitudes requires the pilot to trust the instruments over his/her feelings ▪ Nose high attitude • Apply full power • Lower the nose • Level the wings ▪ Nose low attitude • Reduce power • Level the wings • Raise the nose ▪ After recovering from an unusual attitude reset the power and trim for regular flight ☐ Vacuum failure o If the vacuum system fails, the attitude indicator and the heading indicator will fail to operate correctly o Turning to a heading without a heading indicator ▪ Timed turns may be accomplished by using standard rate turns ▪ Compass turns • Magnetic dip causes the compass to have a lead/lag error depending on whether the turn is to a northerly or southerly heading • The amount of error is 0° when the aircraft is on an easterly or westerly heading and maximizes to an amount approximately equal to the aircraft's latitude when turning past a northerly or southerly heading o Maintaining level flight without an attitude indicator ▪ Pitch can be determined by watching both the airspeed indicator and the attitude indicator ▪ Avoid relying on the vertical speed indicator as it lags behind by approximately 3° ▪ Make small corrections in pitch and then wait for a few seconds before making any other corrections to avoid over correcting ☐ Very high frequency omnidirectional radio beacons (VOR) o Ground based radio transmitter o Emits a modulated radio wave that can be received and interpreted as a radial emanating directly from the station o Operate off line of sight, higher altitudes give better reception			

	o Operates between 108.0 MHz and 117.95 MHz ▪ Type T stations transmit up to 25NM ▪ Type L stations transmit up to 40 NM ▪ Type H stations transmit up to 40 NM below 14,500 feet, and up to 130NM at higher altitudes o Tracking a VOR ▪ Select the VOR ▪ Tune in the frequency on the NAV radio ▪ Identify the signal ▪ Move the OBS until the needle is centered and a TO or FROM indication is received • If you want to track to the station utilize a "TO" indication • If you want to track away from a station utilize the "FROM" indication ▪ Bracketing the course • Once the needle is centered, turn the nose of the aircraft to parallel the selected course • NOTE: Reverse sensing can occur if the nose of the aircraft is more than 90° out from the OBS • If the needle moves away from center, turn the aircraft nose towards the needle and hold that heading until the needle re-centers itself. Do NOT turn more than 90°. • When the needle re-centers turn the nose of the aircraft to match the desired course. If necessary correct for wind. ▪ Station passage • The closer the aircraft is to the station, the more sensitive the needle becomes, avoid chasing the needle at this time • As the aircraft passes over the station, the needle may deflect fully while the TO/FROM indication may not be available. • After station passage the OBS indications will return. If the aircraft is off course, turn slightly to re-intercept the desired radial
Tasks	☐ Review the ground knowledge ☐ Practice recovery from unusual attitudes ☐ Practice timed turns ☐ Practice compass turns ☐ Practice tracking both to and from a VOR
Notes	• This lesson may be accomplished either in an aircraft or in a certificated aviation training device or device of equal or greater abilities • Lesson should NOT be considered a failure if student has problems with pitch control during partial panel basic attitude instruction, however partial panel pitch control should be addressed for safety purposes
Completion	The lesson is considered complete when the student can successfully track to and from a VOR, pass over a VOR station while tracking, recover from unusual attitudes, and successfully turn to a heading without the use of a heading indicator.

Airport Traffic Pattern and Stabilized Approach (flight)

Objective	Teach the student the configuration and importance of a traffic pattern. Teach the student how to fly to and a different airport and enter a traffic pattern. Teach the student how to fly a stabilized approach. If possible, the lesson should be completed at different airports.			
Pre-requisites	• F01. Introduction to flight training • F02. Four fundamental flight maneuvers • F03. Combined fundamental flight maneuvers • F05. Airport traffic patterns and a stabilized approach (ground)			
Approx. Time	**Ground:**	0.5	**Flight:**	2.0
Materials	☐ Model aircraft ☐ Airplane flying handbook			
Ground work	1. Traffic pattern entry a. Controlled fields i. Weather/Airport information should be obtained prior to making contact with ATC ii. Contact should be made with ATC at least 20NM away iii. ATC directs entry and exits b. Uncontrolled fields i. If possible Weather/Airport information should be obtained at least 20NM prior to reaching the airport ii. Pilots announce their position and intent prior to entry iii. Entry should be at a 45° angle into the downwind leg iv. If it is necessary to overfly the field 1. Do so at least 500' above traffic pattern altitude 2. DO NOT descend directly into the traffic pattern 2. Aiming for a point during the stabilized approach a. Use pitch to control airspeed, do NOT attempt to point the nose at the aim point b. Use power to control altitude and glide distance c. Avoid getting behind the power curve			
Tasks	☐ Complete the ground lesson ☐ If possible, fly to a different airport and enter the traffic pattern ☐ Practice flying traffic patterns and end each pattern with a go-around			
Notes	• This lesson may be divided into multiple flights • Student should be focused on flying the aircraft and looking through the front windshield • Traffic pattern should be 'squared' off as much as practical. Rounding out the ends of the traffic pattern should be avoided. This enables the student to learn to 'move' the different legs in order to compensate for varying wind conditions. • The downwind leg should be placed ½ to ¾ of a mile from the runway as a standard, but emphasis should be placed on remaining close enough to the runway to make a power-off landing in the event of an engine failure • During configuration stage, student should pick a point straight ahead and be flying to that point while on downwind in order to prevent "dog-legging" the approach • Aircraft should be configured and stabilized at best glide speed prior to turning base • Landings should not be attempted by student until he/she can fly a traffic pattern and initiate a go-around unaided			

	• Go-arounds should be initiated by the cry "There's a ????? on the runway", or by generating some situation requiring a go-around. Instructor should avoid directly prompting the student to "go-around". • The round-out, flare, and landing should be considered separate maneuvers from the approach and will be taught only after the student can successfully fly a traffic pattern and a stabilized approach.
Completion	The lesson is considered complete when the student can successfully fly a traffic pattern unaided. Student should be able to configure the aircraft for landing without the help of the instructor. Student should be able to initiate a go-around without any help from the instructor.

Airport Traffic Pattern and Stabilized Approach (ground)

Objective	Teach the student the configuration and importance of a traffic pattern. Teach the student how to fly a stabilized approach.			
Pre-requisites	• F01. Introduction to flight training • F02. Four fundamental flight maneuvers • F03. Combined fundamental flight maneuvers			
Approx. Time	**Ground:**	1.0	**Flight:**	N/A
Materials	☐ Model aircraft ☐ Paint, masking tape, or something to create the visual effect of a miniature runway on the ground			

Ground work

1. A traffic pattern is a rectangular course based over and around a runway
2. Standard traffic patterns
    a. Traffic pattern altitude (TPA) is 1000' AGL
    b. Turns are to the left
    c. No more than 30° of bank while turning
    d. Any differences will be noted
        i. Chart Supplements U.S.
        ii. Sectional chart
        iii. Wind sock and segmented circle
3. Flying a traffic pattern
    a. Roll out onto the runway centerline (lights, camera, action)
    b. Apply full power, and simultaneously add right rudder
    c. At rotation speed raise the nose and simultaneously add more right rudder
    d. Climb straight ahead until 300ft below TPA (per AIM)
    e. Execute a 90° turn to the left
    f. Continue climbing until TPA is reached
    g. Execute another 90° left turn approximately ½ to ¾ of a mile from the runway (downwind)
    h. Upon reaching TPA level off
        i. Lower the nose
        ii. Trim for level flight
        iii. Reduce power only after airspeed has increased
        iv. If the aircraft has retractable gear slow to below landing gear extension (V_{LE}) speed and extend the landing gear
    i. While in the downwind leg, evaluate the approach to the runway
        i. Pick a point straight ahead to maintain a correct downwind heading
        ii. Check the runway for obstacles or hazards to the aircraft
        iii. Select an aim point on the runway (usually the numbers)
        iv. Visualize the placement of the base and final legs of the traffic pattern
    j. Abeam the chosen aim point (step 3.i.iii) configure for landing
        i. Maintain the correct downwind heading, DO NOT stare at the runway
        ii. Reduce power while maintaining altitude and trim for best glide speed (V_G)
        iii. Once the airspeed is in the white arc, extend flaps
        iv. After final configuration, airspeed should be stable and trimmed for best glide speed
        v. Utilize pitch to control airspeed, and power to control altitude
    k. After turning base

i. Make only occasional glances at the runway, keep the main focus on the nose and the airspeed indicator
ii. If the aircraft is high then reduce power, slip, and/or add flaps (preferably in that order, once flaps are added do not retract them unless the landing is being aborted)
iii. If the aircraft is too low then add power (DO NOT retract any flaps unless executing a go-around or after landing has been completed)

l. Base to final turn
i. If the aircraft overshoots the final turn, maintain a 30° bank until the extended centerline of the runway is intercept-able once again
ii. If the aircraft undershoots the final turn, level the wings and intercept the extended centerline of the runway at a 45° angle
iii. DO NOT attempt more than 30° of bank in the pattern

m. After turning final
i. Check the configuration of the airplane – gear down, prop full forward (ie. ABC GUMP, Red/Blue/Green, etc.)
1. ABC GUMP
a. Autopilot – off
b. Boost pump – on
c. Cowl flaps – Set per POH
d. Gas – fullest tank
e. Undercarriage - down
f. Mixture - set for density altitude
g. Prop/Power - Prop set for climb
2. Red/Blue/Green, Runway clean
a. Red - mixture set for density altitude
b. Blue - prop set for climb
c. Green - landing gear down and lights illuminated
d. Runway clean - safe to land
ii. If any of the following conditions are met, execute a go-around
a. Aircraft is not trimmed and stabilized
b. Aircraft is not lined up with the runway
c. Aircraft is going to overshoot its intended aim point (if reduction of power, slipping, or addition of flaps cannot be used to correct the situation)

4. Going around
a. Go-arounds should be executed on the following conditions
i. Airspeed and attitude are not stabilized
ii. Aircraft will be touching down more than a 500 hundred feet beyond the chosen aim point
iii. Whenever aircraft nose during the flare rises above the horizon line
iv. To prevent any other unforeseen dangerous situation (ie. An animal running out on the runway)

b. Procedure (PAC it all in and get out of there)
i. Power - apply full power and simultaneously add right rudder
ii. Attitude - Hold the nose level and stop the descent
iii. Clean, climb, communicate (in that order)
1. Remove one notch of flaps and if necessary raise gear
2. Once airspeed is increasing start a climb

	3. Incrementally remove the rest of the flaps, saving the last notch of flaps until above V_x. 4. Communicate - contact Tower/local traffic and advise
Tasks	☐ Complete the ground lesson ☐ Draw a mock runway on the ground ☐ Practice 'flying' a traffic pattern by walking the mock runway while the student describes his/her action in detail, including the procedures for a go-around, being too low or too high, and correcting for over/undershooting final
Notes	• Student should practice 'walking' the traffic pattern until he/she can perform the tasks verbally without any assistance from the instructor • Instructor should teach standard placement of the downwind leg approximately ½ to ¾ of a mile from the runway, however emphasis should be placed upon remaining within gliding distance of the runway in case of an engine failure • Instructor should try to help the student visualize being in the cockpit while 'flying' around the airport • Instructor should add situations such as the effects of crosswind or such as being too high or too low and student should be able to respond by verbally describing how they will correct for each situation • Instructor should initiate the 'go around' by stating to the student, "There's a dog on the runway", or by generating some sort of situation requiring a go-around. Instructor should avoid merely stating, "go-around"
Completion	The lesson is considered complete when the student can successfully describe a traffic pattern unaided while describing how to configure the aircraft for landing. Student should also be able to describe in detail when and how to initiate a go-around without any help from the instructor.

Introduction to landings

Objective	Teach the student the configuration and importance of a traffic pattern. Teach the student how to fly to and a different airport and enter a traffic pattern. Teach the student how to fly a stabilized approach.			
Pre-requisites	• F01. Introduction to flight training • F02. Four fundamental flight maneuvers • F03. Combined fundamental flight maneuvers • F05. Airport traffic patterns and a stabilized approach (ground) • F06. Airport traffic patterns and a stabilized approach (flight)			
Approx. Time	**Ground:**	0.5	**Flight:**	2.0
Materials	☐ Model aircraft ☐ Airplane flying handbook			

Ground work

1. Each portion of the landing should be considered a separate maneuver:
    a. Stabilized approach
        i. See lesson(s) on "Stabilized approach"
        ii. Aircraft should be fully configured prior to short final
        iii. Pilot should be focused on airspeed, nose to horizon relationship, and lining up with the centerline of the runway once on final (in that order of importance)
        iv. Airspeed should be constant with aircraft trimmed "hands-off"
        v. Once the aircraft has the runway "made", pilot should reduce power, lower the nose to maintain airspeed, and enter ground effect in a glide (Note: Some aircraft, specifically higher performance, should be flown onto the runway with power)
    b. Round-out
        i. Upon reaching ground effect (approx. 30-50 ft AGL), begin transitioning from the stabilized approach to a level flight attitude approximately 5-10 feet above the runway
        ii. Transition should be smooth and gradual, rapidly pulling the nose up will lead to ballooning as the energy from the descent needs to bleed off
        iii. One technique is to reduce the angle of approach by half, and then close the distance to the runway by half. Lather, rinse, and repeat until the aircraft is level above the runway (approximately 5-10 ft)
    c. Level-off
        i. Leveling off above the runway is momentary and allows the aircraft to begin bleeding off energy
        ii. Pilot should begin focusing on the relationship between the end of the runway and the nose
        iii. If the aircraft is too high above the runway, a slight lowering of the nose can be introduced in order to adjust the distance above the runway slightly without losing too much airspeed
    d. Flare
        i. As the aircraft bleeds off energy (airspeed) it will begin to sink, and the nose will try to drop. If allowed to continue, uninterrupted, the speed of the sink will increase resulting in an uncontrollably hard landing where the aircraft strikes the ground nose first.
        ii. In response to the sink, the pilot should begin raising the nose thereby increasing the angle of attack

	iii. As the nose is raised, the sink will momentarily slow or even pause as the aircraft continues to bleed off speed and then begins to sink again, at which point the pilot should raise the nose further iv. During this maneuver, the pilot should be focusing on the relationship between the nose of the aircraft and the runway. At no point during this maneuver should the pilot allow or cause the nose to lower/drop v. Aircraft should touch down on the main landing gear with the nose wheel in the air vi. Pilot should "follow through" and hold the nose off the runway until it either lowers on its own or until it can be lowered gently to the runway
Tasks	☐ Complete the ground lesson ☐ Practice landings
Notes	• This lesson may be divided into multiple flights • Student should be focused on flying the aircraft and looking through the front windshield with glances at the airspeed indicator • While on final, student should be intercepting the centerline of the runway and lining up with the runway prior to short final • Student should be encouraged to grade their landings based on technique rather than whether or not they are "smooth" • IMPORTANT: Student should be taught to initiate Go-around if the aircraft at anytime begins to balloon or if the nose touches the horizon during the flare
Completion	The lesson is considered complete when the student can successfully land the aircraft on the runway while meeting the following three conditions without any help from the instructor: 1. Aircraft should be consistently touching down on the mains with the nose in the air 2. Aircraft should be not be drifting sideways 3. Student must be able to recognize a dangerous situation and initiate a Go-around without prompting or aid from the instructor

Airspace

Objective	Introduce the student to the National Airspace System and the rules that govern it so that he/she may operate within it safely.
Pre-requisites	• N/A
Approx. Time	**Ground:** 2.0 **Flight:** N/A
Materials	☐ Pilot's Handbook of Aeronautical Knowledge FAA-H-8083-25B (PHAK)
Ground work	☐ The purpose of controlled airspace is to allow ATC to maintain varying levels of positive control over IFR traffic. In uncontrolled airspace, ATC cannot guarantee positive control of any kind, and thus an IFR clearance cannot be obtained. ☐ Six major airspaces ..... PHAK 15-1 o Class A o Class B o Class C o Class D o Class E o Class G ☐ Special use airspace ..... PHAK 15-3 o Prohibited o Restricted o Military operation areas (MOAs) o Alert areas o Controlled firing areas ☐ Other airspace ..... PHAK 15-4 o Local airport advisory (LAA) o Military training routes (MTR) o Temporary flight restrictions (TFRs) o Published VFR routes o Terminal RADAR service areas (TRSAs) o National Security Areas (NSAs) ☐ Air traffic control and the national airspace system ..... PHAK 15-7 o Coordinating the use of the airspace system o Operating rules and pilot/equipment requirements o Operating under special VFR
Tasks	☐ Review the aeronautical knowledge
Notes	• The easiest method by which to teach airspace is to break the six major airspaces into two categories by size: o A, E, and G are the largest, exist across the U.S., and are where the pilots will spend most of their time. They should be viewed as layers looking from the "top down", and are not depicted on the sectional. o E is depicted on the chart only when it extends below 1200 ft AGL. o D, C, and B are local airspaces surrounding controlled airports. They should be viewed as "sprouting out of the ground" and growing upwards. • Each airspace explanation should be accompanied by its basic VFR weather minimums, its depiction on a sectional, and requirements for entry and operation within. • It should be stressed that conditions with less than 1000' ceilings and 3SM visibility are

	considered Instrument Meteorological Conditions.
Completion	The lesson is considered complete when the student passes the stage 1 written exam (E01 I.R.) or the FAA Private Pilot Airplane Knowledge Exam with a minimum passing grade of 70%

Flying to Other Airports and Refueling

Objective	Teach the student the proper techniques with which to approach non-towered airports and refueling procedures.			
Pre-requisites	• N/A			
Approx. Time	**Ground:**	0.5	**Flight:**	1.0
Materials	An uncontrolled airport with self-serve fuel pumps Method of payment for fuel Airplane flying handbook			

Ground work

1. Radio calls at uncontrolled fields
    a. Radio calls at uncontrolled fields follow the same basic format as radio calls at controlled fields
    b. Who you are talking to becomes a generic broadcast in the blind to the traffic around the airport (ie. Panhandle traffic)
    c. The radio call should begin and end with "Who you are talking to"

        Example: Panhandle traffic, Cherokee niner three fife one Juliet 10 miles south, inbound for touch and goes Panhandle traffic.

    d. Unlike at a controlled field, a radio call should be made when approaching the airport, whenever the aircraft enters or leaves the pattern, whenever the aircraft turns to a different leg of the pattern, or whenever the pilot changes operations
2. Approaching an uncontrolled field
    a. If the field has an automated weather service or a unicom, attempt to acquire the weather and winds, otherwise expect to overfly the field at least 500ft above traffic pattern altitude in order to visually observe the windsock
    b. Begin making radio calls approximately 10-15 minutes out, stating your position, altitude, and intentions
    c. Enter the traffic pattern on the downwind leg at a 45° angle
        i. If it is necessary to cross over the airport, obtain an altitude at least 500ft above the traffic pattern
        ii. Do not descend directly into the traffic pattern
            1. Execute a descending turn outside the traffic pattern that allows the pilot to view the departure and crosswind legs
            2. Once at traffic pattern altitude enter the downwind leg at a 45° angle
    d. Due to the varying size of runways, use parts on the airplane to determine appropriate placement of each leg (ie. the wing or the cowling)
3. Refueling
    a. Aircraft should be completely turned off and the wheels chocked
    b. Connect the grounding wire (preferably to the exhaust) to prevent static buildup which could cause an explosion
    c. For certain high wing modes it may be necessary to use a step ladder
    d. Follow the prompts on the pumps display unit until the fuel pumping system is activated
        i. Sometimes the system will ask for an estimated gallons or dollars. It is OK to overestimate. The system will only charge for what is put into the airplane.
    e. Dispense fuel into the aircraft, DO NOT walk away from an open fuel tank
    f. Once aircraft is fueled, put the fuel hose back on the fuel hose rack

	g. Remove the grounding wire and "walk" it back to the station. Letting it retract on its own could create enough force to damage the wire. h. Make certain that the aircraft is free from hazards, fuel caps are in place, and any access panels are shut before boarding for departure.
Tasks	☐ Complete the ground lesson ☐ Fly to another airport and refuel
Notes	• This lesson may be completed at any time, however it is best if the student has already completed the following lessons: o F01. Introduction to flight training o F02. Four fundamental flight maneuvers o F03. Combined fundamental flight maneuvers o F05. Airport traffic patterns and a stabilized approach (ground) o F06. Airport traffic patterns and a stabilized approach (flight) o F07. Introduction to landings
Completion	The lesson is considered complete when the student can successfully approach a non-towered airport and make radio appropriate radio calls. The student must also demonstrate an appropriate traffic pattern entry.

Federal regulations, inspections, and documents

Objective	Teach the student the written set of regulations provided by the FAA to ensure safe operations in the national airspace system.			
Pre-requisites	• N/A			
Approx. Time	**Ground:**	4.0	**Flight:**	N/A
Materials	☐ Pilot's Handbook or Aeronautical Knowledge ☐ The NTSB's Role in Aviation Safety by Robert L Sumwalt and Sean L Dalton of the National Transportation Safety Board			
Ground work	☐ The FAA is an independent federal agency charged, by congress, to oversee and regulate aviation operations within the United States of America, as well as the operation and development of the national airspace system. ☐ FAR numbering system ☐ Rule of rules – Just follow it ☐ Terms o CFR (Code of Federal Regulations) o Aircraft o Category – something flyable with similar operating characteristics. ▪ Airplane ▪ Glider ▪ Rotorcraft ▪ Lighter than air ▪ Powered lift ▪ *Powered parachute* ▪ *Weight shift control* ▪ *UAV* o Class – a subdivision of categories, where each category has similar propulsion, flight, or landing characteristics. ▪ ie. Airplane, single-engine land. o Make & model o Pilot certificates determine privilege type ☐ Student pilots o Must apply for a student pilot certificate o 61.87 – Solo requirements for student pilots ▪ Received all basic training specified in 61.87 ▪ Pass a pre-solo written exam ▪ Must have a medical ▪ Logbook endorsement • Specific to make and model • Has an expiration date (usually 90 days) • Separate endorsement for night • May not land at other airports without endorsements • Instructor may add additional requirements ***Examples:*** o *Notification of instructor 24hrs. before flight* o *Crosswind component limited to 7kts* o *Maximum gust factor may not exceed 15 kts.* o *Full fuel tanks before every flight.* o *No solo if student expects to have any fun.* o 61.89 – General limitations for solo students ▪ Student pilot			

- May not carry passengers
- May not fly for hire or for any business pursuit
- May not fly without visual reference to the surface or when day visibility is less than 3 miles, or night visibility is 5 miles.
- Must adhere to requirements of endorsement
- 25NM leash with a 25NM-50NM grey area

▪ 61.93 – Solo cross country flight requirements
- Main objective is to keep you from getting lost
- X-country is defined as 25NM or greater
- X-country for training purposes must be 50NM or greater.
- May have a one-time endorsement for repeated training between 25NM-50NM

☐ Private pilots
- o 61.103 – Private pilot requirements
  - ▪ Minimum age requirements
  - ▪ Be able to understand, read, write, and speak English
  - ▪ Pass a knowledge exam within the preceding two years
  - ▪ Pass a practical examination
- o 61.109 – Flight experience
  - ▪ Must have the aeronautical knowledge specified in 61.107
  - ▪ 40hrs total
    - 20hrs dual
      - o 3 hrs x-country
      - o 3 hrs night
        - ▪ 10 takeoffs and landings
        - ▪ 1 night X-country flight of over 100 NM total distance
      - o 3 hrs instrument
    - 10hrs solo
      - o 3 takeoffs and landings to a full stop at an operating control tower.
      - o 5 hrs x-country
        - ▪ 50NM rule
        - ▪ 1 flight at least 150NM total length with three full stop landings and one leg must be at least 50NM.
- o 61.113 – Privileges and limitations
  - ▪ May fly without supervision and carry passengers and/or cargo
  - ▪ May NOT carry passengers or property for hire
  - ▪ May share the direct operating expenses of the flight
  - ▪ May fly in support of a charitable organization seeking donations (250 hours min total time)
  - ▪ May be compensated if the flight is incidental to their work

☐ Instrument pilots
- o 61.65 – Flight experience
  - ▪ 50 hours of cross country flight as PiC
  - ▪ 40 hours of actual or simulated instrument training
- o Privileges and limitations
  - ▪ May operate under Instrument Flight Rules
  - ▪ Note: NOT for flying through thunderstorms, icing, or other dangerous weather

☐ Commercial pilots
- o 61.129 – Flight experience
  - ▪ 100 hours in powered aircraft, with min 50 hours in airplanes
  - ▪ 100 hours of PiC time, with
    - min 50 in airplanes

- 50 hours of cross country, min 10 in airplanes
    - 10 hours of instrument training
    - 10 hours of complex training
    - One 2 hour cross country during the day more than 100 NM away
    - One 2 hour cross country during the night more than 100 NM away
    - 10 hours of solo flight time
    - 5 hours at night with at least 10 takeoffs and landings at an airport with an operating control tower
    - One cross country flight of at least 300 NM total distance, with three landings, one of which must be at least 250 NM away.
- 61.133 – Privileges and limitations
    - May carry persons or property for compensation or hire
    - May not hold out
    - May not provide both a plane and pilot (no charters)
    - Must have an instrument rating or:
        - Limited to 50NM
        - Daytime flight only

☐ Additional endorsements and privileges

- Type rating
    - Weight > 12,500lbs
    - Turbine powered
- VFR (Visual Flight Rules)
- IFR (Instrument Flight Rules)
- Night - period of time between the end evening civil twilight and beginning of morning civil twilight as published in the American Air Almanac converted to local time.
- PIC (Pilot-in-command)

☐ Part 61 - Certification of flying, administrative regulations

- 61.3 - Requirement for certificates or ratings
    - Must have certificates available
    - Must have current medical available
    - Must ***present*** certificates upon request of any FAA official or law-enforcement person.
- 61.15 - Alcohol or drugs
    - Suspension, revocation, or denial of a certificate
    - Minimum waiting periods (up to 1 yr.)
    - Motor vehicle actions involving drugs/alcohol must be reported within 60 days.
    - Bottle to throttle rule – must wait 8 hours between drinking and flying.
    - Legal limit of 0.04% BAC (Blood alcohol content)
    - Cold medicine, Nyquil
- 61.23 – Duration of medical certificates
    - Student certificate doubles as pilot certificate
    - 1st Class
        - 6 calendar months
    - 2nd Class
        - 12 calendar months
    - 3rd Class
        - 60 calendar months under 40
        - 24 calendar months 40 or over
    - Waivers
- 61.31 – Additional training requirements
    - High performance
    - Complex
        - Retractable landing gear
        - Flaps

- Controllable pitch propeller
- Tail wheel
- Pressurized above 25,000MSL (separate endorsements)

- 61.56 – Flight reviews
  - 24 Calendar month duration (exercise of privileges)
  - 1 hour ground and 1 hour flight time
  - No provisions for failure, educational experience
  - Substitutes
    - New certificates
    - Completing phases of FAA programs ie. Wings.
- 61.57 – Recent flight experience PIC (Recency Rule)
  - For carrying passengers, at least three takeoffs and landings within the preceding 90 days in the same category, class, and type (if required)
  - Tail wheel airplanes must be to a full stop
  - Night time must be to a full stop and between 1 hour after sunset and 1 hour before sunrise.
  - Night and tail wheel currency automatically covers daytime currency, but not vice versa
- 61.60 – Change of address

- Part 91 – General operating and flight rules
  - 91.3 – Responsibility and authority of the PIC
    - Sole and final authority over the flight
    - Declaring an emergency
  - 91.7 – Civil aircraft airworthiness
    - PIC is responsible for determining airworthiness
    - No aircraft may be operated unless airworthy
  - 91.9 – Civil aircraft flight manual, markings, and placards
  - 91.15 – Dropping objects
  - 91.17 – Alcohol or drugs
    - Must submit to sobriety or drug tests upon request
    - May not carry a passenger who appears intoxicated or is under the effects of drugs or alcohol
  - 91.103 – Pre-flight action
    - WK FART
    - Pre-flight inspection
  - 91.105 – Flight crewmembers
    - Must be in their seats during operation of the aircraft
    - Seatbelts must be worn at all times
    - Shoulder harnesses must be worn if the aircraft is equipped and they do not interfere with operation of the aircraft.
    - Flight crewmembers may leave their seats when this action is necessary to the operation of the aircraft or when they are attending to physiological needs.
  - 91.107 – Use of safety belts
    - Passengers must be briefed on use of seatbelts prior to take-off.
    - Seatbelts and shoulder harnesses must be used by all passengers during taxi, take-off, and landing.
    - Exceptions
      - Children under two years old
      - Parachutists
  - 91.111 – Operating near other aircraft
    - No buzzing
    - Formation flying without permission
    - Formation flying for hire
  - 91.113 – Right-of-way rules
    - See and avoid
    - Scenarios

- Converging aircraft at same altitude
- Aircraft approaching head on
- Aircraft overtaking another
- Aircraft landing

- Right-of-way priority
  - Aircraft in distress
  - Balloon
  - Glider
  - Aircraft towing another
  - Airship
  - Airplane
  - Unmanned aerial vehicles
- Don't demand right of way

- 91.115 – Right-of-way rules (water operations)
  - Same as right-of-way in the air except for overtaking vessels in which case the overtaking vessel may alter course as needed instead of only to the right.
- 91.117 – Aircraft speed limits
  - 250 kts below 10,000 MSL
  - 200 kts at or below 2,500 AGL within 4NM of primary airport
  - 250 kts within Class B airspace, 200 kts below it
- 91.119 – Minimum safe altitudes
  - Must be able to make a no-engine landing without creating a hazard to persons or property on the surface
  - In a congested area must be 1000ft above the highest obstacle within 2000ft
  - In an uncongested area
    - May not be operated lower than 500ft unless over sparsely populated area or open water
    - Must be a minimum of 500ft from the nearest obstacle or person
  - Congestion depends on where people are supposed to be
- 91.121 – Altimeter settings
- 91.123 – Compliance with ATC clearances and instructions
  - Read back and clarify
  - Deviations
    - Clearance is amended
    - Traffic alert and collision avoidance
    - Emergency situation exists
  - Notification of deviation
  - "Unable"
- 91.125 – ATC light signals
- 91.126 – Operating on or in the vicinity of an airport in Class G
  - Standard traffic pattern has left hand turns
  - Helicopters and powered parachutes should avoid the traffic pattern
- 91.127 – Operating on or in the vicinity of an airport in Class E
  - Similar to Class G
  - May have FAR 93 noise abatement procedures
- 91.129 – Operating on or in the vicinity of an airport in Class D
  - Two-way radio is required
  - Must establish and maintain two-way radio communication
- 91.151 – Fuel requirements
  - 30 min reserve during day
  - 45 min reserve during night
- 91.155 – Basic VFR weather minimums
- 91.159 – VFR cruising altitudes
- 91.203 – Civil aircraft certification (ARROW)
- 91.207 – Emergency locator transmitter

        - Shock sensitive
        - 121.5mhz or 243mhz
        - Testing during first 5 mins after the hour
        - Inspected every 24 calendar months
        - Battery replacement
            - 1 cumulative hour
            - 50% of useful life of charge
        - 406mhz ELT
    - 91.209 – Aircraft lights
        - Position lights
        - Anti-collision lights
        - Anchor lights
        - Alaska rule
    - 91.211 – Use of supplemental oxygen
        - Crewmembers in excess of 30mins above 12,500MSL
        - Crewmembers above 14,000MSL and available to passengers.
        - Available to passengers above 15,000MSL
        - Flash fires
    - 91.215 – ATC transponder and altitude reporting equipment
        - Mode C required in
            - Class A, B, and C
            - Within a mode C veil
            - At and above 10,000ft MSL excluding 2,500AGL
        - Transponder must be on if equipped
        - Requirement may be waived upon request to ATC
    - 91.303 – Aerobatic flight
        - Abrupt or abnormal maneuvers
        - May not be conducted when
            - over a congested area
            - flight visibility < 3SM
            - below 1500 AGL
            - in controlled airspace over an airport
            - within 4NM of the centerline of a federal airway
    - 91.307 – Parachutes and parachuting
        - Required when
            - Bank of > 60° relative to the horizon
            - Pitch of > 30° relative to the horizon
        - Must be approved
        - Packed by an approved packer within the last 60 days if synthetic or 180 days if natural.
    - 91.313 – Restricted category aircraft (crop dusters)
    - 91.319 – Aircraft having experimental certificates
- Aircraft maintenance
    - Maintenance is defined and authorized by FAR 43 and appendices
    - Only a certificated mechanic may perform maintenance
        - Must be flown by an appropriately rated pilot (includes private pilots) to check operations after any major repairs or alterations
        - Owners may perform preventative maintenance
            - Must have the correct manuals
            - Must have the specific/required tools
            - Should have proper training from a certificated mechanic
    - Inspections
        - Annual
        - 100hr
        - Pitot/static

        - Transponder
        - ELT and ELT battery
    - ATC transponder tests and inspections
    - Aircraft maintenance records
    - Airworthiness directives
- Aircraft accidents and incidents
    - NTSB 830 (Title 49 Part 830)
        - *The NTSB's Role in Aviation Safety* by Robert L Sumwalt and Sean L Dalton of the National Transportation Safety Board
            - The NTSB is an independent federal agency, charged by Congress to investigate transportation accidents, determine probable cause, and issue safety recommendations to prevent similar accidents.
            - In some cases the NTSB may delegate a member of the FAA to conduct an investigation on its behalf.
        - 830.1 – Defines the NTSB's authority over accident investigation
        - 830.2 – Defines the following terms
            - Aircraft accident
            - Civil aircraft
            - Fatal injury
            - Incident
            - Operator
            - Public aircraft
            - Serious injury
            - Substantial damage
            - Unmanned aircraft incident
        - 830.5 – A list of criteria mandating immediate notification to the NTSB
            - Flight control malfunction or failure
            - Inability of required flight crew member to perform duties as a result of injury or illness
            - Failure of a turbine
            - In-flight fire
            - In-flight collision
            - Damage to property other than the aircraft exceeding $25,000
            - Aircraft is overdue and believed to have been involved in an accident
            - More than 50% loss of the graphical portion of any EFIS device
        - 830.10 – Preservation of aircraft wreckage
        - 830.15 – Reports and statements to be filed
            - Within 10 days of an accident or 7 days if an overdue aircraft is still missing
            - Upon request
    - Recommended procedures/best practices
        - Report any occurrence as an incident to the NTSB through the FAA, as soon as practically possible
            - Call the local FSDO
            - Weather briefer - (800)WX-BRIEF
        - Try to avoid moving the aircraft until contact has been made and you have been cleared by an FAA representative.
    - FAA reporting
        - Report any and all incidents or accidents to the NTSB through the FAA, as soon as physically possible
            - Call the local FSDO
            - (800)WX-BRIEF
            - (817)222-5006
        - Do not touch the aircraft, or allow anyone else to touch the aircraft except to protect it, until the someone from the FAA gives you permission to do so

	▪ Discussion of the event or even speculation about the even could be misconstrued as a criminal attempt to obstruct the investigation and may result in charges being filed ☐ TFR (Temporary Flight Restriction) o Types ▪ Disaster or hazard areas ▪ Presidential ▪ Aerial demonstrations and sporting events o Requirements to legally operate ▪ Must be entering or exiting the area ▪ Must be talking with ATC ▪ Must be on a valid flight plan o Sources for TFR information ▪ 1(800)WX-BRIEF ▪ tfr.faa.gov ▪ Electronic flight bags ☐ 61.69 - Glider towing o Must have a private pilot's certificate with a category rating for powered aircraft o Must have logged a minimum of 100 hrs in category, class, or type of towing aircraft o Must have logged at least three flights as the sole manipulator of the controls under supervision of a qualified flight instructor ☐ Flight manuals and other documents ☐ Aeronautical Information Manual
Tasks	☐ Review aeronautical knowledge
Notes	• None
Completion	The lesson is considered complete when the student passes the stage 1 written exam (E01 I.R.) or the FAA Private Pilot Airplane Knowledge Exam with a minimum passing grade of 70%

Upper Air Maneuvers

Objective	Teach the student to control the airplane during maneuvers where the bank angle exceeds 30° or in situations where the airspeed of the airplane is slow enough to cause the control surfaces to be less effective			
Pre-requisites	• F01. Introduction to flight training • F02. Four fundamental flight maneuvers • F03. Combined fundamental flight maneuvers • F05. Airport traffic patterns and a stabilized approach (ground) • F06. Airport traffic patterns and a stabilized approach (flight) • F07. Introduction to landings			
Approx. Time	**Ground:**	0.5	**Flight:**	1.5
Materials	• Model airplane • Airplane flying handbook			
Ground work	1. Steep turns a. Are accomplished with 40°-45° of bank b. Rolling into the turn decreases the vertical component of lift causing the nose to drop i. The angle of attack must be increased via back pressure on the yoke in order to compensate for the loss in lift. This prevents a loss in altitude but also increases drag ii. Additional power should be added in order to overcome the increase in drag c. Once in the turn, the outer wing is moving faster than the inner wing 1. Over banking tendency - Lift on the outer wing is increased while lift on the inner wing decreases. This causes the aircraft to want to 'roll over'. A slight application of opposite aileron will prevent this. 2. Adverse yaw - Drag on the outer wing increases while drag on the inner wing decreases. This pulls the nose of the aircraft to the outside of turn and can cause the aircraft to dive in a left turn or to climb in a right turn. Proper application of rudder must be utilized to overcome this tendency. d. The maneuver should be accomplished by referencing the relationship of the nose of the aircraft with the horizon. 2. Slow flight a. Is accomplished at V_{s1} +10, -0 KIAS b. Aircraft should not be stalled c. At slow airspeeds i. Ailerons become less effective due to a lack of relative wind/airflow ii. Rudders and elevators retain some effectiveness due to propwash iii. High power settings cause left hand turning tendencies which must be compensated for with use of right rudder iv. Banking may be limited to 15° if desired, since turning increases stall speed			
Tasks	☐ Complete the ground lesson ☐ Practice steep turns			
Notes	• This lesson may be divided into multiple flights • Student should be focused on flying the aircraft and looking through the front windshield with glances at the airspeed indicator and the altimeter			

Completion	The lesson is considered complete when the student can successfully perform a steep turn while maintaining altitude within 100 feet, and can maintain coordinated flight while operating within 10 KIAS of V_{S1}. Student must also be able to configure the airplane appropriately and recover after each maneuver.

Stalls

Objective	Teach the student to initiate a stalled condition and recover without a loss of control.
Pre-requisites	• F01. Introduction to flight training • F02. Four fundamental flight maneuvers • F03. Combined fundamental flight maneuvers • F05. Airport traffic patterns and a stabilized approach (ground) • F06. Airport traffic patterns and a stabilized approach (flight) • F07. Introduction to landings
Approx. Time	**Ground:** 0.5 **Flight:** 1.5
Materials	• Model airplane • Airplane flying handbook

1. Stalls
    a. Occur whenever the wing's angle of attack exceeds its critical angle of attack
    b. Can occur at any altitude, attitude, or airspeed
    c. Usually occur at low airspeeds such as when landing or taking off
2. Each maneuver should be prefaced with:
    a. Configuring the aircraft (ABC GUMP – Autopilot, Boost pumps, Cowl flaps, Gas, Undercarriage, Mixture, Power/Prop)
    b. Executing a clearing turn to a downwind heading
        i. Purpose is to check the surrounding area for other aircraft and obstacles
        ii. Should consist of two 90° turns, one 180° turn, or any combination of turns necessary to ensure collision avoidance
3. Approach to landing stall (student must be perform)
    a. Configure the aircraft and execute a clearing turn to a downwind heading
    b. Initiate the stall (simulate an approach to landing)
        i. Reduce power to 1500rpm
        ii. Raise the nose and trim for best glide speed
        iii. Once in the white arc, apply full flaps
        iv. Establish a trimmed, stabilized descent at best glide speed
        v. OPTIONAL: Establish a turn in either direction not to exceed 30° of bank
        vi. Raise the nose to just above the horizon, while maintaining coordinated flight via the rudders (keep the ball centered)
        vii. As the airspeed bleeds off, continue adding back pressure to the yoke until the nose breaks over and falls of its own accord
    c. Recovery
        i. As the nose falls, follow it down with the yoke and arrest it at a level flight attitude while simultaneously applying full power
        ii. Retract one increment of flaps, and if necessary raise the landing gear
        iii. As the airspeed begins to increase above stall speed, retract the flaps one increment at a time, making sure to retract the last increment of flaps at or above V_x
        iv. Once cruise speed has been reached, reduce power and trim for level flight
4. Departure stall (student must perform)
    a. Configure the aircraft and execute a clearing turn to a downwind heading
    b. Initiate the stall (simulate a climb out on departure from a runway)
        i. Reduce power and maintain altitude by raising the nose
        ii. Trim the back pressure off the yoke as the airspeed decreases

	iii. Approximately 5 KIAS above stall speed raise the nose above the horizon and smoothly apply full power iv. OPTIONAL: Establish a turn in either direction not to exceed 30° of bank v. Continue raising the nose and bleeding off airspeed until the nose begins to break over c. Recovery i. Apply full power ii. As the nose falls, follow it down with the yoke and arrest it at a level flight attitude iii. Once cruise speed has been reached, reduce power and trim for level flight 5. Cross controlled stall (Instructors demonstrate only) a. Configure the aircraft and execute a clearing turn to a downwind heading b. Reduce airspeed to V_a and roll into a steep turn, power should be as needed c. Apply opposite aileron while maintaining rudder in the direction of the turn d. Recover at the first indication of a stall. DO NOT attempt to fully stall the aircraft. 6. Elevator trim stall (Instructors demonstrate only) a. Configure the aircraft and execute a clearing turn to a downwind heading b. Initiate the stall (simulate an approach to landing) i. Reduce power to 1500rpm ii. Raise the nose and trim for best glide speed iii. Once in the white arc, apply full flaps iv. Establish a trimmed, stabilized descent at best glide speed v. Level off and apply full power as if initiating a "go-around" vi. As the aircraft nose rises, control it with the yoke and retrim the aircraft for a proper climb attitude 7. Accelerated stall (Instructors demonstrate only) a. Configure the aircraft and execute a clearing turn to a downwind heading b. Reduce airspeed to V_a and roll into a steep turn c. Apply back pressure until the first sign of a stall is felt, note that stall speed is increased due to increased load factors d. Recover at the first indication of a stall. DO NOT attempt to fully stall the aircraft.
Tasks	☐ Complete the ground lesson ☐ Practice each type of stall both straight ahead and while turning
Notes	• Student should be focused on flying the aircraft and looking through the front windshield with glances at the airspeed indicator and the altimeter • If the aircraft experiences a wing drop during these maneuvers, application of opposite rudder must be applied immediately. Failure to do so or any attempt to pick up the dropping wing with the yoke/ailerons shall be considered unsatisfactory performance of these maneuvers
Completion	The lesson is considered complete when the student can successfully perform a stall while maintaining coordinated flight and recover the aircraft without assistance from the instructor

In-flight Emergencies

Objective	Teach the student to control the airplane during maneuvers where the bank angle exceeds 30°.			
Pre-requisites	• F01. Introduction to flight training • F02. Four fundamental flight maneuvers • F03. Combined fundamental flight maneuvers • F05. Airport traffic patterns and a stabilized approach (ground) • F06. Airport traffic patterns and a stabilized approach (flight) • F07. Introduction to landings			
Approx. Time	**Ground:**	2.0	**Flight:**	1.0
Materials	□ Model aircraft □ Airplane			

Ground work

Discussion

1. Defining an emergency
    a. An emergency is a serious, often unexpected situation that could result in serious bodily injury or death.
    b. A potential emergency is a situation that if not dealt with could result in an emergency
    c. "Flying is hours and hours of boredom punctuated by moments of sheer terror" – Pappy Boyington (WWII Ace who flew P40s and Corsairs)
2. Fly the airplane
    a. If an aircraft is controlled all the way down to the ground and can dissipate its momentum along a distance of at least 100 ft, the chances of survival increase significantly.
        i. Keep your airspeed under control, and avoid stalling the airplane.
        ii. Configure the aircraft appropriately
        iii. Make the airplane go where you want it to go
    b. Evaluate the situation and decide. Listen to advice but remember that the pilot-in-command must choose a course of action.
3. Use of checklists and flows
    a. Flows are simple checklists that should be committed to memory (ie. ABC GUMP), and are useful during times of extremely high workload
    b. Once the aircraft is under control, time permitting, refer to the emergency checklist(s) in the POH.
4. The airplane is expendable
    a. The insurance company owns the airplane
    b. Use the airplane like a suit of armor to protect yourself
    c. Use the terrain to your advantage
5. Declaring an emergency
    a. Don't be afraid to declare an emergency
    b. Declaring an emergency puts resources at your disposal
    c. Don't be afraid of paperwork or of getting in trouble
6. Common Emergencies
    a. Getting lost
        i. Admit that you are lost
        ii. Climb, radio signals are line of sight
        iii. Communicate with ATC or 121.5
        iv. When all other options have been exhausted, select a suitable site and land

b. Fuel related issues
    i. Fuel gauges are often inaccurate, check fuel levels visually, start a fuel timer, and lean in accordance with the manual
    ii. Fuel starvation occurs when fuel remains in the tanks but cannot get to the engine
    iii. Fuel exhaustion occurs when there is no fuel remaining in the tanks
    iv. Improper mixture settings can cause engine roughness or lead to power loss
c. Electrical failures
    i. The alternator and battery power everything in the cockpit from lights to radios
    ii. The magnetos are completely independent of the aircraft electrical system and will continue to provide spark to the engine
d. Landing gear failure
    i. Gear can collapse if the downlock mechanism fail from lack of maintenance or if they are not engaged prior to landing
    ii. If one or more gear fails to extend and lock down, it might be better to land with all of the gear completely retracted
    iii. Some aircraft dim the downlock lights when the panel lights are turned on. This makes it appear as if the gear are not locked down when they really are ie. “Piper Gotcha”

7. Precautionary and forced landings
    a. Examine the nature of the situation before selecting a place to land
        i. Does the situation require an immediate landing?
        ii. Are there more resources, such as personnel and facilities, available at other landing sites?
    b. If possible, drag the field for obstacles prior to landing
8. Transponder codes
    a. 7700 – General emergency
    b. 7600 – Radio failure
    c. 7500 – Hijacking
9. Light gun signals and loss of radios
    a. Circle the field and wait for a light gun signal from the tower

Description	Signal	Air	Ground
Steady green		Cleared to land	Cleared to takeoff
Steady red		Give way, con't circling	Stop
Flashing green		Return for landing	Cleared to taxi
Flashing red		Taxi clear of runway	Airport unsafe do not land
Flashing white		Not applicable	Return to starting point
Alt. red and green		Use extreme caution	Use extreme caution

Flight maneuvers

10. Each maneuver should be prefaced with:
    a. Configuring the aircraft (ABC GUMP – Autopilot, Boost pumps, Cowl flaps, Gas, Undercarriage, Mixture, Power/Prop)
    b. Executing a clearing turn to a downwind heading
        i. Purpose is to check the surrounding area for other aircraft and obstacles

ii. Should consist of two 90° turns, one 180° turn, or any combination of turns necessary to ensure collision avoidance

11. In order to prepare for emergency situations, the pilot of the aircraft should always be aware of nearby airfield locations, and should plan the route of flight accordingly
12. Dealing with engine roughness
    a. Memory items (Oh My Gosh, I Can Land, etc.)
        i. Oil – Verify oil pressure and oil temperature are normal
        ii. Mixture – Adjust the mixture
        iii. Gas – Verify fuel flow, turn on boost pump, fullest tank or return to previous tank
        iv. Ignition – Check magnetos
        v. Carburetor heat – Check for carburetor ice
        vi. Land – find a place to land, nearby, and maneuver towards it before the engine quits
    b. Refer to the emergency checklist
13. Simulated engine outs
    a. Simulate an engine out
        i. Configure the aircraft and execute a clearing turn
        ii. Reduce power to idle
    b. Configure and fly the aircraft
        i. Establish a glide and trim the aircraft for hands-off flight
        ii. Select an appropriate landing area, within gliding distance, and begin maneuvering to the selected landing area
            1. Do NOT attempt to reach an airport unless one is already known and is within gliding distance (gliding distance should be known before aircraft is flown)
            2. If a road is selected, beware of power lines which are difficult to see from the air and make certain that there is enough room to avoid them
            3. If a field is selected, land as close as safely possible to a road, house, or other access point so that help can reach the aircraft after the forced landing
            4. Use slips, s-turns, circles, and other maneuvers to lose altitude if necessary
            5. Do NOT extend the gear, flaps, or other high drag devices until the field is made
            6. Maintain a stabilized airspeed at V_g during the entire approach
    c. Call for help and set the transponder to code 7700
    d. Time permitting use the emergency checklist
        i. Configure the aircraft for an emergency landing
        ii. Troubleshoot/restart the aircraft engine
    e. Once the field is safely made
        i. Extend the landing gear (if necessary)
        ii. Throw out full flaps
        iii. Turn off the master switch
        iv. Turn off fuel valve
    f. Round-out and level off as if executing a normal landing
    g. Hold the nose off the ground as long as possible and dissipate as much energy as possible prior to touchdown

	h. Touchdown should be made as slowly as possible with a nose high attitude. The nose should be held off the ground for as long as possible in order to prevent the aircraft from flipping over in soft dirt i. Once the aircraft has come to a complete stop, make certain everything is off and exit the plane in an orderly fashion j. Make certain the ELT is transmitting
Tasks	☐ Complete the ground lesson ☐ Practice simulating various emergencies including engine outs
Notes	• Student should be able to use reference points on the aircraft to determine if an area is within gliding distance • Simulate engine outs by reducing the throttle to idle o DO NOT use the mixture control o Periodically apply carburetor heat to prevent carburetor icing and/or clear the carburetor by advancing/retarding the throttle • Simulated engine outs over a field should be terminated no lower than 500ft AGL • Simulated engine outs should periodically be practiced over an airport so that the maneuver can be completed with a full stop landing (if possible)
Completion	The lesson is considered complete when the student can successfully use memory items and checklists to diagnose simulated "engine malfunctions" and the student demonstrates the ability to successfully choose a landing spot and glide to it in the event of an engine "failure".

Performance/Weight and balance

Objective	Ensure the student understands the factors that affect aircraft's ability to perform.
Pre-requisites	• N/A
Approx. Time	**Ground:** 2.0 **Flight:** N/A
Materials	☐ Pilot's Handbook of Aeronautical Knowledge (FAA-H-8083-25B) (PHAK)
Ground work	☐ Importance of performance data ..... PHAK 11-1 ☐ Structure of the atmosphere ..... PHAK 11-2 ☐ Atmospheric pressure ..... PHAK 11-2 ☐ Pressure altitude ..... PHAK 11-3 ☐ Density altitude ..... PHAK 11-3 o Effects of pressure on density o Effects of temperature on density o Effects of humidity on density ☐ Performance ..... PHAK 11-5 o Straight-and-level flight o Climb performance (Best angle/best rate) o Range performance o Region of reversed command o Takeoff and landing performance o Runway surface and gradient o Water on the runway and dynamic hydroplaning o Takeoff and landing performance ☐ Performance speeds ..... PHAK 11-18 ☐ Performance charts ..... PHAK 11-19 o Interpolation o Density altitude chart o Takeoff chart o Climb and cruise chart o Crosswind and headwind component chart o Landing chart o Stall speed chart ☐ Transport category aircraft performance ..... PHAK 11-28 ☐ Air carrier obstacle clearance requirements ..... PHAK 11-28 ☐ Introduction ..... PHAK 10-1 ☐ Weight control ..... PHAK 10-1 o Effects of weight ..... PHAK 10-2 o Weight changes ..... PHAK 10-2 o Balance, stability, and center of gravity ..... PHAK 10-2 ▪ Effects of adverse balance on stability and control o Management of weight and balance control ..... PHAK 10-4 o Terms and definitions ..... PHAK 10-4 o Principles of weight and balance computations ..... PHAK 10-5 o Weight and balance restrictions ..... PHAK 10-6 ☐ Determining loaded weight and CG

	o Computational method o Graph method o Table method o Computations with a negative arm o Computations with zero fuel weight o Shifting, adding, and removing weight ▪ $W_{to\_move}/W_{total} = D_{CG\_moves}/D_{obj\_moves}$
Tasks	☐ Review the aeronautical knowledge
Notes	• Standard temperature and pressure: 15°C and 29.92inHG
Completion	The lesson is considered complete when the student passes the stage 2 written exam (E02 I.R.) or the FAA Private Pilot Airplane Knowledge Exam with a minimum passing grade of 70%

Weather Theory

Objective	Teach the student to understand the importance of weather influences on flight safety and performance.			
Pre-requisites	• N/A			
Approx. Time	**Ground:**	2.0	**Flight:**	N/A
Materials	☐ Pilot's Handbook of Aeronautical Knowledge (PHAK)			
Aeronautical knowledge	☐ Introduction to Weather Theory ..... PHAK 11-1 ☐ Atmosphere ..... PHAK 11-2 o Composition of the atmosphere o Atmospheric Circulation o Atmospheric Pressure ☐ Coriolis Force ..... PHAK 11-3 ☐ Measurement of Atmospheric Pressure ..... PHAK 11-4 ☐ Altitude and Atmospheric Pressure ..... PHAK 11-5 ☐ Wind and Currents ..... PHAK 11-7 o Wind patterns o Convective currents o Effect of obstructions on wind o Low level wind shear o Wind and pressure representation on Surface Weather maps ☐ Atmospheric Stability ..... PHAK 11-12 o Inversions o Moisture and temperature o Relative humidity o Temperature/Dew point relationship o Dew and frost o Fog ☐ Clouds ..... PHAK 11-15 o Ceiling o Visibility o Precipitation ☐ Air masses ..... PHAK 11-18 ☐ Fronts ..... PHAK 11-18 o Warm front o Cold front ▪ Fast moving cold front ▪ Flight toward an approaching cold front ▪ Comparison of cold and warm fronts ▪ Wind shifts o Stationary front o Occluded front o Thunderstorms ..... PHAK 11-23 o Hazards to aircraft ..... PHAK 11-23 ▪ Squall line ▪ Tornadoes ▪ Turbulence ▪ Icing			

	▪ Hail ▪ Ceiling and visibility ▪ Effect on altimeters ▪ Lightning ▪ Engine water ingestion
Tasks	☐ Review aeronautical knowledge
Notes	• None
Completion	The lesson is considered complete when the student passes the stage 2 written exam (E02 I.R.) or the FAA Private Pilot Airplane Knowledge Exam with a minimum passing grade of 70%

Short and soft field landings

Objective	To teach the student how to operate safely from non-standard fields where the runway may be extremely short or where the surface of the runway is soft enough to cause the nose wheel to bog down and stick.
Pre-requisites	• F01. Introduction to flight training • F02. Four fundamental flight maneuvers • F03. Combined fundamental flight maneuvers • F05. Airport traffic patterns and a stabilized approach (ground) • F06. Airport traffic patterns and a stabilized approach (flight) • F07. Introduction to landings
Approx. Time	**Ground:** 0.5 **Flight:** 1.5
Materials	☐ Model aircraft ☐ Airplane
Ground work	☐ Short field techniques o The objective is to get off the ground in the minimum distance and climb relatively steeply to clear any obstacles. o Takeoff ▪ Aircraft should be positioned to use ALL available runway ▪ Apply brakes and set flaps in accordance with POH. ▪ Advance throttle to full power and verify that all engine gauges are indicating proper operation ▪ Release brakes and allow aircraft to accelerate ▪ As aircraft reaches V_x raise the nose and climb at V_x until the aircraft is 100' above the ground and all obstacles have been cleared ▪ Lower the nose and transition to a cruise climb o Landing ▪ Aircraft should be configured for a short-field landing in accordance with the POH ▪ Aircraft airspeed should be 1.3 V_{so} or as stated in the POH ▪ Just prior to reaching short final aircraft should have full flaps ▪ Airspeed may be slightly slower and descent may be steeper than normal ▪ Once clear of all obstacles, landing assured, reduce power and lower the nose to maintain airspeed ▪ Due to increased drag touchdown may be firmer than normal ▪ Upon touchdown, the pilot's control yoke should be moved to the full aft position and maximum braking applied ▪ Do NOT retract flaps unless the POH specifically states to do so. This is to prevent an inadvertent retraction of the landing gear ▪ While applying brakes, do NOT allow the brakes to lock up. If necessary release brake pressure and reapply. ☐ Soft field techniques o The objective is to takeoff/land as gently as possible on the main gear and while keeping the nose wheel off the ground as much as possible to minimize the chances of getting bogged down or flipping the airplane over in severe situations where the nose wheel digs in. o Taxi ▪ Yoke should be held in the full-aft position during taxi to prevent the nose

	wheel from digging into the ground. ▪ Minimal braking should be used in order to keep as much weight on the main gear as possible o Takeoff ▪ Yoke should be in the full-aft position ▪ Apply power smoothly while simultaneously moving the yoke forward until there is just enough back pressure to transfer the weight of the aircraft to the main wheels and off the nose wheel ▪ As the aircraft accelerates, allow it to fly itself off the ground ▪ Once airborne, lower the nose and use ground effect to allow the aircraft to accelerate to V_x ▪ Upon reaching V_x initiate a climb at V_x until the aircraft is 100'above the ground and all obstacles have been cleared ▪ Transition to a cruise climb o Landing ▪ Aircraft should be stabilized and configured for a normal approach ▪ Just prior to short final aircraft should have full flaps ▪ Just prior to touchdown a small amount of power may be added to reduce the aircrafts sink rate and soften touchdown. ▪ Touchdown should occur gently with nose high attitude, and the nose wheel should be held off the runway for as long as possible ▪ As the aircraft slows, the nose will lower and the yoke should be held in the full aft position. ▪ Minimal braking should be used until the aircraft is safely on a hard surface
Tasks	☐ Complete the ground lesson ☐ Practice short field takeoffs and landings ☐ Practice soft field takeoffs and landings
Notes	• This lesson may be divided into multiple flights • Short field landings: The student should identify the location of an imaginary 50 ft obstacle prior to performing the task • Soft field takeoffs and landings: The student should identify the soft and hard portions of the runway/taxiways/ramp prior to performing the task. • Full flaps in some aircraft may make it difficult if not impossible to go around.
Completion	The lesson is considered complete when the student can successfully demonstrate soft and short field operations while meeting the following three conditions without any help from the instructor: 1. Aircraft should be consistently touching down on the mains with the nose in the air 2. Aircraft should be not be drifting sideways 3. Student must be able to recognize a dangerous situation and initiate a Go-around without prompting or aid from the instructor

Weather services

Objective	To provide the student with the skills and knowledge necessary to interpret weather reports and make safe decisions regarding flight.
Pre-requisites	• G09. Weather Theory
Approx. Time	**Ground:** 2.0 **Flight:** N/A
Materials	☐ Pilot's Handbook of Aeronautical Knowledge
Ground work	☐ Introduction to Weather Services ..... PHAK 12-1 ☐ Observations ..... PHAK 12-2 o Surface weather Observations o Upper Air Obervations o Radar Observations o Satellite ☐ SIGMET ..... PHAK 12-4 ☐ AIRMET ..... PHAK 12-4 ☐ Service Outlets ..... PHAK 12-4 o Automated Flight Service Station (AFSS) o Transcribed Information Briefing Service (TIBS) o Direct User Access Terminal Service (DUATS) o En Route Flight Advisory Service (EFAS) o Hazardous Inflight Weather Advisory Service (HIWAS) o Transcribed Weather Broadcast (TWEB) ☐ Weather Briefings ..... PHAK 12-5 o Standard briefing o Abbreviated briefing o Outlook briefing ☐ Aviation Weather Reports ..... PHAK 12-6 o Aviation Routine Weather Report (METAR) o Pilot Weather Report (PIREPs) ☐ Aviation Forecasts ..... PHAK 12-10 o Terminal Aerodrome Forecasts (TAFs) o Area Forecasts (FA) ☐ Inflight Weather Advisories ..... PHAK 12-12 o AIRMETs (WAs) o SIGMETs (WSs) o Convective Significant Meteorological Information (WST) ☐ Winds and Temperature Aloft Forecast (FD) ..... PHAK 12-14 ☐ Weather Charts ..... PHAK 12-15 o Surface Analysis Chart o Weather Depiction Chart o Radar Summary Chart o Significant Weather Prognostic Charts ☐ ATC Weather Displays and Weather Avoidance Assistance ..... PHAK 12-19 ☐ Electronic Flight Displays/Multi-Function Displays ..... PHAK 12-21 o Weather products age and expiration o Next Generation Weather RADAR System ▪ Level II data products

	▪ Level III data products o NEXRAD abnormalities o NEXRAD limitations ▪ Base reflectivity ▪ Resolution display o AIRMET/SIGMET display o Graphical METARs
Tasks	Review aeronautical knowledge
Notes	• Student should be made aware that in-cockpit weather relayed from the ground can be delayed by as much as 15-20 minutes.
Completion	The lesson is considered complete when the student passes the stage 2 written exam (E02 I.R.) or the FAA Private Pilot Airplane Knowledge Exam with a minimum passing grade of 70%

Cross country flight planning and navigation

Objective	Teach the student how to navigate safely to his/her destination without getting lost.			
Pre-requisites	• N/A			
Approx. Time	**Ground:**	3.0	**Flight:**	N/A
Materials	☐ Pilot's Handbook of Aeronautical Knowledge (FAA-H-8083-25B) (PHAK) ☐ Flight Plan Sheet (FP-VFR-01 I.R. 1/30/2018) ☐ E6B flight computer ☐ Navigational plotter			
Ground work	☐ Aeronautical charts.....PHAK 16-2 o Sectional charts o VFR terminal charts o World aeronautical charts ☐ Latitude and longitude (meridians and parallels) .....PHAK 16-3 o Time zones o Measurement of direction o Variation o Deviation ☐ Effect of wind .....PHAK 16-8 ☐ Basic calculations .....PHAK 16-11 o Converting minutes to equivalent hours o Time (T = D/G.S.) o Distance (D = G.S. x T) o Ground Speed (G.S. = D/T) o Converting knots to mph o Fuel consumption o Flight computers (Introduction to the E6B) o Plotter ☐ Pilotage .....PHAK 16-12 ☐ Dead reckoning (wind triangles and vector analysis) .....PHAK 16-13 ☐ Flight planning .....PHAK 16-17 o Assembling the necessary material o Weather check o Use of Chart Supplement U.S. o Airplane Flight Manual (AFMS or POH) ☐ Charting the course .....PHAK 16-18 ☐ Filing a VFR flight plan .....PHAK 16-21 ☐ Ground based navigation (radio aids) .....PHAK 16-22 o Very High Omnidirectional Range (VOR) o Course deviation indicator o Horizontal situation indicator o Radio magnetic indicator o Tracking with a VOR o Intercepting courses with a VOR o Tips for using VOR ☐ Global positioning system .....PHAK 16-30 o Selective availability			

	o VFR use of GPS o RAIM capability o Tips for using GPS for VFR operations o VFR waypoints ☐ Lost procedures ☐ Flight diversion
Tasks	☐ Review the aeronautical knowledge ☐ Complete a flight plan in preparation for Dual Cross Country No. 1
Notes	☐ N/A
Completion	The lesson is considered complete when the student passes the ground school written exam no. 2 or the FAA Private Pilot Airplane Knowledge Exam with a minimum passing grade of 70%. Student must also create a flight plan without assistance from the instructor.

Aeromedical Factors

Objective	Explain to the student the effects of altitude and aviation on the mental and physical capacities of the human body.			
Pre-requisites	• N/A			
Approx. Time	**Ground:**	2.0	**Flight:**	N/A
Materials	☐ Pilot's Handbook of Aeronautical Knowledge FAA-H-8083-25B (PHAK)			

Ground work

- ☐ Obtaining a medical certificate
- ☐ Health and physiological factors affecting pilot performance ..... PHAK 17-2
  - o Hypoxia ..... PHAK 17-3
    - ▪ Hypoxic
    - ▪ Hypemic
    - ▪ Stagnant
    - ▪ Histotoxic
    - ▪ Symptoms and treatment of hypoxia
  - o Hyperventilation ..... PHAK 17-4
  - o Middle ear and sinus problems ..... PHAK 17-5
  - o Spatial disorientation and illusions ..... PHAK 17-6
    - ▪ Vestibular illusions
    - ▪ Visual illusions
  - o Postural considerations ..... PHAK 17-8
  - o Demonstration of spatial disorientation ..... PHAK 17-8
    - ▪ Climbing while accelerating
    - ▪ Climbing while turning
    - ▪ Diving while turning
    - ▪ Tilting to right or left
    - ▪ Reversal of motion
    - ▪ Diving or rolling beyond the vertical plane (Do NOT demonstrate)
  - o Coping with spatial disorientation ..... PHAK 17-9
  - o Optical illusions ..... PHAK 17-10
    - ▪ Runway width illusion
    - ▪ Runway and terrain sloping illusion
    - ▪ Featureless terrain illusion
    - ▪ Water refraction
    - ▪ Haze
    - ▪ Fog
    - ▪ Ground lighting illusions
  - o How to prevent landing errors due to optical illusions ..... PHAK 17-10
  - o Motion sickness ..... PHAK 17-12
  - o Carbon monoxide poisoning ..... PHAK 17-12
  - o Stress ..... PHAK 17-12
  - o Fatigue ..... PHAK 17-13
  - o Exposure to chemicals ..... PHAK 17-13
    - ▪ Hydraulic fluid
    - ▪ Engine oil
    - ▪ Fuel
  - o Dehydration and heatstroke ..... PHAK 17-14
  - o Alcohol ..... PHAK 17-15

	o Drugs ..... PHAK 17-16 o Altitude induced decompression sickness ..... PHAK 17-18 ▪ Scuba diving ☐ Vision in Flight ..... PHAK 17-19 o Vision types ..... PHAK 17-19 ▪ Photopic vision ▪ Mesopic vision ▪ Scotopic vision o Central blind spot ..... PHAK 17-21 o Empty field myopia ..... PHAK 17-22 o Night vision ..... PHAK 17-22 ▪ Night blind spot ▪ Dark adaptation ▪ Scanning techniques ▪ Night vision protection ▪ Self-imposed stress ▪ Distance estimation and depth perception ▪ Binocular cues o Night vision illusions ..... PHAK 17-26 ▪ Autokinesis ▪ False horizon ▪ Reversible perspective illusion ▪ Size-distance illusion ▪ Fascination (fixation) ▪ Flicker vertigo o Night landing illusions ..... PHAK 17-27
Tasks	☐ Review aeronautical knowledge
Notes	• Instructor should also include somatosensory system and the illusions that can occur during a turn when the centrifugal forces cause the aircraft floor to appear to be “down”.
Completion	The lesson is considered complete when the student passes the stage 2 written exam (E02 I.R.) or the FAA Private Pilot Airplane Knowledge Exam with a minimum passing grade of 70%

Aeronautical charts and supplements

Objective	Teach the student how to find information on a sectional chart and its supplements in order to effectively prepare flight plan.			
Pre-requisites	• Airspace			
Approx. Time	**Ground:**	2.0	**Flight:**	N/A
Materials	☐ Pilot's Handbook of Aeronautical Knowledge (FAA-H-8083-25B) (PHAK) ☐ VFR sectional ☐ Chart supplement data			
Ground work	☐ Pilotage is the ability to recognize items on a map, relate them to locations on the ground, and then navigate from location to location visually. ☐ Aeronautical charts o Sectional charts o VFR terminal charts o World aeronautical charts ☐ Latitude and longitude (meridians and parallels) ☐ Isogonic lines (variation) ☐ Topographical information (color coded) ☐ Quadrangles o Spot elevations o Maximum elevation figure ☐ Landmarks o Cities o Rivers and ponds o Dams o Highways o VFR checkpoints o Towers o Windmills o Bridges ☐ Airports o Cyan vs Magenta o Open circle vs filled circle vs blocky style o Private vs public airports o Airports with facilities such as fuel o How to read airport information tag o Acquiring airport information from the chart supplements ☐ Radio beacons o VOR's o NDB's o Remote communications outlets ☐ Airways o Victor airways o Millitary training routes ▪ VR vs IR ▪ Above 1500 ft AGL vs below 1500ft AGL ☐ Airspace			

	o Class E o Class D o Class C o Class B
Tasks	Review the aeronautical knowledge
Notes	N/A
Completion	The lesson is considered complete when the student passes the ground school written exam no. 2 (5b) or the FAA Private Pilot Airplane Knowledge Exam with a minimum passing grade of 70%. Student must also create a flight plan without assistance from the instructor.

Introduction to the E6B

Objective	Teach the student how to make flight and navigation calculations using an E6B flight computer.			
Pre-requisites	☐ E6B flight computer			
Approx. Time	**Ground:**	2.0	**Flight:**	N/A
Materials	☐ Pilot's Handbook of Aeronautical Knowledge (FAA-H-8083-25B) (PHAK) ☐ VFR sectional			

Ground work

- ☐ What is an E6B?
  - Was invented in the 1930's by Navy Lt. Phillip Dalton
  - Does not require batteries and as thus is a good backup in case of an electrical failure
  - Works by setting up ratios
    - Outer circle is usually quantity or unit
    - Inner circle is usually time
    - Works in multiples of 10
- ☐ Trivia
  - "My eyes are dim I cannot see, I have not got my E-6B with me, over the Valley of the Ruhr". (World War II USAAC ditty)
  - "His computer is the instrument on which he stakes his life ... Don't ask for his computer, for he'd sooner lend his wife". (Navigator's Song, 1943)
  - Star Trek – The Original Series
    - In the episode "The Naked Time", Mr. Spock uses an E-6B to calculate the time of impact of the *Enterprise* with a planet.
    - In the episodes "Mudd's Women" and "Who Mourns for Adonais?", he is seen holding an E-6B.
- ☐ Time/Speed/Distance calculations
  - How far?
    - Set the aircraft speed over 60 (rate)
    - Find the elapsed time on the inner scale and read the distance above it
  - How fast?
    - Set the distance traveled over the time
    - Find the 60 (rate) on the inner scale and read the speed above it
  - How long?
    - Set the aircraft speed over 60 (rate)
    - Find the distance on the outer scale and read the time below it on the inner scale
  - Fuel burn
    - Set the gph (outer scale) over 60 (rate)
    - Find the time on the inner scale and read the gallons burned above it on the outer scale
  - Weight of fuel/oil
    - Set the amount of fuel under the "U.S. gals" mark (outer scale)
    - Find "Fuel lbs" mark (outer scale) and read the weight underneath it
    - For oil remember to convert quarts to gallons
- ☐ Wind triangles
    - Set direction of wind under the "True Index" and Mark the wind velocity above the center of the window.
    - Rotate the window to set the aircraft's true course under "True Index" and slide the wind velocity mark to the aircraft's true airspeed
    - Read ground speed under the center of the window and wind correction angle under the wind velocity mark

Sample Problems

How far?					Fuel			
Speed	Time		Distance		Rate		Total	Weight
152Kts	30mins	=	76NM		17.6gph	=	8.8gals	53lbs
114Kts	14mins	=	27NM		12.2gph	=	2.8gals	17lbs
105Kts	93mins	=	163NM		8.6gph	=	13.3gals	80lbs
96Kts	95mins	=	152NM		7.5gph	=	11.9gals	71lbs
173Kts	235mins	=	678NM		23.1gph	=	90.5gals	543lbs
142Kts	107mins	=	253NM		12.3gph	=	21.9gals	132lbs
96Kts	105mins	=	168NM		8.4gph	=	14.7gals	88lbs
47Kts	35mins	=	27NM		5.5gph	=	3.2gals	19lbs

How fast?					Fuel			
Distance	Time		Speed		Rate		Total	Weight
113NM	45mins	=	151Kts		17.3gph	=	13.0gals	78lbs
27NM	19mins	=	85Kts		7.6gph	=	2.4gals	14lbs
27NM	12mins	=	135Kts		11.2gph	=	2.2gals	13lbs
315NM	165mins	=	115Kts		8.4gph	=	23.1gals	139lbs
95NM	45mins	=	127Kts		12.2gph	=	9.2gals	55lbs
213NM	119mins	=	107Kts		8.4gph	=	16.7gals	100lbs
157NM	97mins	=	97Kts		7.9gph	=	12.8gals	77lbs
432NM	174mins	=	149Kts		12.3gph	=	35.7gals	214lbs

How long?					Fuel			
Distance	Speed		Time		Rate		Total	Weight
153NM	111Kts	=	83mins		8.8gph	=	12.1gals	73lbs
177NM	123Kts	=	86mins		11.2gph	=	16.1gals	97lbs
98NM	113Kts	=	52mins		7.6gph	=	6.6gals	40lbs
65NM	173Kts	=	23mins		17.8gph	=	6.7gals	40lbs
253NM	84Kts	=	181mins		6.5gph	=	19.6gals	117lbs
33NM	121Kts	=	16mins		9.1gph	=	2.5gals	15lbs
47NM	84Kts	=	34mins		6.1gph	=	3.4gals	20lbs
1009NM	174Kts	=	348mins		23.4gph	=	135.7gals	814lbs

Wind triangles

Wind Dir.	Velocity		True Crse	Airspeed		Grd Spd	Corr.
020°	15Kts	/	53°	111Kts	=	99Kts	-4°
120°	27Kts	/	275°	143Kts	=	164Kts	-6°
340°	35Kts	/	250°	111Kts	=	104Kts	19°
220°	10Kts	/	180°	133Kts	=	125Kts	3°
340°	11Kts	/	234°	111Kts	=	114Kts	6°
250°	21Kts	/	230°	175Kts	=	154Kts	3°
140°	15Kts	/	63°	143Kts	=	140Kts	6°
080°	17Kts	/	20°	121Kts	=	111Kts	7°

Tasks	☐ Review the aeronautical knowledge
Notes	☐ N/A
Completion	The lesson is considered complete when the student passes the ground school written exam no. 2 (5b) or the FAA Private Pilot Airplane Knowledge Exam with a minimum passing grade of 70%. Student must also create a flight plan without assistance from the instructor.