



**Private Pilot Certification Course
Airplane Single Engine Land**

Training Course Outline (TCO)
Revision 9C

North Star Aviation Inc.
3030 Airport Road North
Mankato, MN 56001



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RECORD OF REVISIONS

<u>Number</u>	<u>Date</u>	<u>Summary of Changes</u>	<u>Affected Pages</u>
Original	June 05, 2011	Original Issue entire manual.	1–63
Rev 1	October 01, 2011	Corrections and updates	1,2,7,9,11,13,14,16,17 21,22,23,24,31,49,62 63,64
Rev 2	January 15, 2012	Entire manual revision	1–81
Rev 3	May 10, 2012	Diagram 12 & completion record	1,2, 9, 61,81
Rev 4	October 10, 2012	Merged ground and flight TCO's	1–110
Rev 5	April 15, 2013	Update of TCO	1,2,5,6,7,8,9,12,13 14,15,17-22,49,50 51,60,62-71,74-90 103,104,106-110
Rev 6	December 01, 2013		1,2,3,7,8,9,12,13 14,15,17-21, 22, 23-49 51,53-58,59,60,63,65, 66,67,71,75,79,80 81,85,88,89, 90-106
Rev 7	November 17, 2014	Chief Flight Instructor change	1,2,3,9,22
Rev 8	January 07, 2015	Entire manual revision	1–105
Rev 9	June 1, 2017	Entire manual revision	1–106
Rev 9b	August 31, 2017	Updated to reflect the addition of Piper Archers for ASEL training	1,2,7,16
Rev 9C	July 8, 2019	Revision to grading and lesson progression sections in preparation for record keeping system change. Addition of in-house test that was left out of the last revision.	1,2,3,7,12,13, 88



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SECTION ONE

Course Description

Private Pilot Certification Course Airplane Single Engine Land

North Star Aviation, Inc.
3030 Airport Road North
Mankato, MN 56001

Welcome to Private Pilot flight training. Minnesota State University, Mankato (MNSU) and North Star Aviation, Inc. (NSA) are committed to providing you with high quality ground and flight instruction designed to transform you into an FAA-certificated Private Pilot. We will do everything possible to help you succeed; however, the ultimate path to a Private Pilot certificate requires significant effort on your part. You must come to each lesson fully prepared and ready to learn. Use this Training Course Outline (TCO) as your guide. Look ahead before each lesson so you'll know what to expect and how to prepare. For example, all ground lessons, and most flight lessons, include a section titled "REQUIRED READING/STUDY." Review the material listed there so that you can better retain the information when it's covered by your instructor. As another example, most flight lessons include a review of previously learned maneuvers, procedures, ground topics, etc. Study the lesson and go over those maneuvers/procedures ahead of time by mentally visualizing the flight (i.e. "chair flying.") This is an affordable way to practice, and it will help you progress through your training without repeating lessons. Your instructor will notice the effort, and you will benefit by making steady progress towards your Private Pilot certificate.



Introduction

This TCO uses the building block approach to maximize learning—each lesson follows the previous in a logical sequence from start to finish. It is divided into two courses, ground school (45 hours) and flight training (44.9 hours), and each course is further divided into stages. The ground school consists of three stages, while flight training consists of two. A student may attend ground school and flight training concurrently, or he/she may complete ground training first and then begin flight training. When a student successfully passes the final stage check of the flight training course he/she will graduate from this TCO*.

[*Note: Unless self-examining approval is granted by the FAA, the student must also pass a written and/or practical flight test given by an FAA representative before earning a Private Pilot certificate.]

Students who progress normally through the TCO should complete all the requirements in the allotted time. Those who progress quicker may complete the training in less than the allotted time, and by accomplishing less than the identified requirements, provided they meet the minimum requirements specified in 14 CFR 141 Appendix B.

Course Objective

The student will obtain the knowledge, skill, and aeronautical experience necessary to meet the requirements for a Private Pilot Certificate, Airplane Single Engine Land.

Completion Standard

The student must demonstrate through written tests, practical tests, and appropriate records that he/she has attained the knowledge, skill, aeronautical decision making abilities, and experience necessary to obtain a Private Pilot Certificate, Airplane Single Engine Land. Stage check pilots will use the most current version of the FAA Private Pilot – Airplane Airman Certification Standards (FAA-S-ACS-6) when testing students to this standard.

Enrollment

Students will be enrolled in the ground and flight training courses separately. They must meet specific prerequisites for each course.

Ground School Prerequisites: Prior to beginning ground school a student must be able to read, write and speak the English language, or have an English language TOEFL paper based score of 500 or better, or a TOEFL Computer based score of 173 or better, or a TOEFL Internet based score of 61 or better.

Flight Training Prerequisites: Prior to beginning the flight training syllabus a student must be enrolled in, or have completed, Private Pilot ground school, and he/she must possess a valid and current FAA medical (first, second, or third class.) Before the first solo flight a student must possess a recreational pilot certificate, sport pilot certificate, or student pilot certificate.

Student enrollment is documented by a paper and/or electronic enrollment certificate signed by the Chief or Assistant Chief Instructor. In addition to the enrollment certificate, students will receive a copy of this TCO and a Safety Procedures and Practices manual (a.k.a. Flight Operations Manual.)

[Note: As required in 14 CFR 141.93(a) a “copy” will be defined as a written copy, emailed copy, an electronic copy in a PDF format that may be distributed to the student through a central download site or delivered through an electronic means.]



Disenrollment

Students should refer to NSA's Flight Operations Manual (FOM) for flight lab attendance and no-show policies. The Chief Instructor may terminate a student from this training course for any of the following reasons:

- Inability to progress in training due to lack of effort (e.g. not studying, not chair flying, not seeking help from tutors, etc.)
- Inactivity; poor attendance of the scheduled flight labs
- Academic failure of the ground school
- Any other reason the Chief Instructor determines valid

Lesson Progression

This TCO uses the building block approach to maximize learning – each lesson follows the previous in a logical sequence from start to finish – therefore, every lesson should be conducted in order. Because training is a complex environment, there are many situations in which skipping a lesson or lessons would be better for the student than conducting them in order (weather, resource availability, schedule conflicts, etc). It is permissible to perform lessons in an individual stage out of order; however, the instructor should ensure that the lesson being skipped does not introduce topics that are reviewed on the lesson to be performed. Topics are commonly introduced on ground lessons, so extra care should be taken to ensure nothing is introduced prior to skipping a ground lesson.

Instructors should consult with their supervising instructor before skipping to look at ways to complete the lessons in order. If it has been determined that skipping is the best course of action, the instructor should include a note in the lesson remarks detailing why the lesson was skipped.

To complete a flight lesson all required maneuvers must receive a passing grade in an airplane; however, additional flight training may be performed in the Redbird FMX 1000 Advanced Aviation Training Device (AATD). Simulator lessons may be completed in an airplane provided the lesson topics are able to be performed in the airplane (e.g. spins and other emergency procedures that would fall outside of NSA's FOM would not be able to be completed in the airplane.).

Ground School Testing

Private Pilot Ground School exams are instructor-created and employ testing methods similar the FAA's knowledge exam. However, to ensure student comprehension ground instructors are encouraged to employ additional testing methods such as fill-in-the-blank, short essay, oral quizzing, etc. Ground school stage exams are designed to cover the material introduced in the stage. The final stage exam (Stage Three Exam) should cover all course material, and it should provide a good measurement of student ability to pass the FAA knowledge exam.

A student who fails to receive a passing grade on any stage exam may continue with the next stage provided the original stage exam is passed within the next 30 days.



Flight Training Lesson Grading

Lesson items or maneuvers are graded on a letter scale of “S”, “U”, “I”, and “O” based on the following table and procedures:

Grade	Description	Result	Application
S	Satisfactory	PASS	The lesson completion standards have been met
U	Unsatisfactory	FAIL	Performance did not meet completion standards
I	Incomplete	N/A	Required item/maneuver was not performed
O	Optional	N/A	Task is not a TCO requirement

- For a lesson to be completed all required items/maneuvers must receive a passing grade of “S”.
- Where there are optional items/maneuvers on a lesson that were not performed, the instructor will use an “O” indicating the item was not required to complete the lesson. Otherwise the appropriate grade of “S” or “I” is required.
- When an individual item/maneuver is graded “I” it will require further training on the same or subsequent training sessions until a grade of “S” is earned to complete the lesson.
- In the case where required items/maneuvers were not trained or performed during a lesson a grade of “I” will be applied. That will leave the item open on the electronic system showing it incomplete.
- Any lesson that needs to be repeated more than two times should be brought to the attention of the supervising instructor (Senior CFI, Asst. Chief, Chief).

Documentation

Students will document all flight and simulator training time used to earn the Private Pilot Certificate in their logbooks per 14 CFR 61.51. Additionally, the training provider will maintain paper and/or electronic training records for each student for a period of not less than one year per 14 CFR 141.101. All lessons in the record system will reflect the TCO presented here, and all flights will be tracked to the corresponding lesson flown.

Graduation

To graduate from this Private Pilot Course a student must complete all lessons and exams identified herein, and, at a minimum, the knowledge and flight training requirements specified in 14 CFR 141 Appendix B. He/she must also successfully pass the final stage check. The student’s training records will be audited per NSA’s Student Training Record Certification process to ensure the above requirements are met. When completed, a graduation certificate, signed by the Chief or Assistant Chief Instructor, will be issued.



SECTION TWO

Personnel

Chief Instructor

The Chief Instructor must meet the minimum qualification requirements per 14 CFR 141.35 for a Private Pilot, Airplane Single Engine Land training course. Specifically, he/she must hold a commercial or airline transport pilot certificate, along with a current flight instructor certificate, for an airplane, single engine land. He/she must also have logged at least 1,000 hours as pilot in command and have accumulated a total of 2 years and 500 hours, or 1,000 hours, of primary flight training experience.

The Chief Instructor has overall responsibility for the flight school training program. He/she will conduct initial and annual qualification checks of flight instructors, unless delegated to the Assistant Chief Instructor or an approved stage check pilot. Other duties, as outlined in 14 CFR 141.85, include certification of student training records, graduation certificates, stage and final test reports, and stage and final test recommendations. These duties are detailed in NSA's Student Training Record Certification process and may be delegated to the Assistant Chief Instructor.

When training is taking place the Chief and/or Assistant Chief Instructor will be available for consultation in person or by phone, email, or text.

Assistant Chief Instructor

The Assistant Chief Instructor must meet the minimum qualification requirements per 14 CFR 141.36 for a Private Pilot, Airplane Single Engine Land training course. Specifically, he/she must hold a commercial or airline transport pilot certificate, along with a current flight instructor certificate, for an airplane, single engine land. He/she must also have logged at least 500 hours as pilot in command and have accumulated a total of 1 year and 250 hours, or 500 hours, of primary flight training experience.

The Assistant Chief Instructor will perform duties as delegated by the Chief Instructor and outlined above. When training is taking place the Chief and/or Assistant Chief Instructor will be available for consultation in person or by phone, email, or text.

Check Instructors

Check Instructors must meet the minimum qualification requirements per 14 CFR 141.37 for a Private Pilot, Airplane Single Engine Land training course. Specifically, they must hold a commercial or airline transport pilot certificate, along with a current flight instructor certificate, for an airplane, single engine land. There is no minimum flight time requirement; however, check instructors must pass a test, given by the chief instructor, on teaching methods, applicable provisions of the Aeronautical Information Manual, applicable provisions of 14 CFR 61, 91, and 141, and the objectives and course completion standards of this TCO. Check Instructors will be designated in writing by the Chief Instructor and approved by the FAA.

Check Instructors will perform stage checks appropriate to their FAA approval letter, and they will assist in student record certification, as defined in NSA's Student Training Record Certification process. Additionally, Check Instructors will perform duties as delegated by the Chief Instructor. A Check Instructor may serve as the primary instructor for a student provided he/she does not conduct a stage check for that student.



Flight Instructors

Flight Instructors must hold at least a commercial pilot certificate for an airplane, single engine land, and a flight instructor certificate for the same category and class. Flight Instructors will train students per this TCO, will document all training in the students' records, and will ensure the records for their assigned students are kept in good order and in accordance with NSA's record-keeping plan.

Chief Ground Instructor (if applicable)

To be eligible for designation as chief instructor for a ground school course a person must have 1 year of experience as a ground school instructor at a certificated pilot school.

Ground Instructors

Ground instructors must hold a flight or ground instructor certificate with the appropriate rating for this course. If a person does not meet these requirements he/she may still be assigned ground training duties provided the chief instructor finds the person qualified and the training is given while under the supervision of the Chief Instructor or the Assistant Chief Instructor.

Ground Instructors are responsible for keeping attendance and will provide NSA with an attendance record following each class period. If a student misses a class he/she must make it up with the Ground Instructor or with a NSA Flight Instructor. At the end of the course Ground Instructors will certify student completion in a manner acceptable to the Chief Instructor, who will then ensure the students' training records are updated.

Dispatcher

Dispatchers are responsible for releasing flights during normal training hours. NSA will train dispatchers on how to enter aircraft and student information, how to review student flight logs and documents for appropriate endorsements and currency, how to print dispatch releases, and how to understand aircraft maintenance due dates, among other duties.

SECTION THREE

Resources

Ground Instruction Facilities

Ground instruction facilities are located at North Star Aviation, Inc. in the terminal building at Mankato Regional Airport, and on campus at Armstrong Hall, Minnesota State University, Mankato. Details of ground instruction facilities, including room square footage, seating capacity, tools and resources, heating and ventilation, etc. are listed in Appendix A.

Airports

Training flights originate from Mankato Regional Airport (KMKT). Other airports in the vicinity, such as Waseca (KACQ) and New Ulm (KULM), are also available for pattern training, including student solo flights. As the base of origination, KMKT meets all requirements per 14 CFR 141.38.

Airport Facilities

The Mankato Regional Airport is equipped with two flight briefing areas located in the terminal. Both briefing areas provide communication access to the Minneapolis Automated Flight Service Station (AFSS) and/or the internet. A 36 by 46-foot training room (FBO Flight Training Suite 150) consists of the Chief Instructor's office, instructor cubicles, tables, dry erase boards, aeronautical charts, and current publications such as the FAR/AIM. There is also a 30 by 24-foot conference room (Conference 104) available for classroom training, meetings, or private one-on-one training. Training resources in this room include a VCR player, DVD player, TV, overhead projector, grease board, HP 61-110 projector, and an extendable projection screen. The room is furnished with nine tables, each table able to handle two people; however, there is space for up to 12 tables and 24 people. Students also have access to the Arrival Lounge equipped with tables, chairs, and vending machines. Behind the front office (FBO Staff) there is a testing center appropriately equipped to provide space for FAA written exams. The dispatch center includes a dispatcher's desk, a dispatch counter, and informational resources on the walls such as chart of the practice areas, a safety information board, and an AWOS monitor. See Appendix B for a floor plan of the entire facility.

Aircraft

North Star Aviation uses the Piper Warrior/Archer (PA-28) for its Private Pilot training. This is a fixed-gear, non-complex four-place aircraft with dual flight controls that meets the requirements of 14 CFR 141.39. While avionics equipment varies among each airplane, they are all equipped for day/night VFR/IFR flight in the National Airspace System (NAS), including all airspace requiring a Mode-C transponder.

Flight Simulators

North Star Aviation employs two Redbird FMX 1000 Advanced Aviation Training Devices (AATD) for simulation training. They are both located in a 24 by 30-foot room with two dry erase boards on the walls. The Redbird FMX 1000 features an electric motion platform, fully enclosed cockpit, and wrap around exterior visuals with a complete terrain and airport database. Other features include traditional and/or glass cockpit configurations, quick change controls for single or multi-engine training, headset compatibility, instructor station with laptop, and a standard 110 power source. In their current configurations the simulators are equipped with the Garmin 430 and Garmin 530 avionics packages. For a copy of the FAA letter of authorization (LOA), see Appendix C.



Reference Books and Materials

All students should equip themselves with the PA-28 POH/IM, current FAR/AIM, current charts, a view limiting device, a fuel tester, and other resources necessary to complete this training course. Ground and flight instructors should provide students with a complete list of required resources. For a list of additional study materials see the “REQUIRED READING/STUDY” section of each lesson and/or Appendix D.



SECTION FOUR

Ground School



PRIVATE PILOT GROUND SCHOOL LESSON LAYOUT

STAGE ONE (21 HOURS)

LESSON	DISCUSSION TOPIC	REQUIRED READING/STUDY	HOURS
1	Flight training process and careers in aviation	Jeppesen Pvt Pilot 1A&B; Gleim Intro; Gleim Study Unit 4.5 (FAR Part 61) Intro and Questions	1.5
2	Airplane components and principles of aerodynamics	Jeppesen Pvt Pilot 2A & 3A; Gleim SU 1.2 – 1.5; 4.8 (91.7, 91.9)	1.5
3	Airplane wing design and flight controls	Jeppesen Pvt Pilot 2A & 3A; Gleim SU 1.1 & 1.6	1.5
4	Airplane stability and control	Jeppesen Pvt Pilot 3B & 3C; Gleim SU 1.7-1.11	1.5
5	Powerplant & related aircraft systems and instruments	Jeppesen 2B; Gleim 2.10 – 2.19	1.5
6	Basic flight instruments – standard panel and glass panel	Jeppesen 2C; Gleim 2.1 – 2.9; 4.8 (91.117, 91.119, 91.121)	1.5
7	Aircraft performance, effects of density altitude, and performance computations	Jeppesen 8A; Gleim 5.1 – 5.6	1.5
8	Weight and balance computations; aerodynamic review of stalls and spins	Jeppesen 3A, 3B & 8B; Gleim 5.7 – 5.10; Gleim 1.3 – 1.4	1.5
9	Airports and preflight actions on how to obtain runway lengths; applicable subjects of the Airman’s Information Manual (AIM) and FAA Advisory Circulars (AC)	Jeppesen 4B & 4C; Gleim 3.1-3.5; 3.14-3.15; 3.17; 4.8 (91.103); 9.5-9.7; AIM Ch 2, Sec 3; AIM Ch 4, Sec 3	1.5
10	Aeronautical charts; airspace	Jeppesen 4C & 4D; Gleim 3.9-3.10; 4.8 (91.130, 91.131, 91.133, 91.135), 4.9 (91.155, 91.157); 9.1-9.3	1.5
11	Radio communication procedures	Jeppesen 5B; Gleim 3.8, 3.13-3.16, 4.8 (91.123); 9.4	1.5
12	Radar and ATC services	Jeppesen 5A; Gleim 3.11-3.12; 4.9 (91.215, 91.413)	1.5
13	Exam One preview	All reading material from lessons 1-12	1.5
14	STAGE ONE EXAM	All reading material from lessons 1-12	1.5
	TOTAL		21
	CUMULATIVE TOTAL		21



STAGE TWO (16.5 HOURS)

LESSON	DISCUSSION TOPIC	REQUIRED READING/STUDY	HOURS
15	Weather theory and weather patterns	Jeppesen 6A & 6B; Gleim 7.1-7.11	1.5
16	Weather hazards and wake turbulence	Jeppesen 6C; Gleim 3.6; 7.4-7.5, 7.7	1.5
17	Weather services; printed weather reports, forecasts, and graphic weather; recognition of weather hazards	Jeppesen 7A, 7B, 7C & 7D; Gleim 8.1-8.11	1.5
18	Federal Aviation Regulations for private pilots; NTSB accident reporting requirements	Federal Aviation Regulations Part 61 and 91; Gleim 4.1 – 4.5; 4.7 -4.10	1.5
19	Safety of flight; collision avoidance	Jeppesen 4A; Gleim 3.7; 4.8 (91.111, 91.113, 91.119, 91.209)	1.5
20	Basic navigation skills; fuel requirements	Jeppesen 9A & 9B; Gleim 11.3, 11.5 – 11.13	1.5
21	Cross country flight planning	Jeppesen 11A & 11B; AIM 5-1-1 – 5-1-9; Gleim 11.1 – 11.7	1.5
22	Review of cross country planning	Jeppesen 11A & 11B; AIM 5-1-1 – 5-1-9; Gleim 11.1 – 11.7	1.5
23	Radio and satellite navigation aids	Jeppesen 9B, 9C, & 9D; Gleim 10.1 – 10.4	1.5
24	Exam Two preview	All reading material from lessons 15 – 23	1.5
25	STAGE TWO EXAM	All reading material from lessons 15 – 23	1.5
	TOTAL		16.5
	CUMULATIVE TOTAL		37.5

STAGE THREE (7.5 HOURS)

LESSON	DISCUSSION TOPIC	REQUIRED READING/STUDY	HOURS
26	Human factors and Aeronautical Decision Making (ADM)	Jeppesen 1C & 10B; Gleim 6.6	1.5
27	Flight physiology	Jeppesen 10A; Gleim 6.1 – 6.5	1.5
28	Advanced aeronautical decision making	Jeppesen 10B; Gleim 6.6	1.5
29	Exam Three preview	All reading material from all lessons	1.5
30	STAGE THREE EXAM (Final Exam)	All reading material from all lessons	1.5
	TOTAL		7.5
	CUMULATIVE TOTAL		45



GROUND LESSON TEMPLATE

GROUND LESSON

X.X HOURS [Approximate hours required to complete the lesson] _____

LESSON OBJECTIVE

Summarizes the subjects all students are expected to learn from this lesson.

ACADEMIC CONTENT

- A bulleted list of the lesson's primary subjects
 - Sub-bullets, if required
 - Sub-bullets, if required

COMPLETION STANDARDS

Summarizes how the instructor will assess student learning (e.g. oral or written quiz.) Complete comprehension results from individual study and/or practice before and after the lecture.

REQUIRED READING/STUDY

- A bulleted list of the reference materials for this lesson
- Students are expected to come prepared to each lecture...
- By studying the material from this list beforehand



PRIVATE PILOT GROUND SCHOOL

STAGE ONE (21 HOURS)

Lessons 1 - 14

STAGE ONE OBJECTIVES: The student will be instructed in aerodynamics, engine power-plant and aircraft related systems, flight instruments, aircraft performance, effects of density altitude, takeoff and landing data, weight and balance, stalls and spins, airports and sources of information, preflight actions on how to obtain runway lengths on airports of intended use, aeronautical charts and airspace, radio communications and procedures, and radar and ATC services.

STAGE ONE COMPLETION STANDARDS: The stage will be completed when the student satisfactorily passes the Stage One Exam with a score of 70% or better.



GROUND LESSON 1

1.5 HOURS

LESSON OBJECTIVE

At the completion of this lesson students should gain an understanding of aviation careers available to them, the flight training process, and basic Federal Aviation Regulations (FARs) governing their training and certification.

ACADEMIC CONTENT

- Course syllabus and expectations
- Aviation careers
- Pilot qualifications (including medical)
- Certification privileges and restrictions

COMPLETION STANDARDS

Student understanding of the material will be demonstrated through oral quizzing by the instructor, and/or through a written quiz.

REQUIRED READING/STUDY

- Jeppesen Guided Flight Discovery: Private Pilot 1A&B
- Gleim FAA Knowledge Test Introduction
- Gleim Study Unit 4.5 (FAR Part 61) Intro and Questions



GROUND LESSON 2

1.5 HOURS

LESSON OBJECTIVE

At the completion of this lesson students should gain an understanding of basic airplane components and aerodynamics.

ACADEMIC CONTENT

- Primary aircraft components (wing, fuselage, empennage, flight controls, landing gear, power plant, etc.)
- Pilot Operating Handbook/Information Manual (POH/IM)
- Basic Aerodynamics
 - Properties of air and Relative Wind
 - Angle of Attack
 - Newton's and Bernoulli's principles
- Intro to Stalls and Spins
- Aerodynamic forces
 - Lift
 - Weight
 - Thrust
 - Drag

COMPLETION STANDARDS

Student understanding of the material will be demonstrated through oral quizzing by the instructor and/or through a written quiz.

REQUIRED READING/STUDY

- Jeppesen Guided Flight Discovery: Private Pilot 2A & 3A
- Gleim Study Units 1.2 – 1.5; 4.8 (91.7, 91.9)



GROUND LESSON 3

1.5 HOURS

LESSON OBJECTIVE

At the completion of this lesson students should gain an understanding of wing design and flight controls.

ACADEMIC CONTENT

- Wing design terms
 - Camber
 - Aspect Ratio
 - Angle of Incidence
 - Wing Twist
- Ground effect
- Flight Controls
 - Axis of rotation
 - Primary
 - Secondary

COMPLETION STANDARDS

Student understanding of the material will be demonstrated through oral quizzing by the instructor and/or through a written quiz.

REQUIRED READING/STUDY

- Jeppesen Guided Flight Discovery: Private Pilot 2A & 3A
- Gleim Study Units 1.1 & 1.6



GROUND LESSON 4

1.5 HOURS

LESSON OBJECTIVE

At the completion of this lesson students should gain an understanding of airplane stability, turning forces, and load factor.

ACADEMIC CONTENT

- Stability
 - Terms
 - Review axis of rotation
 - Static and Dynamic stability
 - Effects of stability on control
 - Power effects
 - How stability is achieved through design
- Torque (Left-turning tendencies)
- Glide
- Turning flight
 - Adverse yaw
 - Overbanking
 - Turn radius
 - Load factor
 - Load limit factor

COMPLETION STANDARDS

Student understanding of the material will be demonstrated through oral quizzing by the instructor, and/or through a written quiz.

REQUIRED READING/STUDY

- Jeppesen Guided Flight Discovery: Private Pilot 3B & 3C
- Gleim Study Units 1.7-1.11



GROUND LESSON 5

1.5 HOURS

LESSON OBJECTIVE

At the completion of this lesson students should gain an understanding of airplane powerplants, systems, and related instruments.

ACADEMIC CONTENT

- Engine types
- Four-stroke engine operation
- Jet engine operation (intro only)
- Induction system
 - Carburetor operation
 - Carburetor ice
 - Rich vs. lean
- Fuel injection
- Supercharger vs. Turbocharger
- Ignition system and operation
- Abnormal combustion (detonation and pre-ignition)
- Fuel systems components and operation
- Oil system
- Engine cooling
- Exhaust system
- Propeller system
- Electric system and operation

COMPLETION STANDARDS

Student understanding of the material will be demonstrated through oral quizzing by the instructor, and through a written quiz.

REQUIRED READING/STUDY

- Jeppesen Guided Flight Discovery: Private Pilot 2B
- Gleim Study Units 2.10-2.19



GROUND LESSON 6

1.5 HOURS

LESSON OBJECTIVE

At the completion of this lesson students should gain an understanding of airplane standard and glass-panel flight instruments.

ACADEMIC CONTENT

- Atmospheric pressure
- Pitot-Static system
 - Airspeed indicator
 - Types of airspeeds
 - Altimeter
 - Types of altitudes
 - Altimeter errors
 - Vertical speed indicator
 - Pitot-static blockage
- Gyroscopic system
 - Rigidity in space and precession
 - Sources of power
 - Attitude indicator
 - Heading indicator
 - Turn coordinator (Turn and slip)
- Magnetic compass
 - Deviation
 - Errors
- Glass panel (Avidyne)

COMPLETION STANDARDS

Student understanding of the material will be demonstrated through oral quizzing by the instructor, and/or through a written quiz.

REQUIRED READING/STUDY

- Jeppesen Guided Flight Discovery: Private Pilot 2C
- Gleim Study Units 2.1-2.9; 4.8 (91.117, 91.119, 91.121)



GROUND LESSON 7

1.5 HOURS

LESSON OBJECTIVE

At the completion of this lesson students should gain an understanding of aircraft performance, effects of density altitude, and performance computations.

ACADEMIC CONTENT

- Density altitude
 - Definition
 - Computation
 - Effects on performance
- Performance charts
 - Takeoff distance
 - Climb
 - Cruise
 - Descent
 - Landing
- Crosswind computation

COMPLETION STANDARDS

Student understanding of the material will be demonstrated through oral quizzing by the instructor, and/or through a written quiz.

REQUIRED READING/STUDY

- Jeppesen Guided Flight Discovery: Private Pilot 8A
- Gleim Study Units 5.1 – 5.6



GROUND LESSON 8

1.5 HOURS

LESSON OBJECTIVE

At the completion of this lesson students should gain an understanding of weight and balance computations, and the dangers of stalls/spins.

ACADEMIC CONTENT

- Hazards of improper weight and balance
- Weight and balance terms and definitions
 - Basic empty weight
 - Ramp weight
 - Takeoff weight
 - Landing weight
 - Useful load
 - Payload
 - Arm
 - Datum
 - Moment
 - Center of gravity
- Weight and balance limitations
- Weight and balance computations
- Shifting weight
- Critical angle of attack
- Indications of a stall
- Stall recovery
- Causes of spins
- Spin recovery (PARE acronym)

COMPLETION STANDARDS

Student understanding of the material will be demonstrated through oral quizzing by the instructor, and/or through a written quiz.

REQUIRED READING/STUDY

- Jeppesen Guided Flight Discovery: Private Pilot 3A, 3B, & 8B
- Gleim Study Units 5.7 – 5.10
- Gleim Study Units 1.3 – 1.4



GROUND LESSON 9

1.5 HOURS

LESSON OBJECTIVE

At the completion of this lesson students should gain an understanding of airport operations, including how to obtain runway information when flight planning.

ACADEMIC CONTENT

- Controlled vs. uncontrolled airports
- Runway and taxiway layout
 - Runway markings
 - Taxiway markings
 - Airport signs
- Traffic patterns
 - Legs of the pattern
 - Standard vs. non-standard
 - Wind indications
 - Radio calls (controlled and uncontrolled)
 - Noise abatement
- Runway incursions
 - Hot spots
 - Land and hold short operations (LAHSO)
- Airport lighting
 - Glidepath
 - Beacons
 - Runway and taxiway
 - ATC light gun signals
- Airport information
 - Airport facilities directory
 - NOTAMS
 - Advisory Circulars
 - Charts
 - Unofficial sources (e.g. airnav.com)
 - Calculate takeoff and landing distance

COMPLETION STANDARDS

Student understanding of the material will be demonstrated through oral quizzing by the instructor, and/or through a written quiz.

REQUIRED READING/STUDY

- Jeppesen Guided Flight Discovery: Private Pilot 4B & 4C
- Gleim Study Units 3.1 – 3.5; 3.14-3.15; 3.17; 4.8 (91.103); 9.5-9.7
- AIM Chapter 2, Section 3 (Airport Marking Aids and Signs)
- AIM Chapter 4, Section 3 (Airport Operations)



GROUND LESSON 10

1.5 HOURS

LESSON OBJECTIVE

At the completion of this lesson students should gain an understanding of VFR charts and airspace.

ACADEMIC CONTENT

- VFR charts
 - World aeronautical chart
 - Terminal area chart
 - Sectional
 - Legend
- Latitude and longitude
- Airspace (A,B,C,D,E and G)
 - Controlled vs. uncontrolled
 - Chart depiction
 - Rules for VFR operations (ceiling/visibility; equipment)
 - Special VFR
- Special use airspace
 - Military
 - Temporary
 - Other

COMPLETION STANDARDS

Student understanding of the material will be demonstrated through oral quizzing by the instructor, and/or through a written quiz.

REQUIRED READING/STUDY

- Jeppesen Guided Flight Discovery: Private Pilot 4C & 4D
- Gleim Study Units 3.9 – 3.10; 4.8 (91.130, 91.131, 91.133, 91.135), 4.9 (91.155, 91.157); 9.1-9.3



GROUND LESSON 11

1.5 HOURS

LESSON OBJECTIVE

At the completion of this lesson students should gain an understanding of radio communication procedures.

ACADEMIC CONTENT

- Importance of effective radio communication
- Radio equipment
- Terminology
 - Phonetic alphabet
 - Proper phraseology
 - Common errors
- Universal Coordinated Time
- Lost communication procedures
- Common radio usage
 - Air traffic control
 - Common traffic advisory frequency
 - ATIS/AWOS/ASOS
 - FSS
 - HIWAS
- Sources of radio frequencies
- Lost communication and emergency procedures
- Emergency Locator Transmitters

COMPLETION STANDARDS

Student understanding of the material will be demonstrated through oral quizzing by the instructor, and/or through a written quiz.

REQUIRED READING/STUDY

- Jeppesen Guided Flight Discovery: Private Pilot 5B
- Gleim Study Units 3.8, 3.13 – 3.16; 4.8 (91.123); 9.4



GROUND LESSON 12

1.5 HOURS

LESSON OBJECTIVE

At the completion of this lesson students should gain an understanding of radar and ATC services.

ACADEMIC CONTENT

- RADAR operation
- Transponder operation
- FAA radar services
- ADS-B (in and out)

COMPLETION STANDARDS

Student understanding of the material will be demonstrated through oral quizzing by the instructor, and through a written quiz.

REQUIRED READING/STUDY

- Jeppesen Guided Flight Discovery: Private Pilot 5A
- Gleim Study Units 3.11 – 3.12; 4.9 (91.215, 91.413)



GROUND LESSON 13

1.5 HOURS

LESSON OBJECTIVE

At the completion of this lesson students should be prepared to pass the Stage One Exam.

ACADEMIC CONTENT

- Preview all the material covered in lessons 1 through 12
- Cover specific questions from students
- Sample Gleim questions

COMPLETION STANDARDS

Student understanding of the material will be demonstrated through oral quizzing by the instructor.

REQUIRED READING/STUDY

All reading from lessons 1-12

GROUND LESSON 14

1.5 HOURS

LESSON OBJECTIVE

This lesson assesses the student's comprehension of material introduced in Stage One.

ACADEMIC CONTENT

Stage One Exam

COMPLETION STANDARDS

The stage will be completed when the student satisfactorily passes the Stage One Exam with a score of 70% or better.

REQUIRED READING/STUDY

N/A



PRIVATE PILOT GROUND SCHOOL

STAGE TWO (16.5 HOURS)

Lessons 15 - 25

STAGE TWO OBJECTIVES: The student will be instructed in weather theory, how to obtain and decipher weather reports, weather hazards to aviation, Federal Aviation Regulations (FARs), National Transportation Safety Board (NTSB) accident reporting requirements, safety of flight (including collision avoidance), basic and advanced navigation skills (including radio and satellite navigation), and cross country planning.

STAGE TWO COMPLETION STANDARDS: The stage will be completed when the student satisfactorily passes the Stage Two Exam with a score of 70% or better.



GROUND LESSON 15

1.5 HOURS

LESSON OBJECTIVE

At the completion of this lesson students should gain an understanding of weather causes and patterns.

ACADEMIC CONTENT

- The atmosphere
 - Contents
 - Levels
 - Circulation
 - Pressure
- Wind patterns
- Weather patterns
 - Stability
 - Adiabatic heating and cooling
- Temperature inversions
- Moisture
 - Relative humidity
 - Temperature/dew point spread
- Clouds
- Thunderstorms
 - Life cycles
 - Movement
- Precipitation
- Air masses and fronts

COMPLETION STANDARDS

Student understanding of the material will be demonstrated through oral quizzing by the instructor, and/or through a written quiz.

REQUIRED READING/STUDY

- Jeppesen Guided Flight Discovery: Private Pilot 6A & 6B
- Gleim Study Units 7.1 – 7.11



GROUND LESSON 16

1.5 HOURS

LESSON OBJECTIVE

At the completion of this lesson students should gain an understanding of weather hazards and wake turbulence hazards.

ACADEMIC CONTENT

- Atmospheric restrictions to visibility
 - Fog
 - Haze or smoke
 - Heavy rain
- Wind hazards
 - Wind shear and microburst
 - Crosswinds
 - Taxiing in strong winds
- Turbulence
 - Convective activity
 - Clear air turbulence
 - Wake turbulence
 - Mountain wave
 - Maintaining aircraft control (attitude vs. altitude)
- Thunderstorms
 - Squall line
 - Lightening
 - Turbulence
 - Hail
 - Wind shear
 - Microburst
 - Tornadoes
- Icing
 - Rime
 - Clear
 - Effects on performance

COMPLETION STANDARDS

Student understanding of the material will be demonstrated through oral quizzing by the instructor, and/or through a written quiz.

REQUIRED READING/STUDY

- Jeppesen Guided Flight Discovery: Private Pilot 6C
- Gleim Study Units 3.6, 7.4 – 7.5; 7.7



GROUND LESSON 17

1.5 HOURS

LESSON OBJECTIVE

At the completion of this lesson students should gain an understanding of weather services, including how to obtain and read weather reports and graphs.

ACADEMIC CONTENT

- Weather reports
 - METAR
 - PIREP
 - TAF
 - Area forecast
 - AIRMET
 - SIGMET
- Graphic weather products
 - Radar summary chart
 - Weather depiction chart
 - Prognostic chart
 - Satellite imagery
 - Convective outlook chart
 - Forecast winds and temperatures aloft
 - Volcanic ash and dispersion chart
- Weather information sources
 - Flight service station
 - HIWAS
 - ATIS/AWOS/ASOS
 - ATC
 - Internet

COMPLETION STANDARDS

Student understanding of the material will be demonstrated through oral quizzing by the instructor, and/or through a written quiz.

REQUIRED READING/STUDY

- Jeppesen Guided Flight Discovery: Private Pilot 7A, 7B, 7C, & 7D
- Gleim Study Units 8.1 – 8.11



GROUND LESSON 18

1.5 HOURS

LESSON OBJECTIVE

At the completion of this lesson students should gain an understanding of the pertinent Federal Aviation Regulations for private pilot privileges.

ACADEMIC CONTENT

- FAR structure
- FAR Part 1, 21, 39, 43: applicable rules
- FAR Part 61: currency and privileges
- FAR Part 91: applicable rules
- NTSB Part 830

COMPLETION STANDARDS

Student understanding of the material will be demonstrated through oral quizzing by the instructor, and/or through a written quiz.

REQUIRED READING/STUDY

- Federal Aviation Regulations Parts 61 & 91
- Gleim Study Units 4.1 – 4.5; 4.7 – 4.10



GROUND LESSON 19

1.5 HOURS

LESSON OBJECTIVE

At the completion of this lesson students should gain an understanding of the hazards to flight (not previously covered.)

ACADEMIC CONTENT

- Collision avoidance
 - Visual scanning
 - Clearing turns
 - Blind spots
 - Aircraft lights
 - Traffic service
- Right-of-way rules
- Safe operating altitudes
- Transfer of aircraft control
- Stall and spin review

COMPLETION STANDARDS

Student understanding of the material will be demonstrated through oral quizzing by the instructor, and/or through a written quiz.

REQUIRED READING/STUDY

- Jeppesen Guided Flight Discovery: Private Pilot 4A
- Gleim Study Units 3.7; 4.8 (91.111, 91.113, 91.119, 91.209)



GROUND LESSON 20

1.5 HOURS

LESSON OBJECTIVE

At the completion of this lesson students should gain an understanding of the skills required for VFR cross country navigation.

ACADEMIC CONTENT

- Pilotage vs. Dead Reckoning (DR)
- Magnetic vs. true north
 - Isogonic lines on a chart
 - Converting true to magnetic course or heading
 - Compass deviation
- Course considerations
 - Altitude
 - Airspace
 - Distance
 - Winds
 - Fuel stops
 - Time zone
- Wind effects
 - Drift
 - Ground speed
 - Wind triangle
 - Ground reference maneuvers
 - Landings
- E6B basics
 - Ground speed
 - Wind correction
- Diversion

COMPLETION STANDARDS

Student understanding of the material will be demonstrated through oral quizzing by the instructor, and/or through a written quiz.

REQUIRED READING/STUDY

- Jeppesen Guided Flight Discovery: Private Pilot 9A & 9B
- Gleim Study Units 11.3, 11.5 – 11.13



GROUND LESSON 21

1.5 HOURS

LESSON OBJECTIVE

At the completion of this lesson students should gain an understanding of the skills required to plan a VFR cross country flight.

ACADEMIC CONTENT

- Route choice
 - Distance between fuel stops
 - Airspace and obstructions
 - VFR cruising altitudes
 - Wind considerations
 - Checkpoint selection
- Plotting courses (true and magnetic)
- Calculating wind drift and ground speed
 - Winds aloft forecast
 - Performance cruise chart for TAS
 - E6B usage
- VFR fuel requirements
- Flight plan forms
- Flight plan filing and activation
- Lost procedures

COMPLETION STANDARDS

Student understanding of the material will be demonstrated through oral quizzing by the instructor, and/or through a written quiz.

REQUIRED READING/STUDY

- Jeppesen Guided Flight Discovery: Private Pilot 11A & 11B
- Airman's Information Manual 5-1-1 to 5-1-9
- Gleim Study Units 11.1 – 11.7



GROUND LESSON 22

1.5 HOURS

LESSON OBJECTIVE

At the completion of this lesson students should gain an understanding of the skills required to plan a VFR cross country flight.

ACADEMIC CONTENT

- Review cross country planning
- Plan a sample cross country flight in class
- Other considerations
 - Aircraft performance
 - Weight and balance
 - NOTAMs
 - TFRs
 - Weather
- Preflight actions
 - Alternatives if flight cannot be completed
 - Alternatives if flight is delayed

COMPLETION STANDARDS

Student understanding of the material will be demonstrated through oral quizzing by the instructor, and/or through a written quiz.

REQUIRED READING/STUDY

- Jeppesen Guided Flight Discovery: Private Pilot 11A & 11B
- Airman's Information Manual 5-1-1 to 5-1-9
- Gleim Study Units 11.1 – 11.7



GROUND LESSON 23

1.5 HOURS

LESSON OBJECTIVE

At the completion of this lesson students should gain an understanding of radio and satellite navigation aids.

ACADEMIC CONTENT

- VOR
 - System operation
 - Position interpretation
 - Tracking
- ADF
- GPS

COMPLETION STANDARDS

Student understanding of the material will be demonstrated through oral quizzing by the instructor, and/or through a written quiz.

REQUIRED READING/STUDY

- Jeppesen Guided Flight Discovery: Private Pilot 9B, 9C, & 9D
- Gleim Study Units 10.1 – 10.4



GROUND LESSON 24

1.5 HOURS

LESSON OBJECTIVE

At the completion of this lesson students should be prepared to pass the Stage Two Exam.

ACADEMIC CONTENT

- Preview all the material covered in lessons 15 through 23
- Cover specific questions from students
- Sample Gleim questions

COMPLETION STANDARDS

Student understanding of the material will be demonstrated through oral quizzing by the instructor.

REQUIRED READING/STUDY

All reading from lessons 15-23

GROUND LESSON 25

1.5 HOURS

LESSON OBJECTIVE

This lesson assesses the student's comprehension of material introduced in Stage Two.

ACADEMIC CONTENT

Stage Two Exam

COMPLETION STANDARDS

The stage will be completed when the student satisfactorily passes the Stage Two Exam with a score of 70% or better.

REQUIRED READING/STUDY

N/A



PRIVATE PILOT GROUND SCHOOL

STAGE THREE (7.5 HOURS)

Lessons 26 - 30

STAGE THREE OBJECTIVES: The student will be instructed in human factors, aeronautical decision making, and flight physiology.

STAGE THREE COMPLETION STANDARDS: The stage will be completed when the student satisfactorily passes the Stage Three Exam (Final Exam) with a score of 70% or better.



GROUND LESSON 26

1.5 HOURS

LESSON OBJECTIVE

At the completion of this lesson students should gain an understanding of human factors and aeronautical decision making.

ACADEMIC CONTENT

- Introduction to Aeronautical Decision Making (ADM)
 - CRM
 - SPRM
 - Risk Management
- Hazardous attitudes and antidotes
- I'M SAFE
- Human error
- The decision-making process

COMPLETION STANDARDS

Student understanding of the material will be demonstrated through oral quizzing by the instructor, and/or through a written quiz.

REQUIRED READING/STUDY

- Jeppesen Guided Flight Discovery: Private Pilot 1C & 10B
- Gleim Study Units 6.6



GROUND LESSON 27

1.5 HOURS

LESSON OBJECTIVE

At the completion of this lesson students should gain an understanding of physiological factors in aviation.

ACADEMIC CONTENT

- Vision
 - Limitations
 - Night adaptation
 - Visual illusions
- Spatial disorientation
- Hypoxia
 - Oxygen requirements
 - Alcohol effects
- Carbon monoxide
- Fatigue

COMPLETION STANDARDS

Student understanding of the material will be demonstrated through oral quizzing by the instructor, and/or through a written quiz.

REQUIRED READING/STUDY

- Jeppesen Guided Flight Discovery: Private Pilot 10A
- Gleim Study Units 6.1 – 6.5



GROUND LESSON 28

1.5 HOURS

LESSON OBJECTIVE

At the completion of this lesson students should be able to apply critical thinking and ADM to a real-world scenario.

ACADEMIC CONTENT

- In class exercise
 - Real-world case study
 - Example: JFK Jr. crash
- Apply risk management and ADM principles

COMPLETION STANDARDS

Student understanding of the material will be demonstrated through oral quizzing by the instructor, and/or through a written quiz.

REQUIRED READING/STUDY

- Jeppesen Guided Flight Discovery: Private Pilot 10B
- Gleim Study Units 6.6



GROUND LESSON 29

1.5 HOURS

LESSON OBJECTIVE

At the completion of this lesson students should be prepared to pass the Stage Three Exam.

ACADEMIC CONTENT

- Preview all the material covered in all previous lessons
- Cover specific questions from students
- Sample Gleim questions

COMPLETION STANDARDS

Student understanding of the material will be demonstrated through oral quizzing by the instructor.

REQUIRED READING/STUDY

All reading from all lessons

GROUND LESSON 30

1.5 HOURS

LESSON OBJECTIVE

This lesson assesses the student's comprehension of all material covered in the Private Pilot Ground School.

ACADEMIC CONTENT

Stage Three Exam (Final Exam)

COMPLETION STANDARDS

The stage will be completed when the student satisfactorily passes the Stage Three Exam (Final Exam) with a score of 70% or better.

REQUIRED READING/STUDY

N/A



SECTION FIVE

Flight Training



PRIVATE PILOT FLIGHT TRAINING LESSON LAYOUT

STAGE ONE (18.1 HOURS)

LESSON	TOTAL (ASEL)	DUAL (ASEL)	SOLO (ASEL)	DUAL X/C	SOLO X/C	NIGHT	INST (SIM/ACTL)	SIM	PRE/POST
1									2.0
2									2.0
3	1.1	1.1							0.9
4	1.5	1.5							0.5
5	1.5	1.5							0.5
6	1.5	1.5							0.5
7									2.0
8	1.5	1.5							0.5
9	1.5	1.5							0.5
10	1.5	1.5							0.5
11									2.0
12								1.0	
13	1.5	1.5							0.5
14	1.5	1.5							0.5
15	1.5	1.5							0.5
16	0.5		0.5						
17	1.5	1.5							0.5
18									2.5
19	1.5	1.5							1.0
Stage 1 Totals	18.1	17.6	0.5					1.0	17.4

Note: Lesson hours (dual, pre/post, etc.) are approximations. Instructors should attempt to meet these times for each lesson to maximize efficiency and student learning.



STAGE TWO (26.8 HOURS)

LESSON	TOTAL (ASEL)	DUAL (ASEL)	SOLO (ASEL)	DUAL X/C	SOLO X/C	NIGHT	INST (SIM/ACTL)	SIM	PRE/POST
20									2.0
21	1.5	1.5					0.4		0.5
22	1.5	1.5					0.4		0.5
23	1.5		1.5						
24									2.5
25	1.7	1.7		1.7			0.3		1.0
26	1.5		1.5						
27	2.5	2.5		2.5			0.3		1.0
28	3.0	3.0		3.0		3.0	0.4		1.0
29	3.3		3.3		3.3				1.0
30	2.2		2.2		2.2				1.0
31	1.5	1.5					0.3		0.3
32	1.5		1.5						
33	1.7	1.7					0.3		0.3
34	1.7	1.7					0.3		0.3
35									2.5
36	1.7	1.7					0.3		2.0
Stage 2 Totals	26.8	16.8	10	7.2	5.5	3.0	3.0		15.9
Totals	44.9	34.4	10.5	7.2	5.5	3.0	3.0	1.0	33.3

Note: Lesson hours (dual, pre/post, etc.) are approximations. Instructors should attempt to meet these times for each lesson to maximize efficiency and student learning.

Note: A student may complete the training in less than the allotted time, and by accomplishing less than the identified requirements, provided he/she meets the minimum requirements specified in 14 CFR 141 Appendix B.



FLIGHT LESSON TEMPLATE

LESSON #: [Flight, Simulator, or Pre/Post Ground]

X.X HOURS DUAL/SOLO [Approximate flight hours required]

X.X HOURS INSTRUMENT [Simulated or actual]

X.X HOURS Pre/Post [Approximate Pre/Post briefing time required]

LESSON OBJECTIVE

[Summarizes the ground and flight training the student is expected to receive and/or accomplish during this lesson.]

GROUND TRAINING: Review [Identifies elements introduced on a previous lesson]

Topic in Bold [The primary topic to reviewed]

- Square bullets represent graded items
 - Not graded; extra information
 - Not graded; extra information
- OPTIONAL [Not required; grade 1-5 if performed]

GROUND TRAINING [Identifies topics to be introduced on this lesson]

Topic in Bold [The primary topic to introduced]

- Square bullets represent graded items
 - Not graded; extra information
 - Not graded; extra information
- OPTIONAL [Not required; grade 1-5 if performed]

FLIGHT TRAINING: Review [Identifies maneuvers/skills to be reviewed on this lesson.]

Maneuver/Skill in Bold: [The primary maneuver/skill to be reviewed]

- Square bullets represent graded maneuvers/skills
 - Not graded; extra information
 - Not graded; extra information
- OPTIONAL [Not required; grade 1-5 if performed]

FLIGHT TRAINING [Identifies maneuvers/skills to be introduced on this lesson]

Maneuver/Skill in Bold: [The primary maneuver/skill to be introduced]

- Square bullets represent graded maneuvers/skills
 - Not graded; extra information
 - Not graded; extra information
- OPTIONAL [Not required; grade 1-5 if performed]

COMPLETION STANDARDS

[Summarizes the level of student performance required to complete the lesson.]

REQUIRED READING/STUDY

- A bulleted list of the reference materials for this lesson
- Students are expected to come prepared to each lesson...
- by studying the material from this list beforehand



PRIVATE PILOT FLIGHT TRAINING

STAGE ONE (18.1 HOURS)

Lessons 1 - 19

STAGE ONE OBJECTIVES: The student will be instructed in the basic flying procedures and skills necessary to operate an aircraft solo in today's modern airspace system and in a technologically advanced aircraft.

STAGE ONE COMPLETION STANDARDS: The stage will be completed when the student satisfactorily passes the Stage One check and is able to conduct solo flights safely.



LESSON 1: PRE/POST GROUND 2.0 HOURS

LESSON OBJECTIVE

The objective is to ensure the student is properly enrolled, and to acquaint the student with the training course outline and flight school operating procedures. Each element is to be briefly discussed and introduced to the student to familiarize him/her with the subject matter.

GROUND TRAINING

Enrollment – ensure the student:

- Is taking, or has taken, Private Pilot Ground School
- Possesses a 1st, 2nd, or 3rd class medical
- Has TSA approval (if applicable)
- Has read and signed the flight lab Terms of Agreement (if applicable)
- Is furnished with...
 - a signed enrollment certificate
 - a copy of this TCO
 - a copy of the FOM
 - Show where these are stored electronically
- Has applied for a student pilot certificate in IACRA

How to Succeed in Pilot Training

- Show up prepared!
 - Study
 - Chair fly
- Fly often – at least 3 times/week
- Communicate with your CFI
- Keep perfect records (go over how to fill out a logbook)

Safety Procedures and Practices Manual (Flight Operations Manual (FOM))

- Purpose of the manual
 - Augments FARs (Can be more restrictive; not less)
 - Airlines use them
 - Treat as regulatory
- Go over the rules (dress code; no show; taxi procedures; weather mins; etc.)
- Safety Management System: how/when to file a report

Training Course Outline (TCO)

- Facilities, resources, and personnel
- Lesson progression and topics
- Lesson layout
- Stage 1 and 2 objectives and completion standards
- Flight time and Pre/Post ground time requirements

Federal Aviation Regulations (FAR)

- How to read the FARs
 - Division into Parts, Subparts, etc.
 - Primary and sub-paragraphs
 - Purpose of Part 1, 61, 91, 141, etc.
- 61.3 Requirements for Certificates, Ratings, and Authorizations
- 61.23 Medical Certificates: Requirement and Duration
- 61.51 Pilot Logbooks
- 61.56 Flight Review
- 61.57 Recent Flight Experience for PIC
- 61.87 Solo Requirements for Student Pilots
- 61.89 General Solo Limitations

COMPLETION STANDARDS

By the end of this lesson the student should be enrolled and ready to begin flight training. Also, through oral quizzing the student shall demonstrate a basic understanding of the Safety Procedures and Practices Manual (a.k.a. FOM), the TCO, and the FARs. Further, the student should demonstrate knowledge of how to study and succeed in this flight training program.

REQUIRED READING/STUDY

(None)

LESSON 2: PRE/POST GROUND 2.0 HOURS

LESSON OBJECTIVE

The objective is to introduce the P and A of the PAVE risk management acronym by discussing I'M SAFE and aircraft preflight procedures. Additionally, the student will review basic aerodynamic principles that will apply to the first flight lesson. (If weather and time permit, this lesson should immediately precede Lesson 3)

GROUND TRAINING

Risk Management

- PAVE – the 4 risk elements
- Making the go/no-go decision

Aeromedical Overview

- I'M SAFE
- Middle ear and sinus problems
- Motion sickness
- Carbon monoxide poisoning
- Stress and fatigue
- Effects of alcohol and drugs

Aerodynamics

- Angle of Attack (AOA) and how a wing creates lift
- 4 Forces acting on the airplane
- Axis of rotation (roll, pitch, yaw)
- Trim (how to trim off pressure)
- Flight controls
 - Elevator/Stabilator controls speed and/or altitude
 - Rudder for coordination
 - Ailerons to bank/turn
 - Power controls speed and/or altitude
- Left turning tendencies
- Dynamic and Static stability

Instrumentation

- Pitot/static instruments
 - “6-pack” (Description/Operation)
 - “Glass” (PFD/MFD; AHRS/ADC)
- Gyroscopic instruments
 - “6-pack” (Description/Operation)
 - “Glass” (PFD/MFD; AHRS/ADC)

Preflight Preparation and Procedures

- How to complete dispatch paperwork
- Certificates and documents (AROW)
- Operating limitations to include placards and STC's
- Airworthiness requirements (inspections, AD's etc.)
- How to verify maintenance inspections (A-AVIATE)
- FAR 91.9, 91.203 & 91.205
- POH Sections 2, 3, & 4
- Conduct a thorough preflight inspection
 - Use an airplane if available
 - Use the Preflight Power Point if no airplane available
 - Follow along with the checklist

COMPLETION STANDARDS

The student should be able to demonstrate basic preflight requirements, to include a self-assessment (I'M SAFE) and a proper airplane inspection. Additionally, through oral quizzing the student should demonstrate basic knowledge of aerodynamic principles.

REQUIRED READING/STUDY

- Federal Aviation Regulations (FARs) – 91.9, 91.203 and 205
- Airplane Flying Handbook (AFH) FAA-H-8083-3A - Ch 1 thru 2
- Aircraft Pilot Operating Handbook sections 1, 2 & 4
- North Star Aviation Inc. Preflight Power Point Presentation
- FAA Private Pilot – Airplane Airman Certification Standards (ACS) Area of Operation I. Task B (Airworthiness Requirements)



LESSON 3: FLIGHT

1.1 HOURS DUAL

0.9 HOURS PRE/POST

LESSON OBJECTIVE

The student will be introduced to all normal checklist procedures—preflight through post flight. In the flight phase the student will be introduced to the fundamentals of basic aircraft control and pilotage navigation (the GPS/VOR should **not** be used.)

GROUND TRAINING

Preflight Preparation

- Pilot Certificates and documents
- FAR 91.103
 - Check weather
 - Check NOTAMs
 - Check TFRs
 - Calculate T/O & Landing performance
 - Calculate Weight & Balance
- I'M SAFE
- Practice area selection

Safety Related Operations and Procedures

- Crew Resource Management
- Positive exchange of flight controls
- Visual scanning/collision avoidance
- Pre-maneuver checklist and clearing turns
- Runway incursion avoidance

Preflight Briefing

- Takeoff procedures
- V-Speeds
- Pitch/Power relationship for airspeed and altitude control
- Coordinated turns

FLIGHT TRAINING

Preflight Procedures

- Preflight inspection
- Aircraft servicing: oil and fuel
- Cockpit management
- Checklist usage

Start, Taxi, Run-up

- Engine start and warm-up
- Taxi briefing
- Taxi procedures
 - Use of rudder pedals
 - Use of brakes
 - Positioning flight controls
- Aircraft Run-up

Normal/Crosswind Takeoff and Landing

- Pre-takeoff briefing
- Before takeoff checklist
- CFI-demonstrated takeoff
- Climb at V_y : emphasize the horizon
- CFI-demonstrated pattern and landing
- Radio Communications - CFI

Pilotage Navigation (No GPS/VOR!)

- Navigate to/from the practice area via landmarks
- Estimate distance

Basic & Performance Maneuvers

- Straight-and-level flight at various airspeeds: emphasize the horizon
- Use of pitch trim
- Power settings for key airspeeds
- Climbs and descents from St. & Lvl.
- Turns up to 30° bank
- Dynamic and static stability demo
- Rudder and aileron coordination maneuvers

Post Flight Procedures

- After landing checklist
- Parking and securing the aircraft
- Post flight inspection

COMPLETION STANDARDS

The student should begin to develop basic flight control skills, and he/she should be able to perform an instructor-assisted preflight.

REQUIRED READING/STUDY

- POH Sections 2 & 4
- AFH Ch 3 and 5
- FAR 91.103
- AIM 5-1-3 (NOTAMs)
- ACS I. Task A (Pilot Qualifications)



LESSON 4: FLIGHT

1.5 HOURS DUAL

0.5 HOURS PRE/POST

LESSON OBJECTIVE

The student will build upon the previous lesson with continued practice of preflight procedures and checklist usage. Basic control skills are further developed with the introduction of steep turns. From this point forward the student should perform the takeoff and make radio calls with/without CFI assistance. The CFI performs landings through Lesson 6 so the student can develop a proper sight picture. Pilotage navigation (i.e. no GPS/VOR) continues to be an emphasis.

GROUND TRAINING: Review

Preflight Preparation

- Pilot certificates and documents
- FAR 91.103 (weather, NOTAMS, wt. & balance, etc.)
- I'M SAFE
- Practice area selection

GROUND TRAINING

Normal/Crosswind Takeoff

- Centerline control via rudder
- Ailerons into the wind; gradually reduce
- V-speeds (Rotate and Climb)

Radio Communication

- Begin/end all calls with the airport name
- Who, where, what, etc.
- Example radio calls: "Mankato Traffic, Warrior 282 Mike Kilo, Left Base ..."

Steep Turns

- Load factor: why more "pull" is needed to hold altitude
- Induced drag: why more power is needed to hold airspeed
- Coordinated turns
- Outside (horizon) reference
- ACS standards

FLIGHT TRAINING: Review

Pre/Post flight Procedures

- Checklist usage
- Preflight inspection
- Cockpit management
- Parking and securing the aircraft
- Post flight inspection

Safety Related Operations and Procedures

- Crew Resource Management
- Positive Exchange of the Flight Controls
- Visual Scanning/Collision Avoidance
- Pre-maneuver Checklist and Clearing Turns
- Runway Incursion Avoidance

Start, Taxi, Run-up

- Engine start and warm-up
- Taxi briefing
- Taxi procedures (rudder pedals, brakes, and flight controls for wind.)
- Aircraft Run-up

Normal/Crosswind Takeoff and Landing

- Pre-takeoff briefing
- Before takeoff checklist
- Student takeoff with CFI assistance
- CFI-demonstrated pattern and landing
- Radio Communications – Student

Pilotage Navigation (No GPS/VOR!)

- Navigate to/from the practice area via landmarks
- Remain in the area via landmarks
- Estimate distance

Basic & Performance Maneuvers

- Use of pitch trim
- Power settings for key airspeeds
- Climbs and descents from S & L
- Rudder and aileron coordination maneuvers

FLIGHT TRAINING

Steep Turns

- Line up on a N-S or E-W road
- Add power and elevator thru 30° bank
- 45° bank left and right horizon picture
- Roll out on the same road

COMPLETION STANDARDS

With limited assistance the student will be able to perform preflight operations, and he/she should show progression with basic control. He/she should also begin to demonstrate situational awareness by navigating to/from the practice area using pilotage only.

REQUIRED READING/STUDY

- AFH Ch 9 through "steep turns."
- AIM 4-2-1 & 4-2-2



LESSON 5: FLIGHT

1.5 HOURS DUAL

0.5 HOURS PRE/POST

LESSON OBJECTIVE

The student will build upon the previous lessons with continued practice of preflight procedures and checklist usage. Basic control skills are further developed with the introduction of slow flight and glides. The CFI performs landings through Lesson 6 so the student can develop a proper sight picture. Pilotage navigation (i.e. no GPS/VOR) continues to be an emphasis.

GROUND TRAINING: Review

Preflight Preparation

- Pilot Certificates and documents
- FAR 91.103 (weather, NOTAMS, wt. & balance, etc.)
- I'M SAFE
- Practice area selection

Normal/Crosswind Takeoff

- Centerline control via rudder
- Ailerons into the wind; gradually reduce
- V-speeds (rotate and climb)

Radio Communication

- Begin/end all calls with the airport name
- Who, where, what, etc.

GROUND TRAINING

Slow Flight

- Pitch/power relationship
 - Pitch for speed
 - Power for altitude
- Target speeds and configurations
- Aerodynamic stall
- ACS standards

Glides

- Purpose
- Glide ratios
- Trim settings

FLIGHT TRAINING: Review

Pre/Post flight Procedures

- Checklist usage
- Preflight inspection
- Cockpit management
- Parking and securing the aircraft
- Post flight inspection

Start, Taxi, Run-up

- Engine start and warm-up
- Taxi briefing
- Taxi procedures (rudder pedals, brakes, and flight controls for wind.)
- Aircraft run-up

Normal/Crosswind Takeoff and Landing

- Pre-takeoff briefing
- Before takeoff checklist
- Student takeoff with CFI assistance
- CFI-demonstrated pattern and landing
- Radio communications – student

Pilotage Navigation (No GPS/VOR!)

- Navigate to/from the practice area via landmarks
- Remain in the area via landmarks
- Estimate distance

FLIGHT TRAINING

Slow Flight

- Clean and with various flaps
 - Note AOA changes
 - Monitor airspeed (white arc)
- Emphasize pitch for speed & power for altitude
- Level flight, turns, climbs, descents
- Recover while holding altitude

Glides

- Power idle and various low settings
- Trim for hands-off speed control
 - Normal descent
 - V_g Glide (power idle)
- Glide straight ahead and turning
- Level off at a predetermined altitude

COMPLETION STANDARDS

With limited assistance the student will be able to perform preflight operations, and he/she should show progression with basic control by maintaining altitude ± 150 feet, heading $\pm 15^\circ$. He/she should demonstrate situational awareness by navigating to/from the practice area using pilotage only.

REQUIRED READING/STUDY

- AFH Ch 3 “glides” and Ch 4 “slow flight.”
- ACS V. Task A (Steep Turns)
- ACS VII. Task A (Slow Flight)



LESSON 6: FLIGHT

1.5 HOURS DUAL

0.5 HOURS PRE/POST

LESSON OBJECTIVE

This is a review lesson to hone basic skills, steep turns, and slow flight. The CFI continues to perform the landing so the student can develop a proper sight picture. Pilotage navigation (i.e. no GPS/VOR) remains an emphasis.

GROUND TRAINING: Review

Aircraft Airworthiness

- Airworthiness requirements (inspections, AD's etc.)
- Required maintenance inspections (A-AVIATE)
- FAR 91.203 & 205

GROUND TRAINING

Pilotage Navigation

- Identify landmarks on the practice area map
- Discuss how to remain in the area
 - Use landmarks
 - Use the wind (fly upwind most often)
 - Always make turns
- Discuss landmarks to find the airport

FLIGHT TRAINING: Review

Pre/Post flight Procedures

- Checklist usage
- Preflight inspection
- Cockpit management
- Parking and securing the aircraft
- Post flight inspection

Start, Taxi, Run-up

- Engine start and warm-up
- Taxi briefing
- Taxi procedures (rudder pedals, brakes, and flight controls for wind.)
- Aircraft run-up

Normal/Crosswind Takeoff and Landing

- Pre-takeoff briefing
- Before takeoff checklist
- Student takeoff with CFI assistance
- CFI-demonstrated pattern and landing
- Radio communications – student

Pilotage Navigation (No GPS/VOR!)

- Navigate to/from the practice area via landmarks
- Remain in the area via landmarks
- Estimate distance
- Find the airport with no CFI assistance

Slow Flight

- Clean and with various flaps
 - Note AOA changes
 - Monitor airspeed (white arc)
- Emphasize pitch for speed & power for altitude
- Level flight, turns, climbs, descents
- Recover while holding altitude

Steep Turns

- Line up on a N-S or E-W road
- Add power and elevator thru 30° bank
- 45° bank left and right horizon picture
- Roll out on the same road

COMPLETION STANDARDS

The student will be able to perform preflight operations, and he/she should show progression with basic control by maintaining altitude ± 150 feet, heading $\pm 15^\circ$ through all maneuvers. He/she should demonstrate situational awareness by navigating to/from the practice area using pilotage only and with no CFI assistance.

REQUIRED READING/STUDY

- Pilot's Handbook of Aeronautical Knowledge (PHAK) Ch 9
- ACS V. Task A (Steep Turns)
- ACS VII. Task A (Slow Flight)

LESSON 7: PRE/POST GROUND 2.0 HOURS

LESSON OBJECTIVE

This ground lesson prepares the student to handle emergency situations such as aerodynamic stalls, systems and equipment malfunctions, and situations requiring emergency descents. It also introduces ground reference maneuvers.

GROUND TRAINING

Stalls

- Definition of Angle of Attack (relative wind to chord line)
- Definition of a stall
 - Critical AOA is exceeded
 - Not directly related to airspeed (e.g. accelerated stall)
- Dangers of stalling (especially when maneuvering low to the ground)
- Stall recognition
 - Warning horn (some aircraft)
 - “Mushy” controls
 - Buffet
 - Nose drop (natural recovery)
- Stall recovery (“Relax-Max-Roll”)
 - Lower AOA (i.e. drop the nose)
 - Level the wings (emphasize rudder for this vs. ailerons)
 - Max power
 - Secondary stalls
- Stall practice
 - Why practice?
 - Power off (approach and landing) stalls
 - Power on (takeoff and departure) stalls
 - ACS standards

Spins

- Definition (uncoordinated stall)
 - Insipient phase
 - Developed phase
- Dangers of spinning (especially when maneuvering low to the ground)
- Spin recognition
- Spin recovery
 - PARE acronym
 - Dive recovery
 - Must recover BEFORE spin begins when low!

Systems/Equipment Malfunctions

- Review emergency checklists
- Discuss memory items
 - Fire during start
 - Takeoff abort
 - Fire/Engine failure in flight
 - Emergency descent
- Emergency scenarios; “What would you do if?”
 - Rough engine
 - Engine failure in flight
 - Alternator failure
 - Radio failure
 - Flight control failure

Federal Aviation Regulations

- 91.3 PIC emergency authority
- 830.1 Emergency reporting

Ground Reference Maneuvers

- Purpose
- Analyzing the wind
- How to track a road (i.e. crab)
- Required maneuvers
 - Rectangle pattern
 - Turn-about-a-point
 - S-turn
- ACS standards

COMPLETION STANDARDS

The student should gain a thorough understanding of, and respect for, the dangers of stalls and spins. The student should be able to verbalize the proper recognition and recovery procedures for both. Additionally, the student should be able to recite the appropriate checklist for a given system or equipment malfunction, and he/she should begin to show Aeronautical Decision Making (ADM) skills for a given scenario.

REQUIRED READING/STUDY

- AFH Ch 4 and 6 (thru S-turn)
- PHAK Ch 2 & 5
- POH Section 3
- NSA Warrior Emergency Checklist
- FAR (NTSB) 830



LESSON 8: FLIGHT

1.5 HOURS DUAL

0.5 HOURS PRE/POST

LESSON OBJECTIVE

This lesson introduces power on and power off stalls to prepare the student for safe aircraft operation prior to solo. The student should begin to perform the landing with CFI assistance. Pilotage navigation (i.e. no GPS/VOR) remains an emphasis.

GROUND TRAINING: Review

Stalls/Spins

- Stall recognition
- Stall recovery
- How to set up the maneuvers for training
- Spin recognition and recovery
 - Uncoordinated stall
 - Airplane begins to turn
 - PARE to recover

Systems/Equipment Malfunctions

- Engine fire during start
- Rough engine during run-up
 - Magneto check doesn't pass
 - Discuss clearing procedure

FLIGHT TRAINING: Review

Start, Taxi, Run-up

- Engine start and warm-up
 - Simulate a fire
 - Identify emergency equipment
- Taxi briefing
- Taxi procedures (rudder pedals, brakes, and flight controls for wind.)
- Aircraft Run-up
 - Simulate a rough mag check
 - Practice clearing procedure

Normal/Crosswind Takeoff and Landing

- Student takeoff
- Student pattern and landing with CFI assistance
- Radio communications

Steep Turns

- OPTIONAL: Steep turns if time allows

Pilotage Navigation (No GPS/VOR!)

- Navigate to/from the practice area via landmarks
- Remain in the area via landmarks
- Estimate distance
- Find the airport with no CFI assistance

Slow Flight

- Clean and with various flaps
 - Note AOA changes
 - Monitor airspeed (white arc)
- Emphasize pitch for speed & power for altitude
- Level flight, turns, climbs, descents

FLIGHT TRAINING

Power Off Stall

- Various flap configurations
- Recover on first indication
- Recover at the buffet
- Recover from a full stall
- Demo secondary stall during recovery

Power On Stall

- Various takeoff/go-around flap configurations
- Recover on first indication
- Recover at the buffet
- Recover from a full stall
- Demo secondary stall during recovery

Spin Awareness (Do Not Spin!)

- Enter a turning power off stall
- Emphasize rudder use on recovery to level wings

COMPLETION STANDARDS

The student should be able to recite stall/spin recognition and recovery procedures and apply that knowledge to stall setup and recovery in the airplane with CFI assistance. Basic aircraft control should be at ACS requirements (± 100 feet, heading $\pm 10^\circ$, airspeed ± 10 knots.) The student should continue to demonstrate situational awareness by navigating to/from the practice area, and remain within the practice area, using pilotage only and with no CFI assistance.

REQUIRED READING/STUDY

- AFH Ch 4
- ACS VII. Task B, C, and D (Stalls/Spins)



LESSON 9: FLIGHT

1.5 HOURS DUAL

0.5 HOURS PRE/POST

LESSON OBJECTIVE

The student will further develop power on/off stall setup and recovery procedures. Ground reference maneuvers are introduced as a precursor to traffic patterns. Additionally, the student will gain skills in handling emergencies through the introduction of system/equipment malfunctions in flight. The student should continue to perform the landing with some CFI assistance. Pilotage navigation (i.e. no GPS/VOR) remains an emphasis.

GROUND TRAINING: Review

Systems/Equipment Malfunctions

- Review emergency checklists
- Discuss memory items
 - Fire during start
 - Fire/Engine failure in flight
 - Takeoff abort
- Emergency scenarios; "What would you do if?"
 - Rough engine
 - Engine failure in flight
 - Alternator failure
 - Radio failure
- Emergency Descents
 - When required
 - Safe airspeeds
 - Bank angle

FLIGHT TRAINING: Review

Normal/Crosswind Takeoff and Landing

- Student takeoff
- Student pattern and landing with CFI assistance
- Radio communications

Pilotage Navigation (No GPS/VOR!)

- Navigate to/from the practice area via landmarks
- Remain in the area via landmarks
- Find the airport with no CFI assistance

Steep Turns

- OPTIONAL: Steep turns if time allows

Slow Flight

- OPTIONAL: Slow flight if time allows

Power Off Stall

- Various flap configurations
- Straight and/or turning
- Recover on first indication, buffet, or full stall

Power On Stall

- Various takeoff/go-around flap configurations
- Straight and/or turning
- Recover on first indication, buffet, or full stall

FLIGHT TRAINING

Emergency Descent

- Scenario: smoke/fumes in the cabin
- Execute an emergency descent to 1000' AGL
 - Idle power
 - Accelerate to V_{no}
 - Max Bank - 45°

Ground Reference Maneuvers

- Track a road with a crosswind using crab
- Rectangular pattern
- Turn-about-a-point
- S-turn

COMPLETION STANDARDS

The student should be able to setup and recover from stalls with some CFI assistance. Basic aircraft control should be at ACS requirements (± 100 feet, heading $\pm 10^\circ$, airspeed ± 10 knots.) During an emergency descent the student should recognize airspeed limitations and be able to fly near V_{no} . He/she should continue to demonstrate situational awareness and pilotage skills by analyzing winds during ground reference maneuvers and while navigating to/from, and remaining within, the practice area.

REQUIRED READING/STUDY

- ACS V. Task B (Ground Ref. Mnvs)
- ACS IX. Task A (Emergency Descent)



LESSON 10: FLIGHT

1.5 HOURS DUAL

0.5 HOURS PRE/POST

LESSON OBJECTIVE

This review flight will hone the student's stall recognition and recovery skills. Another system/equipment malfunction scenario is introduced, leading to an emergency descent. The number and type of ground reference maneuvers are at the CFI's discretion, but turns-about-a-point and/or s-turns should be emphasized (rectangular patterns receive more attention when practicing traffic patterns.) The student should continue to perform the landing with some CFI assistance. Pilotage navigation (i.e. no GPS/VOR) remains an emphasis.

GROUND TRAINING

Safety of Flight

- Collision avoidance
- Wind shear avoidance
- Wake turbulence avoidance

FLIGHT TRAINING: Review

Normal/Crosswind Takeoff and Landing

- Student takeoff
- Student pattern and landing with CFI assistance
- Radio communications

Pilotage Navigation (No GPS/VOR!)

- Navigate to/from the practice area via landmarks
- Remain in the area via landmarks
- Find the airport with no CFI assistance

Step Turns

- OPTIONAL: Step turns if time allows

Slow Flight

- OPTIONAL: Slow flight if time allows

Power Off Stall

- Various flap configurations
- Straight and/or turning
- Recover on first indication, buffet, or full stall

Power On Stall

- Various takeoff/go-around flap configurations
- Straight and/or turning
- Recover on first indication, buffet, or full stall

Emergency Descent

- Scenario: engine fire
- Execute an emergency descent to 1000' AGL
 - Idle power
 - Accelerate to V_{no}
 - Max Bank - 45°

Ground Reference Maneuvers

- Track a road with a crosswind using slip (in preparation for crosswind landings)
- Ground reference maneuver: Choose 1 or more:
 - Turn-about-a-point
 - S-Turn
 - Rectangular pattern

COMPLETION STANDARDS

The student should be able to setup and recover from stalls with little CFI assistance. Basic aircraft control should be at ACS requirements (± 100 feet, heading $\pm 10^\circ$, airspeed ± 10 knots.) During an emergency descent the student should recognize airspeed limitations and be able to fly near V_{no} . He/she should continue to demonstrate situational awareness and pilotage skills by analyzing winds during ground reference maneuvers and while navigating to/from and remaining within the practice area.

REQUIRED READING/STUDY

- AFH Ch 1 "Collision avoidance"
- PHAK Ch 11 "Low-level wind shear"
- AIM Ch 7, Section 3 (Wake Turbulence)
- ACS V. Task B (Ground Ref. Mnvs)
- ACS IX. Task A (Emergency Descent)

LESSON 11: PRE/POST GROUND 2.0 HOURS

LESSON OBJECTIVE

This ground lesson will prepare the student for solo flight by covering traffic patterns, normal/crosswind landings, forward slips to landings, and go-arounds. Emergency procedures are further emphasized, including the emergency approach and landing both on and off the airport. By this point the student should be able to navigate to/from the local area via pilotage; therefore, GPS and radio (VOR) navigation procedures are introduced.

GROUND TRAINING: Review

Systems/Equipment Malfunctions

- Review emergency checklists
- Discuss memory items
 - Fire during start
 - Fire/Engine failure in flight
 - Takeoff Abort
- ADM in emergencies
- Emergency scenarios; "What would you do if?"
 - Low oil pressure
 - Engine fire in flight
 - Alternator failure
 - Smoke/fumes in cockpit
 - Flight control failure

GROUND TRAINING

Emergency Equipment

- Use of the fire extinguisher
- ELT
 - Location
 - Operation
 - Maintenance requirements
- Emergency radio communications
 - 121.5
 - Declaring emergency/mayday
- Recommended emergency/survival gear

Emergency Approach and Landing

- Trim for best glide
- Troubleshoot a failed engine
 - Checklist if time
 - Memory items
- Locate a suitable landing spot
- Energy management/wind analysis
- Setting up a landing pattern

Traffic Patterns

- Traffic pattern legs
- How to enter (local and other airports)
- Radio calls
- Airspeeds and configurations on downwind, base, and final
- Adjusting for wind
- Visual references

Normal/Crosswind Landing

- A stable approach is most important
- Focus down the runway in the flare
- Level off above the runway, and hold it
- Maintain centerline
- Touch on the mains first

Forward Slip

- When to use (i.e. to deplete energy)
- How to fly (i.e. cross-controlled)
- Differentiate from side slip used for crosswind landing

Go-Around

- When to initiate
- How to fly (5Cs: Cram, Climb, Clean, Cool, Call)
- Go-around from a bounce, balloon, porpoise, etc.
- Offset if required for traffic

GPS and VOR Navigation

- Programming the GPS for direct-to flight
- Using the VOR to fly to/from a station
 - Tune and identify the station
 - Center the CDI with a To/From
 - Apply wind corrections

COMPLETION STANDARDS

The student should be able to apply basic ADM to a given emergency scenario, using the checklist and/or emergency responses. This includes being able to recite the memory items in an engine failure situation. The student should know the legs of a traffic pattern and the radio calls, airspeeds, and configurations associated with each, and he/she should be able to recite the 5Cs used in a go-around.

REQUIRED READING/STUDY

- **FOM Open Book Test**
- POH Section 5 "Takeoff/Landing"
- AIM Section 4-3-3 (Traffic Pattern)
- AFH Ch 7 & 8
- PHAK Ch 15 "VOR" & "GPS"



LESSON 12: SIMULATOR

1.0 HOURS DUAL

LESSON OBJECTIVE

This emergency procedures simulator session is used to reinforce previous emergency lessons in preparation for solo flight. It is intended as a *procedures* training session so that the student can practice applying various checklists to various situations (i.e. basic aircraft control skills are not evaluated.)

SIMULATOR TRAINING

Systems/Equipment Malfunctions

- Engine fire during start
- Rough engine during mag check
- Takeoff abort
- Engine fail after takeoff
- Engine fail in flight (at altitude)
 - Power restored
 - Power not restored (followed by a power off landing)
- Engine fire in flight
- Emergency descent
- Smoke/fumes in the cockpit
 - Electrical fire
 - Other sources (e.g. iPad)
- Loss of oil pressure
- Loss of fuel pressure
- High oil temperature
- Rough engine in flight
- Alternator failure

Spin Training

- Practice spins from various entry situations (turn motion off)
- Use PARE to recover

COMPLETION STANDARDS

The student should be able to apply basic ADM to a given emergency scenario, using the checklist and/or emergency responses. This includes being able to recite the memory items in an engine failure situation. The student should know the PARE acronym and apply it during a spin.

REQUIRED READING/STUDY

- AFH Ch 17
- ACS IX. Task B, C, D (Emergency Operations)

LESSON 13: FLIGHT

1.5 HOURS DUAL

0.5 HOURS PRE/POST

LESSON OBJECTIVE

The student will begin to practice multiple traffic patterns, landings, and go-arounds in preparation for solo flight. A satellite airport should be used to avoid congested patterns. This lesson begins with multiple patterns that result in go-arounds to solidify procedures, and then it moves on to landings. An emergency approach and landing off airport is also emphasized. In-flight maneuvers can be performed at CFI discretion if time allows. GPS and VOR navigation are used, along with pilotage, to/from the airport(s).

GROUND TRAINING: Review

GPS and VOR Navigation

- Programming the GPS for direct-to flight
- Using the VOR to fly to/from a station
 - Tune and identify the station
 - Center the CDI with a To/From
 - Apply wind corrections

Traffic Patterns

- Traffic pattern legs
- How to enter (local and other airports)
- Radio calls/Clearing for traffic
- Airspeeds and configurations on downwind, base, and final
- Adjusting for wind
- Visual references

Normal/Crosswind Landing

- A stabilized approach is most important
- Focus down the runway in the flare
- Level off above the runway and hold it!
- Maintain centerline
- Touch on the mains first

GROUND TRAINING

Airport Selection/Review

- Select a satellite airport for training
 - Check NOTAMs & TFRs
 - Check METAR/TAFs
 - Check runway lengths
- Review the route to/from the airport
- Review Chart Supplement (a.k.a. A/FD)
 - Frequencies
 - Pattern altitudes

FLIGHT TRAINING

Navigation

- Program the GPS for direct-to flight
 - Set the CDI to GPS
 - Use map mode for SA only
 - Note distance, g/s, track, etc.
- Set VOR for direct-to flight
 - Tune/Identify station
 - Center CDI with "TO"

Traffic Patterns

- Enter per AIM or local procedures
- Fly multiple patterns to go-arounds
 - Work on ground track, airspeed, and configuration
 - Practice radio calls
 - Apply the 5Cs for go-arounds

Normal/Crosswind Takeoffs and Landings

- Fly a stabilized approach on speed
- Begin round-out at the correct height
- Hold the aircraft off the runway as it slows in idle power
 - Adjust back pressure to keep from ballooning or sinking
 - Focus down the runway
 - Wait for the mains to touch
- Full stop taxi back, stop and go, or touch and go at CFI's discretion

Emergency Approach and Landing (departing or returning flight)

- Simulated engine failure en-route
- Trim for Vg
- Select a landing field (watch for towers)
- Troubleshoot (checklist/memory items)
- Manage energy/adjust for winds
- Configure when appropriate for landing
- Apply forward slip if required
- Go around no lower than 500' AGL

COMPLETION STANDARDS

The student should demonstrate preflight planning skills by reviewing information for another airport, and he/she should be able to navigate with CFI assistance using GPS/VOR. In the pattern he/she should make all radio calls and name all legs correctly. Basic aircraft control should be at ACS standards (± 100 feet, heading $\pm 10^\circ$, airspeed ± 10 knots.)

REQUIRED READING/STUDY

- AFH Ch 8
- ACS IV. Task A & B (Takeoff/Landing)

LESSON 14: FLIGHT

1.5 HOURS DUAL

0.5 HOURS PRE/POST

LESSON OBJECTIVE

This lesson continues the practice of repetitive patterns and landings, including an on-airport emergency approach and landing. A satellite airport should be used to avoid congested patterns. In-flight maneuvers can be performed at CFI discretion if time allows. GPS and VOR navigation are used along with pilotage to/from the airport(s).

GROUND TRAINING: Review

Normal/Crosswind Landing

- A stabilized approach is most important
- Focus down the runway in the flare
- Level off above the runway and hold it!
- Maintain centerline
- Touch on the mains first

Emergency Approach & Landing

- On airport – minimize troubleshooting
- Don't stray too far
 - Consider the winds
 - Use the whole runway
- Trim for V_g and hold that until flaring
- Manage energy
 - Configure with flaps/drag when safe
 - Wait on final flaps until necessary
 - Apply forward slip to increase drag

Airport Selection/Review

- Select a satellite airport for training
 - Check NOTAMS & TFRs
 - Check METAR/TAFs
 - Check runway lengths
- Review the route to/from the airport
- Review Chart Supplement (a.k.a. A/FD)
 - Frequencies
 - Pattern altitudes

FLIGHT TRAINING: Review

Navigation

- Program the GPS for direct-to flight
- Set VOR for direct-to flight
 - Tune/Identify station
 - Center CDI with "TO"

Traffic Patterns

- Enter per AIM or local procedures
- Fly multiple patterns to go-arounds
 - Work on ground track, airspeed, and configuration
 - Practice radio calls
 - Apply the 5Cs for go-arounds

Normal/Crosswind Takeoffs and Landings

- Fly a stabilized approach on speed
- Forward slip to reduce energy
- Begin round-out at the correct height
- Hold the aircraft off the runway as it slows in idle power
 - Adjust back pressure to keep from ballooning or sinking
 - Focus down the runway
 - Wait for the mains to touch
- Maintain centerline
- Full stop taxi back, stop and go, or touch and go at CFI's discretion

Emergency Approach and Landing (on airport)

- Simulated engine failure on downwind
- Trim for V_g
- Manage energy/adjust for winds
- Configure when appropriate for landing
- Apply forward slip if required

Steep Turns

- OPTIONAL: Steep turns if time allows

Slow Flight

- OPTIONAL: Slow flight if time allows

Power on/off stalls

- OPTIONAL: Power on/off stalls if time

COMPLETION STANDARDS

The student should demonstrate preflight planning skills by reviewing information for another airport, and he/she should be able to navigate with little CFI assistance using GPS/VOR. The student should fly patterns while applying appropriate wind corrections and maintaining ground track. Landings should show improvement with some CFI assistance. Basic aircraft control should be at ACS standards (± 100 feet, heading $\pm 10^\circ$, airspeed ± 10 knots.)

REQUIRED READING/STUDY

- **Pre Solo Open Book Test**
- **Pre Solo Closed Book Test**



LESSON 15: FLIGHT

1.5 HOURS DUAL

0.5 HOURS PRE/POST

LESSON OBJECTIVE

This is the final lesson before solo. It should be repeated as necessary until the CFI is confident in the student's abilities to fly safe patterns and landings*. When the student is ready for solo this lesson is combined with Lesson 16. The local pattern or a satellite airport may be used (record the return leg as dual on Lesson 15.) The emphasis is on patterns and landings; all other maneuvers are at the CFI's discretion.

**Note: after two repeats without a solo endorsement the student should fly with another CFI; preferably a stage check pilot.*

GROUND TRAINING: Review

Pre Solo Tests: Correct to 100% (required before flight)

- FOM Open Book Test
- Pre Solo Open Book Test
- Pre Solo Closed Book Test

Go Around

- When to execute
 - Bounced landing
 - High balloon or porpoise
 - Traffic on the runway
 - Something's not right
- The 5C's
 - Cram (max power)
 - Climb (away from the ground)
 - Clean (raise flaps slowly)
 - Cool (i.e. take a breath)
 - Call (let others know)

FLIGHT TRAINING: Review

Navigation

- OPTIONAL: Program the GPS for direct-to flight
- OPTIONAL: Use VOR navigation for the return flight

Traffic Patterns

- Enter per AIM or local procedures
- Fly multiple patterns to go-arounds/landings
 - Work on ground track, airspeed, and configuration
 - Practice radio calls

Normal/Crosswind Takeoffs

- Pre-departure radio call: check for traffic
- Maintain centerline
- Rotate at V_r and climb at V_y
- Apply ailerons into the wind (crosswind); gradually reduce
- Crab into the wind after liftoff (crosswind) to hold centerline

Normal/Crosswind Landings

- Fly a stabilized approach on speed
- Forward slip to reduce energy
- Begin round-out at the correct height
- Hold the aircraft off the runway as it slows in idle power
 - Adjust back pressure to keep from ballooning or sinking
 - Focus down the runway
 - Wait for the mains to touch
- Maintain centerline
- Align the aircraft with the runway (crosswind)
- Increase aileron into the wind (crosswind)
- Full stop taxi back, stop and go, or touch and go at CFI's discretion

Emergency Approach and Landing (on/off airport)

- OPTIONAL: Emergency approach and landing if time allows

Steep Turns

- OPTIONAL: Steep turns if time allows

Slow Flight

- OPTIONAL: Slow flight if time allows

Power on/off stalls

- OPTIONAL: Power on/off stalls if time

COMPLETION STANDARDS

This lesson is complete when the student is able to demonstrate safe patterns and landings consistently. The CFI must also be confident in the student's ability to handle emergencies while in the traffic pattern, including immediate recovery from an impending stall. With the above assurances, the CFI will endorse the student for solo flight. (Note: the FOM and pre solo open/closed book tests must also be completed and corrected to 100%.)

REQUIRED READING/STUDY

- ACS III. Task B (Traffic Patterns)



LESSON 16: FLIGHT

0.5 HOURS SOLO

LESSON OBJECTIVE

This lesson should be combined with Lesson 15. The student will fly his/her first solo in the traffic pattern following successful completion of multiple landings in Lesson 15*. A total of three solo landings should be performed under direct supervision of the CFI**, with as many go-arounds as required. The student should use the correct call sign per the FOM so that other pilots can identify him/her (e.g. "Solo 282 MK".)

**Note: A student pilot certificate is required before solo.*

***Note: Logbook endorsement required. Reference FAR 61.87 (n) & (p)*

FLIGHT TRAINING: Review

Traffic Patterns

- Make all radio calls, and clear for traffic
- Checklist usage
- Normal/crosswind takeoffs
- Normal/crosswind landings
- OPTIONAL: Go around if required
- Full stop, taxi back all landings**

COMPLETION STANDARDS

This lesson is complete when the student is able to perform at least one solo takeoff, pattern, and landing (he/she should perform three.)

REQUIRED READING/STUDY

- ACS III. Task B (Traffic Patterns)
- ACS IV. Task A & B (Takeoff/Landing)
- ACS IV. Task M (Forward Slip to Landing)
- ACS IV. Task N (Go-Around/Rejected Landing)



LESSON 17: FLIGHT

1.5 HOURS DUAL

0.5 HOURS PRE/POST

LESSON OBJECTIVE

This lesson is used to prepare the student for his/her Stage One check. The student should practice all maneuvers learned up to this point, repeating those that need extra work. This is an instructional flight; however, the CFI should exercise discretion in determining when to teach vs. when to evaluate (i.e. prepare the student to be evaluated on Lesson 19.)

GROUND TRAINING: Review

Preflight Preparation

- Pilot certificates and documents
- FAR 91.103 (weather, NOTAMS, wt. & balance, etc.)
- I'M SAFE
- Practice area selection

Aircraft Airworthiness

- Airworthiness requirements (inspections, AD's etc.)
- Required maintenance inspections (A-AVIATE)
- FAR 91.203 & 205
- Inspect aircraft maintenance logs

FLIGHT TRAINING: Review

Navigation

- Pilotage to and within the practice area
- VOR or GPS navigation to the airport

Normal/Crosswind Takeoffs and Landings

- Normal/crosswind takeoff and climb
- Traffic pattern entry
- Traffic patterns
- Normal/crosswind landings
- Radio communication
- Forward slip to landing
- Go-around/rejected landing
- Full stop taxi back, stop and go, or touch and go at CFI's discretion

Practice Area Maneuvers

- Steep turn
- Slow flight
- Power off stall (turning or straight)
- Power on stall (turning or straight)
- Spin awareness

Emergency Procedures

- System/equipment malfunction
- Emergency descent
- Emergency approach and landing (off airport)
- Emergency approach and landing (on airport)

Ground Reference Maneuvers

- Turn-about-a-point or S-turn
- OPTIONAL: rectangular pattern

COMPLETION STANDARDS

The student will be able to perform all maneuvers with little to no CFI assistance. While ACS standards are not required yet, the student should be showing steady progression in that direction. Basic control (altitude, airspeed, heading) should be at ACS standards.

REQUIRED READING/STUDY

- All material previously covered, with an emphasis on the ACS Areas of Operations and Tasks.



LESSON 18: PRE/POST GROUND 2.5 HOURS

LESSON OBJECTIVE

This ground lesson is used to prepare the student for the oral portion of his/her Stage One check, and to ensure his/her training records are in order.

GROUND TRAINING: Review

Risk Management

- PAVE
- Making the go/no-go decision

FARs

- 61.3 Requirements for certificates, ratings, and authorizations
- 61.23 Medical certificates: requirement and duration
- 61.51 Pilot logbooks
- 61.56 Flight review
- 61.57 Recent flight experience for PIC
- 61.87 Solo requirements for student pilots
- 61.89 General solo limitations
- 91.3 PIC emergency authority
- 830.1 Emergency reporting

Aeromedical Overview

- I'M SAFE
- Middle ear and sinus problems
- Motion sickness
- Carbon monoxide poisoning
- Stress and fatigue
- Effects of alcohol and drugs

Aerodynamics

- Angle of Attack (AOA)
- 4 Forces acting on the airplane
- Axes of rotation (roll, pitch, yaw)
- Left turning tendencies
- Dynamic and static stability
- Definition of a stall
 - Stall recognition
 - Stall recovery
- Definition of a spin
- Spin recovery (PARE)

Preflight Preparation and Procedures

- Pilot certificates and documents
- FAR 91.103 (weather, NOTAMS, wt. & balance, etc.)
- Airplane certificates and documents (AROW)
- Maintenance inspections (A-AVIATE)
- FAR 91.203 & 205

Systems/Equipment Malfunctions

- Review emergency checklists
- Discuss memory items
 - Fire during start
 - Fire/Engine failure in flight
 - Takeoff Abort
- Emergency scenarios; "What would you do if?"

Emergency Equipment

- Use of the fire extinguisher
- ELT (location, operation, maintenance requirements)

GROUND TRAINING

Records Audit (Student must be present)

- Complete the *Private Pilot Stage One Auditing Checklist* and correct all errors.
- Certify completion with a remark on this lesson's gradesheet (example below):

"I have audited all lessons for TCO compliance using North Star Aviation's Private Pilot Stage One Auditing Checklist."

COMPLETION STANDARDS

Through oral quizzing the student should demonstrate a basic understanding of safe aircraft operating principles, including FAR's, aeromedical considerations, aerodynamics, preflight planning and inspection requirements, and emergency procedures. This lesson is not complete until the record audit is accomplished and all errors are corrected.

REQUIRED READING/STUDY

- All material previously covered, with an emphasis on the ACS Areas of Operations and Tasks.



LESSON 19: STAGE ONE CHECK

1.5 HOURS DUAL

1.0 HOURS PRE/POST

LESSON OBJECTIVE

The Chief/Assistant Chief Instructor or an approved Stage Check Pilot will evaluate the student's knowledge and proficiency in the items listed below to determine if he/she is able to operate the aircraft safely in the local environment, and to determine if he/she is ready to begin Stage Two.

GROUND TRAINING: Review

General Knowledge

- FARs (See Lesson 2 for references)
- Aeromedical considerations
- Aerodynamics (including stalls/spins)
- Aircraft systems
- Basic weather

Preflight Preparation

- Pilot certificates and documents
- FAR 91.103 (weather, NOTAMS, wt. & balance, etc.)
- I'M SAFE
- Practice area selection

Aircraft Airworthiness

- Airworthiness requirements (inspections, AD's etc.)
- Required maintenance inspections (A-AVIATE)
- FAR 91.203 & 205
- Inspect aircraft maintenance logs

Systems/Equipment Malfunctions

- Emergency checklists
- Memory items
- Emergency scenarios; "What would you do if?"

Emergency Equipment

- Use of the fire extinguisher
- ELT (location, operation, maintenance requirements)

FLIGHT TRAINING: Review

Navigation

- Pilotage to, and within, the practice area
- VOR or GPS navigation to the airport

Normal/Crosswind Takeoffs and Landings

- Normal/crosswind takeoff and climb
- Traffic pattern entry
- Traffic patterns
- Normal/crosswind landings
- Radio communication
- Forward slip to landing
- Go-around/rejected landing
- Full stop taxi back, stop and go, or touch and go at CFI's discretion

Practice Area Maneuvers

- Steep turn
- Slow flight
- Power off stall (turning or straight)
- Power on stall (turning or straight)
- Spin awareness

Emergency Procedures

- System/equipment malfunction
- Emergency descent
- Emergency approach and landing (off airport)
- Emergency approach and landing (on airport)

Ground Reference Maneuvers

- Turn-about-a-point or S-turn
- OPTIONAL: rectangular pattern

COMPLETION STANDARDS

The student should demonstrate a basic understanding of the primary risk elements (PAVE), and the ability to perform safe solo flights under CFI supervision. ACS standards are not yet required; however, all maneuvers should be performed with little CFI assistance, indicating that the student has the ability and aptitude to complete Private Pilot training. Basic control (altitude, airspeed, heading) should be at ACS standards.

REQUIRED READING/STUDY

- All material previously covered, with an emphasis on the ACS Areas of Operations and Tasks.



PRIVATE PILOT FLIGHT TRAINING

STAGE TWO (26.8 HOURS)

Lessons 20 - 36

STAGE TWO OBJECTIVES: In this stage the student will build upon what he/she learned in Stage One by learning how to operate the aircraft safely in the National Airspace System (NAS). This includes dual day and night cross country flights, solo day cross country flights, air traffic control communications, and takeoffs and landings from short or soft runways. The student will also learn how to fly solely by reference to instruments. Stage One lessons, such as area maneuvers and emergency procedures, will continue to be refined in preparation for the end of course stage check and Private Pilot checkride.

STAGE TWO COMPLETION STANDARDS: The stage will be completed when the student demonstrates through written, oral, and practical testing that he/she meets or exceeds Private Pilot Single Engine Land Airman Certification Standards (ACS). The student's flight time in various categories, as indicated in his/her training records, must meet or exceed those set forth in FAR Part 141 Appendix B.

Students are expected to complete the FAA Private Pilot knowledge test prior to the end of course stage check. A logbook endorsement from the student's instructor is required before taking this written test.



LESSON 20: PRE/POST GROUND 2.0 HOURS

LESSON OBJECTIVE

This ground lesson introduces the student to short and soft field takeoff and landing procedures. It also prepares the student for instrument flying by discussing instrumentation, basic control by reference to instruments, and the dangers of flying VFR into IMC, with an emphasis on Spatial Disorientation.

GROUND TRAINING

Short Field Takeoff

- Checklist review
- V-Speeds and configuration
- How to perform
- Dangers/common errors
- ACS standards

Short Field Landing

- Checklist Review
- V-Speeds and configuration
- How to perform
- Apply max brakes if required (simulated)
- Dangers/common errors
- ACS standards

Soft Field Takeoff

- Checklist review
- V-Speeds and configuration
- How to perform
- Dangers/common errors
- ACS standards

Soft Field Landing

- Checklist review
- V-Speeds and configuration
- How to perform
- Dangers/common errors
- ACS standards

Flight by Reference to Instruments

- Pitot/static instruments
 - “6-pack” (description/operation)
 - “Glass” (PFD/MFD; AHRS/ADC)
- Gyroscopic instruments
 - “6-pack” (description/operation)
 - “Glass” (PFD/MFD; AHRS/ADC)
- Control/performance method
- Primary/supporting method
- Standard/half standard rate turns
- Timed turns
- Emphasize trim and power settings

Hazards of Instrument Flying

- CFIT (Controlled Flight Into Terrain)
- Limitations to visibility
- Spatial disorientation
- Illusions leading to Spatial “D”
- Unusual attitude recovery
- Runway illusions
- Aeromedical factors affecting instrument flight

VFR into IMC

- Emergency situation for a non-instrument rated pilot
- Make a 180 degree turn
 - Stay trimmed; hold altitude and speed
 - Note initial heading
 - Standard/half standard rate turn
- Seek help on 121.5 if required
- Find VFR weather and land

COMPLETION STANDARDS

The student should be able to state when short or soft field procedures are required and how to apply them. The student should also demonstrate understanding of the primary flight instruments, including the difference between pitot/static and gyroscopic instruments (glass and traditional.) Additionally, the student should understand how and why flight by reference to instruments is performed, including the hazards.

REQUIRED READING/STUDY

- AFH Ch 4 (Human Factors)
- AFH Ch 5 and 8 “Short/Soft field only”
- AFH Ch 17 “Inadvertent VFR into IMC”
- PHAK Ch 8
- ACS IV. Task C, and D (Short/Soft Takeoff/Landing)
- ACS VIII. (Basic Instrument Maneuvers)



LESSON 21: FLIGHT

1.5 HOURS DUAL

0.4 INSTRUMENT

0.5 HOURS PRE/POST

LESSON OBJECTIVE

This lesson introduces the student to short/soft field procedures and to flight by reference to instruments only. Soft/soft field practice may be accomplished at a satellite airport to reduce congestion. Other in-flight maneuvers may be practiced at the CFI's discretion.

FLIGHT TRAINING: review

Navigation

- Pilotage to the practice area
- VOR or GPS navigation to the local airport
- OPTIONAL: GPS Navigation to a satellite airport

Steep Turns

- OPTIONAL: Steep turns if time allows

Slow Flight

- OPTIONAL: Slow flight if time allows

Power On/Off Stalls

- OPTIONAL: Power on/off stalls if time

FLIGHT TRAINING

Takeoffs, Landings, and Go-Arounds

- Short field takeoff
- Max performance climb (V_x)
- Short field landing
- Soft field takeoff
- Soft field landing
- Forward slip to landing
- Go-around/rejected landing

Flight by Reference to Instruments

- Straight and level
- Changing airspeeds while holding altitude
- Standard/half-standard rate turns
- Turns to headings
- Constant speed climbs and descents
- 180-degree timed turn
- Unusual attitude recoveries
- Track a VOR or GPS course
- Radio communication (e.g. simulated emergency calls)

COMPLETION STANDARDS

The student should begin to control the aircraft solely by reference to instruments, working towards ACS standards. Additionally, the student should demonstrate understanding of the purpose and procedures for performing short and soft field takeoffs and landings.

REQUIRED READING/STUDY

- AFH Ch 4 (Human Factors)
- AFH Ch 5 and 8 "Short/Soft field only"
- AFH Ch 17 "Inadvertent VFR into IMC"
- PHAK Ch 8
- ACS IV. Task C, and D (Short/Soft Takeoff/Landing)
- ACS VIII. (Basic Instrument Maneuvers)



LESSON 22: FLIGHT

1.5 HOURS DUAL

0.4 INSTRUMENT

0.5 HOURS PRE/POST

LESSON OBJECTIVE

This lesson repeats the previous lesson, providing the student more practice with instrument flight and short/soft field procedures. Short/soft field practice may be done at a satellite airport to reduce congestion. Other in-flight maneuvers may be practiced at the CFI's discretion.

FLIGHT TRAINING: review

Navigation

- Pilotage to the practice area
- VOR or GPS navigation to the local airport
- OPTIONAL: GPS navigation to a satellite airport

Steep Turns

- OPTIONAL: Steep turns if time allows

Slow Flight

- OPTIONAL: Slow flight if time allows

Power On/Off Stalls

- OPTIONAL: Power on/off stalls if time allows

FLIGHT TRAINING

Takeoffs, Landings, and Go-Arounds

- Short field takeoff
- Max performance climb (V_x)
- Short field landing
- Soft field takeoff
- Soft field landing
- Forward slip to landing
- Go-around/rejected landing

Flight by Reference to Instruments

- Straight and level
- Changing airspeeds while holding altitude
- Standard/half standard rate turns
- Turns to headings
- Constant speed climbs and descents
- 180-degree timed turn
- Unusual attitude recoveries
- Track a VOR or GPS course
- Radio communication (e.g. simulated emergency calls)

COMPLETION STANDARDS

The student should be able to control the aircraft by reference to instruments only, working towards ACS standards. Unusual attitude recoveries should be prompt and safe. Short and soft field takeoffs and landings should show steady progression throughout the flight.

REQUIRED READING/STUDY

- AFH Ch 4 (Human Factors)
- AFH Ch 5 and 8 "Short/Soft field only"
- AFH Ch 17 "Inadvertent VFR into IMC"
- PHAK Ch 8
- ACS IV. Task C, and D (Short/Soft Takeoff/Landing)
- ACS VIII. (Basic Instrument Maneuvers)



LESSON 23: FLIGHT

1.5 HOURS SOLO

LESSON OBJECTIVE

This solo flight is designed to build confidence for the student by allowing him/her to fly to the practice area for maneuver training.

**Note: Logbook endorsement required (check for 90-day currency). Ref. FAR 61.87 (n) & (p)*

FLIGHT TRAINING: review

Navigation

- Pilotage to and within the practice area
- VOR or GPS navigation to the local airport

Area Maneuvers

- Steep turns
- Slow flight
- Power on/off stalls

Takeoffs, Landings, and Go-Arounds

- Normal/crosswind takeoff and landing
- Short field takeoff
- Max performance climb (V_x)
- Short field landing
- Soft field takeoff
- Soft field landing
- Forward slip to landing
- Go-around/rejected landing
- Full stop, taxi back all landings**

COMPLETION STANDARDS

The student should begin to show more confidence in his/her abilities to operate the aircraft safely and to ACS standards. He/she should demonstrate safe collision avoidance practices by making correct radio calls throughout the flight and by maneuvering to avoid other traffic if required. Landings should be safe, on centerline, and with minimal bounce or balloon.

REQUIRED READING/STUDY

(None)



LESSON 24: PRE/POST GROUND 2.5 HOURS

LESSON OBJECTIVE

This ground lesson begins the cross-country phase of training. The student will learn how to plan a cross country flight and how to apply pilotage and dead reckoning (DR) navigation principles to the flight. Night flying is also discussed in preparation for that phase of training.

GROUND TRAINING

Flight Planning

- VFR Sectional chart (legend, symbols, etc.)
- Route review
 - Airspace (rules and equipment)
 - Obstructions
 - Minimum safe altitudes
 - Checkpoints
- Destination
 - Chart supplement (a.k.a. A/FD) review
 - Runway lengths and directions
 - Communications
 - Services
 - NOTAMs
- Find true and magnetic course
- Altitude selection
 - FAR 91.159: VFR altitudes
 - Winds aloft: how to find
- Find True Airspeed
 - POH performance charts
 - Find fuel burn; rpm; etc.
- Find true/mag headings and groundspeed
 - E6B “Spin the winds”
 - Variation vs. deviation
- Plot all distances
- Determine estimated time en-route
- Determine Wt. & Bal. and fuel burn

Risk Management

- Emphasize the V and E in PAVE
- How PAVE applies to a X/C flight

Filing a Flight Plan

- FAR 91.153: required information
- Purpose (search and rescue)
- FAR 91.151: fuel requirements VFR
- How/where to file
- How/where to close the flight plan

Weather

- Sources of weather information
- Departure, en-route, and arrival forecast
- METAR, TAF, FA, PIREP, winds aloft
- Charts (Prog; Radar Summary; etc.)

ATC Communication

- Check in with ATIS information
- Who, where, what
- Follow all instructions
 - “Unable” if you can’t
 - Request alternative
- ATC light gun signals
- VFR flight following

Pilotage and DR: How to Fly

- Single Pilot Resource Management
- Find obvious landmarks along the way
- Adjust course/heading for winds
- Ground speed checks; update times
- Lost procedures

Diversion

- Scenarios: when to divert
- How to find the closest airport
- How to set up for a landing
 - AWOS
 - Entering the traffic pattern

Night Flying

- Functions and parts of the eye
- Night illusions
- Night adaptation
- Aircraft lighting
- Airport lighting
- Personal lighting equipment

COMPLETION STANDARDS

At the completion of this lesson the student should be able to plan a VFR cross country flight, and he/she should be able to explain how to obtain all the required information per FAR 91.103. The student will prepare for the next lesson (25) by completing a cross country flight plan assigned by the CFI.

REQUIRED READING/STUDY

- FAR 91.151 thru 159, 91.209, 61.57(b)
- AFH Ch 10
- PHAK Ch 2, 12 thru 16
- ACS I. Task C, D, E, (Cross Country Planning)
- ACS VI. (Navigation)
- ACS XI. (Night Preparation)



LESSON 25: FLIGHT

1.7 HOURS DUAL X/C

0.3 INSTRUMENT

1.0 HOURS PRE/POST

LESSON OBJECTIVE

The student will plan a VFR cross country flight to one or more destinations, assigned by the CFI, that are at least 50NM apart*. This lesson will introduce the student to pilotage and dead reckoning skills as they apply to long distance navigation. To gain confidence in these skills use of the GPS and VOR should be minimized. (Exception: employ all available resources when necessary for safety and/or practicing Single Pilot Resource Management (SPRM))

**Note: Recommended routes: KMKT to KRWF; KMKT to KMWM; KMKT to KAUM*

GROUND TRAINING: review

Flight Planning

- Review the student's flight plan log
- Have the student explain how he/she derived various numbers on the log

Filing a Flight Plan

- Review the student's flight plan form
- Have the student file the flight plan with Flight Service

FAR 91.103

- Check departure, en-route, and destination weather
- Check NOTAMs and TFRs
- Calculate weight and balance
- Calculate takeoff and landing performance

FLIGHT TRAINING: review

Takeoffs, Landings, and Go-Arounds

- OPTIONAL: Normal/crosswind takeoff and landing
- Short field takeoff
- Max performance climb (V_x)
- Short field landing
- Soft field takeoff
- Soft field landing
- OPTIONAL: Forward slip to landing
- OPTIONAL: Go-around/rejected landing

Flight by Reference to Instruments

- Straight and level, climbs, descents, turns to headings
- Recovery from unusual attitudes

FLIGHT TRAINING

Cross Country Navigation

- Activate and close the VFR flight plan
- Navigate via pilotage and DR to each point (no GPS)
- Set power per the performance chart (rpm and mixture)
- Perform groundspeed checks, update times, fuel use, etc.
- Update heading for winds
- Obtain weather information
- Checklist procedures
- Traffic pattern entry
- Lost procedures (fly or discuss)
- Diversion (fly or discuss)
 - Identify the nearest airport
 - Obtain current weather
 - Explain how to enter the pattern
- OPTIONAL: VFR flight following

COMPLETION STANDARDS

The student should be able to plan the flight accurately, using all resources. When flying, he/she should be able to find the destination airport and enter the traffic pattern with little to no CFI assistance. During groundspeed checks the student's estimated time of arrival (ETA) over each point should be ± 5 minutes of the actual time (ATA), and the ETA to the destination should be ± 10 minutes of ATA. Basic aircraft control throughout the flight is expected to meet ACS standards.

REQUIRED READING/STUDY

- FAR 91.151 thru 159
- PHAK Ch 2, 12 thru 16
- ACS I. Task C, D, E, (Cross Country Planning)
- ACS II. Task B (Cockpit Management)
- ACS VI. (Navigation)



LESSON 26: FLIGHT

1.5 HOURS SOLO

LESSON OBJECTIVE

This solo flight is designed to further build confidence for the student by allowing him/her to fly to the practice area for maneuver training, and to a satellite airport for patterns and landings*.

**Note: Logbook endorsement required for solo flight to another airport. Ref. FAR 61.93 (b)*

**Note: Logbook endorsement required (check for 90-day currency). Ref. FAR 61.87 (n) & (p)*

FLIGHT TRAINING: review

Navigation

- Pilotage to and within the practice area
- GPS navigation to the satellite airport
- VOR or GPS navigation to the home airport

Area Maneuvers

- Steep turns
- Slow flight
- Power on/off stalls
- Ground reference maneuvers (turn-about-a-point and/or S-turn)

Takeoffs, Landings, and Go-Arounds

- Normal/crosswind takeoff and landing
- Short field takeoff
- Max performance climb (V_x)
- Short field landing
- Soft field takeoff
- Soft field landing
- Forward slip to landing
- Go-around/rejected landing
- Full stop, taxi back all landings**

COMPLETION STANDARDS

The student should begin to show more confidence in his/her abilities to operate the aircraft safely and to ACS standards. He/she should demonstrate safe collision avoidance practices by making correct radio calls throughout the flight, and by maneuvering to avoid other traffic if required. Landings should be safe, on centerline, and with minimal bounce or balloon.

REQUIRED READING/STUDY

(None)



LESSON 27: FLIGHT

2.5 HOURS DUAL X/C

0.3 INSTRUMENT

1.0 HOURS PRE/POST

LESSON OBJECTIVE

This second cross country lesson introduces the student to Air Traffic Control (i.e. tower) communications while conducting patterns and landings*. The student will plan a VFR cross country flight assigned by the CFI to at least one destination with an active control tower* that is at least 50NM away. A second destination 50NM from the first and 50NM from the home airport is encouraged. This lesson will reinforce the student's pilotage and dead reckoning skills in preparation for solo cross country flights. To gain confidence in these skills use of the GPS and VOR should be minimized. (Exception: employ all available resources when necessary for safety and/or practicing Single Pilot Resource Management (SPRM))

**Note: N/A if operating from a towered airport*

GROUND TRAINING: review

Flight Planning

- Review the student's flight plan log
- Have the student explain how he/she derived various numbers on the log

Filing a Flight Plan

- Review the student's flight plan form
- Have the student file the flight plan with Flight Service

FAR 91.103

- Check departure, en-route, and destination weather
- Check NOTAMs and TFRs
- Calculate weight and balance
- Calculate takeoff and landing performance

FLIGHT TRAINING: review

Takeoffs, Landings, and Go-Arounds

- Towered airport traffic patterns
- Normal/crosswind takeoff and landing
- Short field takeoff
- Max performance climb (V_x)
- Short field landing
- Soft field takeoff
- Soft field landing
- Forward slip to landing
- Go-around/rejected landing

Flight by Reference to Instruments

- Straight and level, climbs, descents, turns to headings
- Recovery from unusual attitudes

Cross Country Navigation

- Activate and close the VFR flight plan
- Navigate via pilotage and DR to each point (no GPS)
- Set power per the performance chart (rpm and mixture)
- Perform groundspeed checks, update times, fuel use, etc.
- Update heading for winds
- Obtain weather information
- Checklist procedures
- Traffic pattern entry
- Lost procedures (fly or discuss)
- Diversion
 - Identify the nearest airport
 - Obtain current weather
 - Enter the pattern
- VFR flight following

FLIGHT TRAINING

- Tower communication
- OPTIONAL: Practice light gun signals

COMPLETION STANDARDS

The student should be able to plan the flight accurately using all resources. When flying, he/she should be able to find the destination airport and enter the traffic pattern with little to no CFI assistance. During groundspeed checks the student's estimated time of arrival (ETA) over each point should be ± 5 minutes of the actual time (ATA), and the ETA to the destination should be ± 10 minutes of ATA. Basic aircraft control throughout the flight is expected to meet ACS standards.

REQUIRED READING/STUDY

- AIM 4-3-2 (Airport Control Tower)
- FAR 91.151 thru 159
- PHAK Ch 2, 12 thru 16
- ACS I. Task C, D, E, (Cross Country Planning)
- ACS II. Task B (Cockpit Management)
- ACS VI. (Navigation)



LESSON 28: FLIGHT

3.0 HOURS DUAL X/C

3.0 HOURS NIGHT

0.4 INSTRUMENT

1.0 HOURS PRE/POST

LESSON OBJECTIVE

This cross country lesson introduces the challenges of night flying and meets FAR 141 Appendix B night requirements*. The student will plan a night VFR cross country flight to at least one destination. Additional destinations, including towered airports, are encouraged. This lesson should employ all available navigation resources (VOR, GPS, Pilotage, DR, etc.)

Note: Per FAR 141 Appendix B total cross country distance must be greater than 100NM, total night time must be at least 3.0 hours, and total patterns and landings to a full stop must be at least 10. **This lesson may be repeated until the 3.0 hour and 10 pattern and landing requirements are met.*

GROUND TRAINING: review

Flight Planning

- Review the student's flight plan log
- Have the student explain how he/she derived various numbers on the log

Filing a Flight Plan

- Review the student's flight plan form
- Have the student file the flight plan with Flight Service

FAR 91.103

- Check departure, en-route, and destination weather
- Check NOTAMs and TFRs
- Calculate weight and balance
- Calculate T/O & Ldg. performance

Night Flying

- Night illusions
- Night adaptation
- Aircraft lighting
- Airport lighting
- Personal lighting equipment

FLIGHT TRAINING: review

Flight by Reference to Instruments

- Basic control (climbs, turns, descents)
- VOR or GPS navigation
- Unusual attitude recovery

Cross Country Navigation

- Activate and close the VFR flight plan
- Navigate using all resources to each point
- Set power per the performance chart (rpm and mixture)
- Perform groundspeed checks, update times, fuel use, etc.
- Update heading for winds
- Obtain weather information
- Checklist procedures
- Traffic pattern entry
- Lost procedures (fly or discuss)
- Diversion (fly or discuss)
- OPTIONAL: VFR flight following

Takeoffs, Landings, and Go-Arounds

- Normal/crosswind takeoff and landing
- Short or soft field takeoff and landing
- Go-around/rejected landing

FLIGHT TRAINING

Night Training

- Traffic patterns to full-stop landings at night (10 req'd to complete the lesson*)
- Night preflight (checking lights)
- Setting cockpit lighting
- Blind cockpit check (pre-departure)
 - Student closes his/her eyes
 - CFI names switches, knobs, etc.
 - Student touches each while "blind"

Emergency Procedures (Discuss in flight)

- Electrical malfunctions
- Lost communication
- Engine failure at night

COMPLETION STANDARDS

This lesson is not complete until all FAR 141 Appendix B night requirements are met*. Repeat as necessary. The student should be able to plan the flight accurately. In flight the student should be able to find and identify each destination airport using all available resources (GPS, VOR, Pilotage, DR, Airport Lighting), and he/she should enter a normal traffic pattern and perform safe night landings.

REQUIRED READING/STUDY

- AIM 2-1-1 thru 2-1-11
- FAR 91.151 thru 159, 91.209, 61.57(b)
- AFH Ch 10 (Night Operations)
- PHAK Ch 2, 12 thru 16
- ACS XI. (Night Preparation)

LESSON 29: FLIGHT

3.3 HOURS SOLO X/C

1.0 HOURS PRE/POST

LESSON OBJECTIVE

The student will apply lessons learned on the previous cross country dual flight(s) to perform a solo cross country flight that meets FAR 141 Appendix B solo cross country requirements*. The student will plan a VFR cross country flight, assigned by the CFI, to at least three different points of landing, with at least one segment greater than 50NM. The final point of landing should be the home airport. One airport should have an active control tower**. The student may employ all available navigation resources (VOR, GPS, Pilotage, DR, etc.); however, for training and checkride preparation he/she should concentrate on pilotage and dead reckoning navigation.

**Note: Per FAR 141 Appendix B para. 5(a)(1), total distance must be at least 100NM (one segment greater than 50NM) with landings at three or more points.*

***Note: Per FAR 141 Appendix B para. 5(a)(2), the student must perform 3 solo patterns and landings at a tower-controlled airport.*

****Note: Logbook endorsements required. Reference FAR 61.93 (c) and (d),*

GROUND TRAINING: review***

Flight Planning

- Review the student's flight plan log
- Have the student explain how he/she derived various numbers on the log

Filing a Flight Plan

- Review the student's flight plan form
- Have the student file the flight plan with Flight Service

FAR 91.103

- Check departure, en-route, and destination weather
- Check NOTAMs and TFRs
- Calculate weight and balance
- Calculate T/O & Ldg. performance

FLIGHT TRAINING: review

Cross Country Navigation

- Activate and close the VFR flight plan
- Navigate using all resources to each point (emphasize pilotage and DR)
- Set power per the performance chart
- Perform groundspeed checks, update times, fuel use, etc.
- Update heading for winds
- Obtain weather information
- Checklist procedures
- Traffic pattern entry
- OPTIONAL: VFR flight following

Takeoffs, Landings, and Go-Arounds

- Normal/crosswind takeoff and landing
- Short field takeoff and landing
- Soft field takeoff and landing
- Go-around/rejected landing
- Full stop, taxi back all landings**
- OPTIONAL: Pattern and landing at a tower-controlled airport (3 required between this lesson and lesson 30.)**

COMPLETION STANDARDS

The student should be able to plan the flight accurately. In flight the student should be able to find and identify each destination airport using all available resources (GPS, VOR, Pilotage, DR), and he/she should enter a normal traffic pattern and perform safe landings.

REQUIRED READING/STUDY

- FAR 91.151 thru 159
- PHAK Ch 2, 12 thru 16
- ACS I. Task C, D, E, (Cross Country Planning)
- ACS II. Task B (Cockpit Management)
- ACS VI. (Navigation)



LESSON 30: FLIGHT

2.2 HOURS SOLO X/C

1.0 HOURS PRE/POST

LESSON OBJECTIVE

This second solo cross country flight augments the first, enhancing the student's confidence in his/her ability to fly and navigate solo in the national airspace system (NAS). It is also used to complete FAR 141 Appendix B solo cross country requirements not accomplished in Lesson 29. The student will plan a VFR cross country flight to at least one destination, assigned by the CFI, that is greater than 50NM away. (Two destinations, one with a control tower, are required if 141 Appendix B para. 5(a)(1) & (2) requirements* were not met on Lesson 29.) The student may employ all available navigation resources (VOR, GPS, Pilotage, DR, etc.); however, for training and checkride preparation, he/she should concentrate on pilotage and dead reckoning navigation.

**Note: Per FAR 141 Appendix B para. 5(a)(1), total distance must be at least 100NM (one segment greater than 50NM) with landings at three or more points.*

**Note: Per FAR 141 Appendix B para. 5(a)(2), the student must perform 3 solo patterns and landings at a tower-controlled airport.*

***Note: Logbook endorsements required. Reference FAR 61.93 (c) and (d),*

GROUND TRAINING: review**

Flight Planning

- Review the student's flight plan log
- Have the student explain how he/she derived various numbers on the log

Filing a Flight Plan

- Review the student's flight plan form
- Have the student file the flight plan with Flight Service

FAR 91.103

- Check departure, en-route, and destination weather
- Check NOTAMs and TFRs
- Calculate weight and balance
- Calculate T/O & Ldg. performance

FLIGHT TRAINING: review

Cross Country Navigation

- Activate and close the VFR flight plan
- Navigate using all resources to each point (emphasize pilotage and DR)
- Set power per the performance chart
- Perform groundspeed checks, update times, fuel use, etc.
- Update heading for winds
- Obtain weather information
- Checklist procedures
- Traffic pattern entry
- OPTIONAL: VFR Flight Following

Takeoffs, Landings, and Go-Arounds

- Normal/crosswind takeoff and landing
- Short field takeoff and landing
- Soft field takeoff and landing
- Go-around/rejected landing
- Full stop, taxi back all landings**
- OPTIONAL: 3 patterns and landings at a tower-controlled airport* (Required if not accomplished on Lesson 29.)

COMPLETION STANDARDS

The student should be able to plan the flight accurately. In flight the student should be able to find and identify each destination airport using all available resources (GPS, VOR, Pilotage, DR), and he/she should enter a normal traffic pattern and perform safe landings. This lesson is not complete unless all requirements of FAR 141 Appendix B para. 5(a)(1) & (2) have been accomplished between Lessons 29 and 30.

REQUIRED READING/STUDY

- FAR 91.151 thru 159
- PHAK Ch 2, 12 thru 16
- ACS I. Task C, D, E (Cross Country Planning)
- ACS II. Task B (Cockpit Management)
- ACS VI. (Navigation)

LESSON 31: FLIGHT

1.5 HOURS DUAL

0.3 INSTRUMENT

0.3 HOURS PRE/POST

LESSON OBJECTIVE

This lesson reviews and emphasizes area training maneuvers, takeoffs, patterns, landings, and emergency procedures in preparation for the end of course stage check and the Private Pilot checkride. The CFI should closely evaluate the preflight inspection to ensure attention to detail and no degradation of skill. Method of navigation is optional; choose what is most challenging to the student.

GROUND TRAINING: review

Preflight Preparation

- Pilot certificates and documents
- FAR 91.103 (weather, NOTAMS, wt. & balance, takeoff/landing performance.)
- I'M SAFE
- Practice area selection

FLIGHT TRAINING: review

Pre/Post flight Procedures

- Checklist usage
- Preflight inspection (CFI evaluates)
- Cockpit management
- Parking and securing the aircraft
- Post flight inspection

Safety Related Operations and Procedures

- Single Pilot Resource Management
- Positive exchange of the flight controls
- Visual scanning/collision avoidance
- Pre-maneuver check & clearing turns
- Runway incursion avoidance

Takeoffs, Landings, and Go-Arounds

- Normal/crosswind takeoff and landing
- Short field takeoff and landing
- Soft field takeoff and landing
- OPTIONAL: Go-around/rejected landing
- OPTIONAL: Forward slip to landing

Navigation (CFI Discretion)

- OPTIONAL: Pilotage to/from and within the practice area
- OPTIONAL: VOR navigation to/from the practice area/airport
- OPTIONAL: GPS navigation to/from the practice area/airport

Area Maneuvers

- Steep turn
- Slow flight
- Power off stall (full stall)
- Power on stall (full stall)
- Ground reference maneuvers (choose at least one)
 - Turn-about-a-point
 - S-Turn
 - Rectangular pattern

Flight by Reference to Instruments

- Straight and level, turns, climbs, descents
- Track a course (VOR or GPS)
- Unusual attitude recoveries

Emergency Procedures

- Engine failure after takeoff (simulated; discuss in flight)
- Engine failure in the traffic pattern (simulated)
- Emergency approach and landing (on airport)
- System/equipment malfunction
 - CFI discretion
 - Pick one or more; discuss in flight
 - Checklist procedures
- Emergency descent
- Emergency approach and landing (off airport)

COMPLETION STANDARDS

The student should be able to perform a thorough preflight inspection with no CFI assistance. Basic aircraft control (airspeed, altitude, heading) should be to ACS standards. All area maneuvers should be set up by memory and performed correctly. The student should demonstrate sound Aeronautical Decision Making (ADM), Single Pilot Resource Management (SPRM), visual scanning/collision avoidance techniques, and other safety related procedures throughout the flight with little to no CFI assistance.

REQUIRED READING/STUDY

- **Private Pilot Open Book Final Test**
- **Private Pilot Closed Book Final Test**
- **FAA Private Pilot Knowledge Exam (logbook endorsement required.)**



LESSON 32: FLIGHT

1.5 HOURS SOLO

LESSON OBJECTIVE

The objective of this solo flight is to provide the student with more opportunity to practice and to build confidence. Patterns and landings may be performed at a satellite airport*.

**Note: Logbook endorsement required for solo flight to another airport. Ref. FAR 61.93 (b)*

FLIGHT TRAINING: review

Navigation

- Pilotage to, and within, the practice area
- OPTIONAL: GPS navigation to the satellite airport
- OPTIONAL: VOR/GPS navigation to the home airport

Area Maneuvers

- Steep turns
- Slow flight
- Power on/off stalls
- Ground reference maneuvers (turn-about-a-point and/or s-turn)

Takeoffs, Landings, and Go-Arounds

- Normal/crosswind takeoff and landing
- Short field takeoff
- Max performance climb (V_x)
- Short field landing
- Soft field takeoff
- Soft field landing
- Forward slip to landing
- Go-around/rejected landing
- Full stop, taxi back all landings**

COMPLETION STANDARDS

The student should begin to show more confidence in his/her abilities to operate the aircraft safely and to ACS standards. He/she should demonstrate safe collision avoidance practices by making correct radio calls throughout the flight, and by maneuvering to avoid other traffic if required. Landings should be safe, on centerline, and with minimal bounce or balloon.

REQUIRED READING/STUDY

(None)



LESSON 33: FLIGHT

1.7 HOURS DUAL

0.3 INSTRUMENT

0.3 HOURS PRE/POST

LESSON OBJECTIVE

This lesson closely mimics the end of course stage check and the Private Pilot checkride. It is an instructional lesson; however, the CFI should exercise discretion in determining when to teach vs. when to evaluate. Repeat any maneuvers that require extra practice. The flight begins with a cross country leg that is interrupted by a diversion scenario. The CFI will choose the destination and evaluate the student's planning.

GROUND TRAINING: review

Preflight Preparation

- Pilot certificates and documents
- Aircraft maintenance logs
- FAR 91.103 (weather, NOTAMS, wt. & balance, takeoff/landing performance.)
- I'M SAFE
- Practice area selection

Flight Planning

- Review the student's flight plan log
- Have the student explain how he/she derived various numbers on the log
- Review the student's flight plan form

FLIGHT TRAINING: review

Pre/Post flight Procedures

- Checklist usage
- Preflight inspection (CFI evaluates)
- Cockpit management
- Parking and securing the aircraft
- Post flight inspection

Cross Country Navigation

- Activate the VFR flight plan (simulated)
- Use pilotage and DR to find each point
- Set power per the performance chart
- Perform groundspeed checks, update times, fuel use, etc.
- Update heading for winds
- Checklist procedures
- Lost procedures (fly or discuss)
- Divert to another airport
 - Identify the nearest airport
 - Obtain current weather
 - Enter the pattern

Takeoffs, Landings, and Go-Arounds

- Normal/crosswind takeoff and landing
- Short field takeoff and landing
- Soft field takeoff and landing
- Go-around/rejected landing
- Forward slip to landing

Area Maneuvers

- Steep turn
- Slow flight
- Power off stall (full stall)
- Power on stall (full stall)
- Spin awareness
- Ground reference maneuvers (choose at least one)
 - Turn-about-a-point
 - S-Turn
 - Rectangular pattern

Flight by Reference to Instruments

- Straight and level, turns, climbs, descents
- Track a course (VOR or GPS)
- Unusual attitude recoveries

Emergency Procedures

- System/Equipment malfunction
 - CFI discretion
 - Pick one or more; discuss in flight
 - Checklist procedures
- Emergency descent
- Emergency approach and landing (off airport)

COMPLETION STANDARDS

The student should be able to perform a thorough preflight inspection with no CFI assistance. Basic aircraft control (airspeed, altitude, heading) should be to ACS standards. All area maneuvers should be set up by memory and performed correctly. The student should demonstrate sound Aeronautical Decision Making (ADM), Single Pilot Resource Management (SPRM), visual scanning/collision avoidance techniques, and other safety related procedures throughout the flight with little to no CFI assistance.

REQUIRED READING/STUDY

- ACS I. Task F, G, H (Performance/Limitations, Systems, Human Factors)
- Plan a cross country to one destination assigned by the CFI



LESSON 34: FLIGHT

1.7 HOURS DUAL

0.3 INSTRUMENT

0.3 HOURS PRE/POST

LESSON OBJECTIVE

This lesson closely mimics the end of course stage check and the Private Pilot checkride. Consideration should be given to using a senior CFI to evaluate the student's proficiency. Repeat any maneuvers that require extra practice. The flight begins with a cross country leg that is interrupted by a diversion scenario. The CFI will choose the destination and evaluate the student's planning.

GROUND TRAINING: review

Preflight Preparation

- Pilot certificates and documents
- Aircraft maintenance logs
- FAR 91.103 (weather, NOTAMS, wt. & balance, takeoff/landing performance.)
- I'M SAFE
- Practice area selection

Flight Planning

- Review the student's flight plan log
- Have the student explain how he/she derived various numbers on the log
- Review the student's flight plan form

FLIGHT TRAINING: review

Pre/Post flight Procedures

- Checklist usage
- Preflight inspection (CFI evaluates)
- Cockpit management
- Parking and securing the aircraft
- Post flight inspection

Cross Country Navigation

- Activate the VFR flight plan (simulated)
- Use pilotage and DR to find each point
- Set power per the performance chart
- Perform groundspeed checks, update times, fuel use, etc.
- Update heading for winds
- Checklist procedures
- Lost procedures (fly or discuss)
- Divert to another airport
 - Identify the nearest airport
 - Obtain current weather
 - Enter the pattern

Takeoffs, Landings, and Go-Arounds

- Normal/crosswind takeoff and landing
- Short field takeoff and landing
- Soft field takeoff and landing
- Go-around/rejected landing
- Forward Slip to Landing

Area Maneuvers

- Steep turn
- Slow flight
- Power off stall (full stall)
- Power on stall (full stall)
- Spin awareness
- Ground reference maneuvers (choose at least one)
 - Turn-about-a-point
 - S-Turn
 - Rectangular course

Flight by Reference to Instruments

- Straight and level, turns, climbs, descents
- Track a course (VOR or GPS)
- Unusual attitude recoveries

Emergency Procedures

- System/equipment malfunction
 - CFI discretion
 - Pick one or more; discuss in flight
 - Checklist procedures
- Emergency descent
- Emergency approach and landing (off airport)

COMPLETION STANDARDS

The student's knowledge and proficiency in all areas of operation should meet ACS standards. Additionally, the student should demonstrate sound Aeronautical Decision Making (ADM), Single Pilot Resource Management (SPRM), visual scanning/collision avoidance techniques, and other safety related procedures throughout the flight with no CFI assistance.

REQUIRED READING/STUDY

- All material previously covered, with an emphasis on the ACS Areas of Operations and Tasks.
- Plan a cross country to one destination assigned by the CFI



LESSON 35: PRE/POST GROUND 2.5 HOURS

LESSON OBJECTIVE

This lesson may immediately precede Lesson 34 (complete the audit afterwards.) It prepares the student for the oral portion of his/her Stage Two check and ensures the training records are certifiable for graduation. Refer to the Private Pilot ACS for a detailed list of knowledge and risk management elements (at least one of each should be assessed from every task.)

GROUND TRAINING: Review*

Preflight Preparation

- Pilot qualifications
- Airworthiness requirements
- Weather information
- Cross country flight planning
- National Airspace System (NAS)
- Performance and limitations
- Operation of systems
- Human factors

Preflight Procedures

- Preflight assessment (including pilot self-assessment)
- Cockpit management
- Engine starting
- Taxiing
- Before takeoff check

Airport Operations

- Communications and light gun signals
- Traffic patterns

Takeoffs, Landings, and Go-Arounds

- Normal takeoff and climb
- Normal approach and landing
- Soft field takeoff and climb
- Soft field approach and landing
- Short field takeoff/max perform climb
- Short field approach and landing
- Forward slip to a landing
- Go-around/rejected landing

Performance Maneuvers

- Steep turns
- Ground reference maneuvers

Navigation

- Pilotage and DR
- Navigation systems and radar services
- Diversion
- Lost procedures

Slow Flight and Stalls

- Maneuvering during slow flight
- Power off stalls
- Power on stalls
- Spin awareness

Basic Instrument Maneuvers

- Straight and level flight
- Constant airspeed climb/descent
- Turns to headings
- Recovery from unusual attitudes
- Radio comm./nav. systems/radar

Emergency Operations

- Emergency descent
- Emergency approach and landing
- Systems and equipment malfunction
- Emergency equipment/survival gear

Night Operations

- Night preparation

Postflight Procedures

- After landing, parking, securing

*Note: Review missed subjects from the FAA written exam. Endorse per FAR 61.39.

GROUND TRAINING

Records Audit (Student must be present)

- Complete the *Private Pilot Stage Two Auditing Checklist* and correct all errors.
- Certify completion with a remark on this lesson's gradesheet (example below):

"I have audited all lessons for TCO compliance using North Star Aviation's Private Pilot Stage Two Auditing Checklist."

COMPLETION STANDARDS

Through oral quizzing the student should demonstrate the knowledge required to operate safely as a Private Pilot (single engine land) in the National Airspace System. This lesson is not complete until the record audit is accomplished and all errors are corrected.

REQUIRED READING/STUDY

- All material previously covered, with an emphasis on the ACS.
- Plan a cross country to one destination assigned by the CFI

LESSON 36: STAGE TWO CHECK

1.7 HOURS DUAL

0.3 INSTRUMENT*

2.0 HOURS PRE/POST

LESSON OBJECTIVE

The Chief/Assistant Chief Instructor or an approved Stage Check Pilot will evaluate the student's knowledge and proficiency in all items required for a Private Pilot, Single Engine Land certificate. The check pilot, after assigning the student a X/C flight, should prepare a plan of action that mimics a Private Pilot checkride, emphasizing knowledge areas that were missed on the FAA written test. Refer to the Private Pilot ACS for a detailed list of knowledge and risk management elements (at least one of each should be assessed from every task.)

GROUND TRAINING: review**

***Note: At least one knowledge and risk management element should be assessed for each task in the Private Pilot ACS (single engine land only.) All tasks are grouped in areas of operation listed below (or refer to Lesson 35):*

ACS Areas of Operation

- Preflight preparation
- Preflight procedures
- Airport operations
- Takeoffs, landings and go-arounds
- Performance maneuvers
- Navigation
- Slow flight and stalls
- Basic instrument maneuvers
- Emergency operations
- Night operations
- Postflight procedures

FLIGHT TRAINING: review***

****All in-flight applicable skills from all tasks in the ACS should be evaluated*

Preflight Procedures

- Preflight assessment
- Cockpit management
- Engine starting
- Taxiing
- Before takeoff check

Airport Operations

- Communications and light gun signals
- Traffic patterns

Takeoffs, Landings, and Go-Arounds

- Normal/crosswind takeoff and climb
- Normal/crosswind approach and landing
- Soft field takeoff and climb
- Soft field approach and landing
- Short field takeoff/max perform climb
- Short field approach and landing
- Forward Slip to Landing
- Go-around/rejected landing

Performance Maneuvers

- Steep turn
- Ground reference maneuver (turn-about-a-point, rectangle, or s-turn)

Navigation

- Pilotage and DR
- Navigation systems and radar services
- Diversion
- Lost procedures

Slow Flight and Stalls

- Maneuvering during slow flight
- Power off stall
- Power on stall
- Spin awareness

Basic Instrument Maneuvers

- Straight and level
- Constant speed climb & descent
- Turns to headings
- Unusual attitude recoveries
- Radio comm./nav. systems/radar

Emergency Operations

- Emergency descent
- Emergency approach and landing (simulated)
- System/Equipment malfunction
- Emergency equipment/survival gear

Postflight Procedures

- After landing, parking, and securing

COMPLETION STANDARDS

The student must meet Private Pilot ACS standards in all areas of operation.

**Note: Ensure the student has logged 3.0 hours instrument by the end of the flight.*

REQUIRED READING/STUDY

- All material previously covered, with an emphasis on the ACS Areas of Operations and Tasks.



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APPENDIX A **Ground Instruction Facilities**

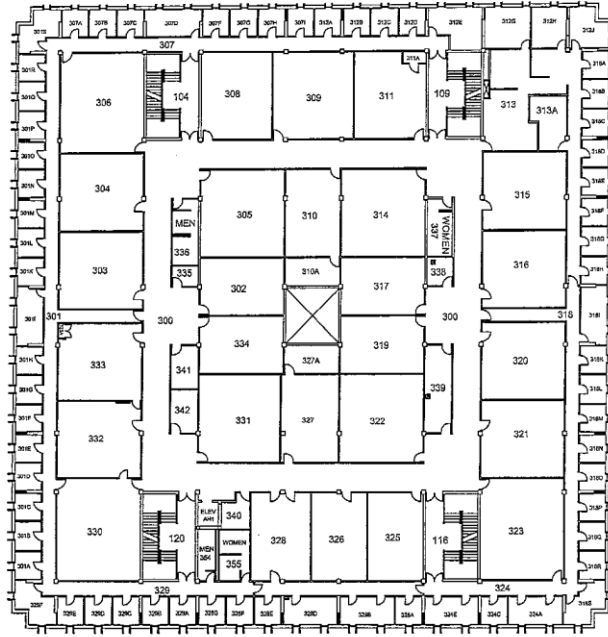
The training rooms at MNSU and NSA are well lighted, and the temperature is thermostatically controlled. Each room is ventilated and conforms to the city of Mankato building, sanitation, and health codes. The rooms are designed and located so that students will not be distracted by instruction conducted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

MNSU Armstrong Hall Room Capacity and Square Footage

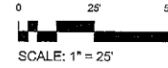
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302	33	503	334	33	501
303	36	669	202	33	504
304	43	674	203	27	665
305	48	762	204	27	670
306	58	881	205	40	761
308	42	644	208	40	650
309	40	733	209	36	741
310	32	501	211	42	650
311	41	653	213	55	882
314	40	764	214	50	761
315	34	671	215	38	581
316	44	664	216	40	763
317	30	501	217	33	503
319	33	500	219	33	505
320	32	665	220	40	761
321	38	671	221	28	581
322	35	765	222	50	770
323	58	881	225	30	522
325	30	502	231	50	762
326	25	502	232	44	668
327	26	528	233	42	668
330	43	882	101	161	1539
331	30	740	102	112	1282
332	10	673	123	42	633
333	30	669			



MNSU Armstrong Hall Room Third Floor



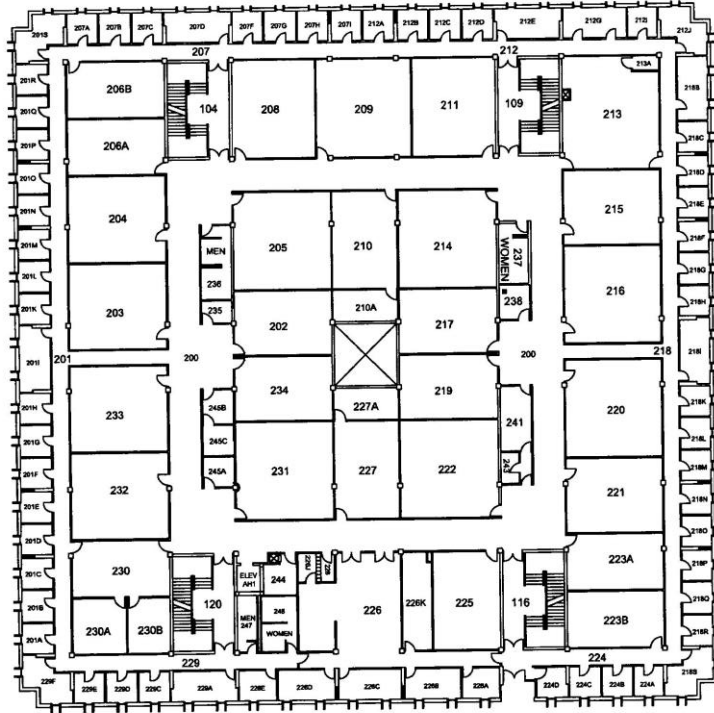
ARMSTRONG
 HALL
 THIRD FLOOR



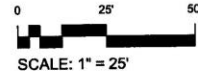
MINNESOTA STATE UNIVERSITY, MANKATO FACILITIES MANAGEMENT		Armstrong Hall Third Floor
		Scale: 1"=25' Date: 7/6/2008
		Drawn By: Mike Lovvold



MNSU Armstrong Hall Room Second Floor



ARMSTRONG
HALL
SECOND FLOOR



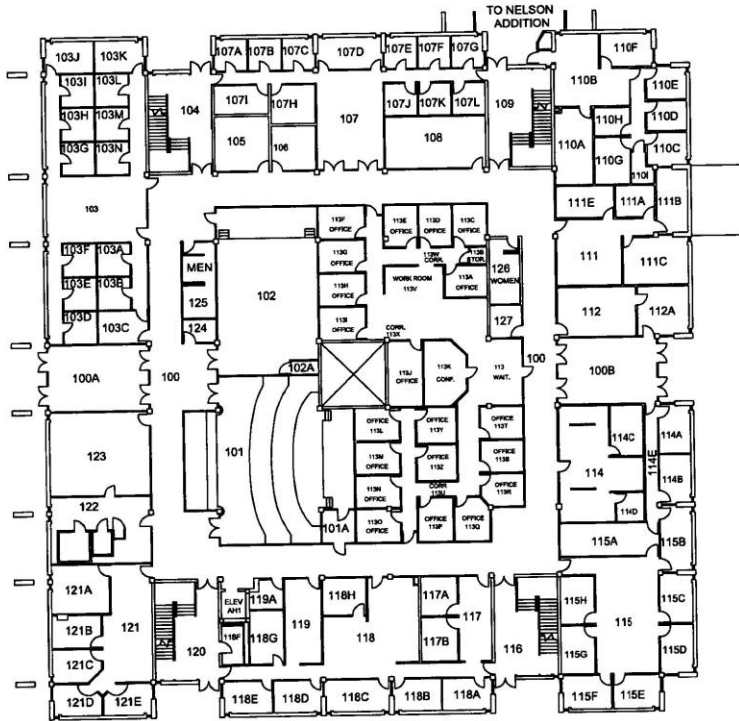
MINNESOTA STATE UNIVERSITY,
MANKATO
FACILITIES MANAGEMENT



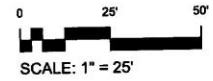
Armstrong Hall
Second Floor

Scale: 1"=25' Date: 10/05/2011
Drawn By: Room Guide

MNSU Armstrong Hall Room First Floor

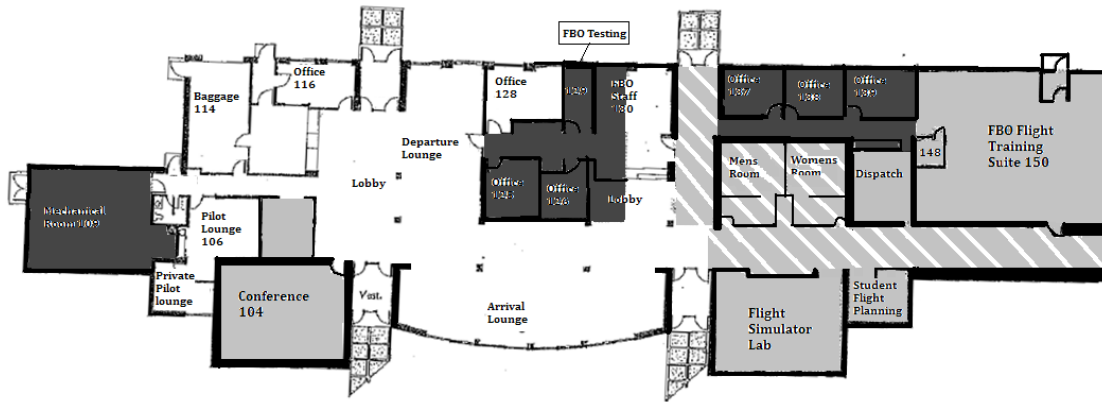


ARMSTRONG
HALL
FIRST FLOOR



MINNESOTA STATE UNIVERSITY, MANKATO FACILITIES MANAGEMENT		Armstrong Hall First Floor	
		Scale: 1"=25'	Date: 10/29/2012
		Drawn By: Robin Gulase	

APPENDIX B Airport Facilities



Legend

- City of Mankato and public Area
- North Star Aviation Area
- Shared Area
- Flight Training Area



Area configurations:

The Corridors, washrooms, and the mechanical room divided up equally between the City of Mankato and North Star Aviation. Each space was calculated by three area configuration options.

- area calculated from outside of exterior wall to outside of exterior wall.
- area calculated from outside of exterior wall to center line of interior wall.
- area calculated from center line of interior wall to center line of interior wall.

City of Mankato and public space including shared Areas with North Star Aviation =	8,703 Sq Ft
North Star Aviation areas including Areas shared with City of Mankato and the public =	6,597 Sq Ft
Total building area =	15,300 Sq Ft



APPENDIX C Red Bird Letter of Authorization (LOA)



U.S. Department
of Transportation
**Federal Aviation
Administration**

800 Independence Ave., SW
Washington DC 20591

DEC 19 2014

Mr. Jerome N. Gregoire
Redbird Flight Simulations
2301 East St. Elmo Rd., Suite 100
Austin, Texas 78744

Dear Mr. Gregoire:

The Federal Aviation Administration (FAA) last qualified and approved your airplane LD, SD, FMX, and MCX device as an Advanced Aviation Training Device (AATD) on February 14, 2013 in accordance with Title 14 Code of Federal Regulations (14 CFR) section (§) 61.4(c). This training device was found to meet the criteria for an AATD as described in FAA Advisory Circular AC 61-136.

Starting January 1, 2015, the FAA requires all Letters of Authorization (LOA) to contain the correct training allowances to remain valid. Based on the previous approval and review of the qualification and approval guide dated February 7, 2013, the FAA has determined that this device continues to meet the current standards for approval. The Redbird model LD, SD, FMX, and MCX is authorized for use in satisfying the following sections of Title 14 of the Code of Federal Regulations parts 61 and 141:

Redbird Model LD, SD, FMX, MCX version 4.4 Airplane Single and Multi-Engine Land Advanced Aviation Training Device (AATD)

- § 61.51(b)(3) – Logbook entries;
- § 61.51 (h) – Logging training time;
- § 61.57(c) – Instrument experience;
- § 61.57(c)(4)(iii) – Instrument experience;
- § 61.57(c)(5)(ii) – Instrument experience;
- § 61.57(d)(1)(ii) – Instrument proficiency check, per the Instrument PTS;
- § 61.65(i) – Instrument rating;
- § 61.109(k)(1) – Private Pilot Certificate Aeronautical experience: up to 2.5 hours;
- § 61.129(i)(1)(i) – Commercial Pilot Certificate: up to 50 hours;
- § 61.159(a)(3)(i) – Airline Transport Pilot Certificate: up to 25 hours; and
- § 141.41(b) – Approved for use under the part 141 appendices as follows:
 - *Appendix B* – Up to 15% toward the total Private Pilot flight training time requirements;

- *Appendix C* – As allowed under 4(b) toward the total instrument flight training time requirements;
- *Appendix D* – Up to 20% toward the total Commercial Pilot flight training time requirements;
- *Appendix E* – Up to 25% toward the total Airline Transport Pilot flight training time requirements;
- *Appendix F* – Up to 5% toward the total Flight Instructor flight training time requirements;
- *Appendix G* – Up to 5% toward the total Flight Instructor instrument flight training time requirements;
- *Appendix I, Private Pilot Airplane Single Engine or Multiengine Class Rating Course* – Up to 3 hours toward the flight training time requirements;
- *Appendix I, Commercial Pilot Airplane Single Engine or Multiengine Class Rating Course* – Up to 11 hours toward the required flight training time requirements;
- *Appendix I, Airline Transport Pilot Airplane Multiengine Class Rating Course* – Up to 6.25 hours toward the flight training time; and
- *Appendix M, Combined Private Pilot Certification and Instrument Rating* – Up to 25% toward the total flight training time requirements

Note: Training or experience requirements such as cross country, night, solo, takeoffs and landings, or the 3 hours of training within 2 calendar months of the practical test must be accomplished in an aircraft. Private Pilot Airplane applicants must also complete the requirement for 3 hours of control and maneuvering of an airplane solely by reference to instruments specified in §61.109 in an airplane. Additionally, practical tests cannot be conducted in an AATD.

Exemption Notice: This device qualifies for the exemption from 14 CFR section 61.65(i) and part 141 Appendix C under the terms and conditions described in the FAA Notice of Policy Change for the Use of FAA Approved Training Devices in the Federal Register (Docket No.: FAA-2013-0809). This exemption allows pilots applying for an instrument rating to credit up to 20 hours of time obtained in this device toward the aeronautical experience requirements in § 61.65(d)(2). In addition, this exemption allows training providers with a training course outline approved under part 141 Appendix C, to continue to train under that program with up to a 40% credit of the training time requirement obtained in this device. This exemption will expire as noted in the Federal Register policy notice.

This approval is contingent upon the following:

- 1) This aviation training device must continue to maintain its performance and function without degradation. The minimum instrument requirements specified under 14 CFR part 91, § 91.205 for day visual flight rules (VFR) and instrument flight rules (IFR) must be functional during the training session;



- 2) Only the configurations that are in the FAA approved Qualification and Approval Guide are utilized during training;
- 3) A copy of this authorization and approval letter must be readily available in a location near the device when in use. Additionally, a copy of this authorization must be provided to the person using the above credits for pilot certification or ratings;
- 4) An authorized instructor must provide and certify the above instructional use;
- 5) Any changes or modifications to this aviation training device which have not been reviewed, evaluated, and approved by AFS-800 will terminate this letter of approval; and
- 6) The FAA reserves the right to revoke this authorization at any time if the Administrator determines that this training device is used contrary to FAA regulation, guidance, or safety.

This approval is valid for sixty (60) calendar months from the date of this letter and supersedes any previous approvals for this training device. Renewal requests should be made prior to the expiration (90 days in advance) by letter to AFS-800 and the above contingencies (1) through (6) must remain valid. At the time of application AFS-800 will conduct (at a minimum) a review of the QAG, to verify compliance with the current AC 61-136 for their approval and use, before a new Letter of Authorization (LOA) can be provided.

This authorization expires on 11/30/2019

Sincerely,

A handwritten signature in blue ink, appearing to read "J. Viola".

James A. Viola
Manager, General Aviation and Commercial Division
Flight Standards Service

APPENDIX D

Reference Books and Materials

The following list is not all-inclusive. Instructors may refer to any supplemental source of information (e.g. Advisory Circulars and other FAA publications, NASA training videos, FAA Safety Videos, AOPA Air Safety Foundation web-based safety training, etc.) in order to increase the quality of training. Students should refer to the REQUIRED READING/STUDY section of each lesson for specific study material.

- The Garmin GNS 430: A Pilot Friendly Manual by Jon Dittner
- Pilot Operating Handbooks / Aircraft Flight Manuals (POH/AFM)
- FAA Chart Supplements (a.k.a. Airport Facility Directory)
- Private Pilot Practical Test Oral Study Guide instructor version with answers & explanations by June Bonesteel
- Everything Explained for Professional Pilots by Richie Lengel
- Aircraft Systems for Pilots by Dale De Remer, Phd
- ASA Private Pilot Oral Exam Guide
- Jeppesen Guided Flight Discovery Private Pilot Book
- Jeppesen GFD Private Pilot Video Series on DVD
- Jeppesen Private Pilot CD-ROM (for a power point presentation)
- Gleim Private Pilot Written Test Bank
- FAA Private Pilot Practical Airmen Certification Standards
- North Star Aviation, Inc. Private Pilot ASEL Power Point Standardized Flight Training Presentation – Warrior III PA-28-161
- North Star Aviation, Inc. Standard Operating Procedures - Piper Aircraft Warrior III PA-28-161
- North Star Aviation, Inc. Preflight Power Point Presentation on the Piper Aircraft Warrior III PA-28-161
- North Star Aviation, Inc. Checklist for the Piper Aircraft Warrior III PA-28-161
- VTS, Inc. VTS Training Systems Piper Warrior and Piper Seminole aircraft systems training software
- Garmin's 400 and 500 Series online flight simulator
- Garmin's 400W and 500W Series downloadable flight simulator
- Garmin's 500 Series downloadable flight simulator
- Jeppesen's Garmin 430 and Garmin 530 Training Software
- Aeronautical Information Manual (AIM)
- Federal Aviation Regulations (FARs)
- Federal Aviation Regulations EXPLAINED by Kent Jackson
- FAA-H-8083-25A: Pilot's Handbook of Aeronautical Knowledge
- FAA-H-8083-1A: Aircraft Weight and Balance Handbook
- FAA-H-8083-3: Airplane Flying Handbook
- FAA-H 8083-6: Advanced Avionics Handbook
- FAA-H-8083-15: Instrument Flying Handbook
- FAA-H-8083-19: Plane Sense
- AC 00-6: Aviation Weather
- AC 00-45G: Aviation Weather Services
- AC 60-22: Aeronautical Decision Making



- AC 61-65: Certification - Pilots and Flight Instructors
- AC 61-67: Stall and Spin Awareness Training
- AC 61-84: Role of Preflight
- AC 90-23E: Aircraft Wake Turbulence
- AC 90-48C: Pilot's Role in Collision Avoidance
- AC 90-66A: Recommended Standard Traffic Patterns and Practices for Aeronautical Operations at Airports without Operating Control Towers
- AC 91-33A: Use of Alternate Grades of Aviation Gasoline for Grade 80/87, and use of Automotive Gasoline
- AC 91-51A: Effect of Icing on Aircraft Control and Airplane Deice and Anti-ice Systems
- AC 91-67: Minimum Equipment for General Aviation Operations under FAR Part 91
- AC 120-51: Crew Resource Management Training
- AC 00-54: Pilots Windshear Guide
- AC 00-24B: Thunderstorms
- AC 00-34A: Aircraft Ground Handling and Servicing
- AC 20-43C: Aircraft Fuel Control
- AC 20-73A: Aircraft Ice Protection
- AC 43-9C: Maintenance Records
- AC 43-12A: Preventative Maintenance



APPENDIX E **Acronyms**

A/C	Aircraft	EFIS	Electronic instrument flight system
AC	Advisory Circular	ELT	Emergency Locator Transmitter
ACS	Airmen Certification Standards	ETA	Estimated Time of Arrival
AD's	Airworthiness Directive's	ETE	Estimated Time Enroute
ADC	Air Data Computer	FAA	Federal Aviation Administration
ADM	Aeronautical Decision Making	FAASafety Team	FAA Safety Team
AFD	Airport/Facility Directory	FAF	Final Approach Fix
AGL	Above Ground Level	FAR	Federal Aviation Regulation
AHRS	Attitude Heading Reference System	FBO	Fixed Base Operator
AIM	Aeronautical Information Manual	FD	Flight Director
AIRMET	Airmen's Meteorological Information	FOM	Flight Operations Manual
ALS	Approach Lighting System	FSDO	Flight Standards District Office
AME	Airmen Medical Examiner	FSS	Flight Service Station
AMEL	Airplane Multi Engine Land	GNSS	Global Navigation Satellite System
AOA	Angle Of Attack	GPS	Global Positioning System
APP	Approach	GS	Glide Slope
ARR	Arrival	HAT	High Above Touchdown
ARTCC	Air Route Traffic Control Center	HIRL	High Intensity Runway Lights
ASAP	Aviation Safety Action Program	HSI	Horizontal Situation Indicator
ASEL	Airplane Single Engine Land	HWAS	Hazardous In-Flight Weather Advisory System
ASI	Airspeed Indicator	IAF	Initial Approach Fix
ASR	Airport Surveillance Radar	IAP	Instrument Approach Procedure
ATC	Air Traffic Control	IF	Intermediate Fix
ATIS	Automated Terminal Information Service	IFR	Instrument Flight Rules
AWOS	Automated Weather Observing System	ILS	Instrument Landing System
CAP	Civil Air Patrol	IMC	Instrument Meteorological Conditions
CDI	Course Deviation Indicator	KCAS	Knots Calibrated Airspeed
CDL	Configuration Deviation List	KIAS	Knots Indicted Airspeed
CFI	Certified Flight Instructor	LDA	Localizer Directional Aid
CFIT	Controlled Flight Into Terrain	LLWAS	Low Level Wind Shear Alert System
CFR	Code of Federal Regulations	LNAV	Lateral Navigation
CG	Center of Gravity	LOA	Letter Of Authorization
CRM	Crew Resource Management	LOC	Localizer
DA/H	Decision Altitude/Height	LPV	Localizer Performance w/ Vertical Navigation
DEP	Departure	MAA	Maximum Authorized Altitude
DG	Directional Gyro	MAP	Missed Approach Point
DME	Distance Measuring Equipment	MCA	Minimum Crossing Altitude
DP	Departure Procedure	MDA	Minimum Descent Altitude
EFB	Electronic Flight Bag	MEA	Minimum Enroute Altitude
EFC	Expect Further Clearance	MEL	Minimum Equipment List



METAR	Meteorological Information	SIGMET	Significant Meteorological Information
MFD	Multifunction Flight Display	SM	Statute Mile
MOA	Military Operations Area	SMS	Safety Management System
MOCA	Minimum Obstacle Clearance Altitude	SOP	Safety Operating Procedure
MRA	Minimum Reception Altitude	SPRM	Single Pilot Resource Management
MSA	Minimum Safe Altitude	STAR	Standard Terminal Arrival Route
MSL	Mean Sea Level	SUA	Special Use Airspace
MVFR	Marginal Visual Flight Rules	SVFR	Special Visual Flight Rules
N/A	Not Applicable	T/O	Take Off
NAVAID	Navigation Aid	TAC	Terminal Area Chart
NDB	Nondirectional Beacon	TACAN	Tactical Aircraft Control and Navigation
NEXRAD	Next Generation Weather Radar	TAF	Terminal Area Forecast
NM	Nautical Mile	TAS	True Airspeed
NOTAM	Notice to Airmen	TCO	Training Course Outline
NTSB	National Transportation Safety Board	TFR	Temporary Flight Restriction
OAT	Outside Air Temperature	TOGA	Take Off/Go Around
OBS	Omni Bearing Selector	TRACON	Terminal Radar Approach Control
ODP	Obstacle Departure Procedure	TRSA	Terminal Radar Service Area
OEI	One Engine Inoperative	TSA	Transportation Security Administration
OROCA	Off Route Obstacle Clearance Altitude	TXY	Taxiway
OTS	Out of Service	UAS	Unmanned Aircraft System
PAPI	Precision Approach Path Indicator	UTC	Coordinated Universal Time (ZULU)
PAR	Precision Approach Radar	VASI	Visual Approach Slope Indicator
PED	Personal Electronic Device	VDP	Visual Descent Point
PFD	Primary Flight Display	VFR	Visual Flight Rules
PIC	Pilot In Command	VHF	very high frequency
PIREP	Pilot Weather Report	VMC	Visual Meteorological Conditions
POH	Pilot's Operating Handbook	VNAV	Vertical Navigation
PTS	Practical Test Standards	VOR	VHF Omnidirectional Range
RCO	Remote Communications Outlet	VOR/DME	VOR/Distance Measuring Equipment
REIL	Runway End Identifier Lights	VORTAC	VOR with TACAN
RNAV	Area Navigation	VOT	VOR Test Facility
RPM	Revolutions Per Minute	VSI	Vertical Speed Indicator
RVR	Runway Visual Range	WAAS	Wide Area Augmentation System
RWY	Runway	WX	Weather
SDF	Simplified Directional Facility		

