Instrument Pilot Certification Course

Airplane Single Engine Land

Training Course Outline (TCO)

Revision 9b

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

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Original	June 05, 2011	Original Issue entire manual.	1–67
Rev 1	October 01, 2011	Corrections and updates	1,2,7,9,10,11,13,14 16,52,67
Rev 2	April 30, 2012	Entire manual revision	1–72
Rev 3	October 15, 2012	Merged ground and flight TCO's	1–93
Rev 4	April 15, 2013		1,2,5,7,9,13,14,15,17 44,45,47,53,54,67,68 69,71,72,73,74,86,87 89,90,91,92,93
Rev 5	December 01, 2013	Ground school time 36 hours, Type errors, ground school two floors added	1,2,4,4,7,9,10,11,12,13 15,17–39,41,42,44,45 48,49,51,53,57,58–62 64,66,71,72,74–89
Rev 6	November 17, 2014	Chief Flight Instructor change	7,17
Rev 7	January 09, 2015	Stage 1&2 flight ground lessons Grading system changes Updated GS testing requirements	1,2,4,5,7,11–15, 18–96
Rev 8	August 16, 2015	Corrected 3.5 sim allowance Adjusted some elements for better understanding & documentation of elements completed. Added rules for conducting lessons out of order.	1,2,5,7,15,18,38,39,40 46,47,50,51,53,54,57 60,61,63,64,66,67,70 75,76
Rev 9	June 1, 2017	Entire manual revision	1–109
Rev 9b	August 31, 2017	Updated to reflect the addition of Piper Archers for ASEL training	1,2,7,16

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SECTION ONE

Course Description

Instrument Pilot Certification Course
Airplane Single Engine Land

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

Welcome to Instrument 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 Instrument Pilot. We will do everything possible to help you succeed; however, the ultimate path to an Instrument Pilot certificate requires significant effort on your part. You must come to each lesson fully prepared. This Training Course Outline (TCO) is 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 Instrument 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 (36 hours) and flight training (43.8 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.

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 C.

Course Objective
The student will obtain the knowledge, skill, and aeronautical experience necessary to meet the requirements for an Instrument Rating, 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 (ADM) abilities, and experience necessary to obtain an Instrument Rating, Airplane Single Engine Land. Stage check pilots will use the most current version of the FAA Instrument Pilot – Airplane Airman Certification Standards (FAA-S-ACS-8) 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 Instrument Pilot ground school a student must possess a Private Pilot Certificate, Airplane Single Engine Land, or he/she must have completed North Star Aviation's Private Pilot Ground School TCO.
>
> Flight Training Prerequisites: Prior to beginning the flight training syllabus a student must be enrolled in, or have completed, the Instrument Pilot ground school TCO, and he/she must possess a Private Pilot Certificate, Single Engine Land, and a current FAA medical (first, second, or third class.)

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. When circumstances preclude conducting a lesson (e.g. weather, maintenance, illness, etc.) a following lesson may be performed out of sequence with approval from the Chief or Assistant Chief Instructor (for flight training) or ground instructor (for ground school.) This provides a degree of flexibility for adapting to individual student needs and the training environment. Any deviation should not disturb the course continuity or objective (e.g. the next lesson should not review material that would've been introduced in the previous lesson.)

To complete a flight lesson all required maneuvers must be receive a passing grade in an airplane; however, additional flight training may be performed in the Redbird FMX 1000 Advanced Aviation Training Device (AATD).

Ground School Testing

Instrument 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 numbered scale from 0 to 6 based on the following table and procedures:

Grade	Description	Result	Application
0	Not Performed	N/A	Required item/maneuver was not performed
1	Well Above Standard	PASS	Excellent performance; Equivalent to an “A”
2	Above Standard	PASS	Good performance; Equivalent to a “B”
3	Standard	PASS	Average performance; Equivalent to a “C”
4	Below Standard	FAIL	Poor performance; Equivalent to a “D”
5	Well Below Standard	FAIL	Very poor performance; Equivalent to an “F”
6	Not Required (Optional)	N/A	Grade 1 – 5 if performed; otherwise grade 6

- For a lesson to be completed all required items/maneuvers must receive a passing score of 1(Well Above Standard), 2(Above Standard), or 3(Standard).
- Where there are optional items/maneuvers on a lesson that were not performed, the instructor will use a 6 indicating the item was not required to complete the lesson. Otherwise a 1 – 5 grade is required.
- When an individual item/maneuver is graded 4 or 5 it will require further training on the same or subsequent training sessions until a grade of 3 or better is earned to complete the lesson.
- In the case where required items/maneuvers were not trained or performed during a lesson a grade of 0 will be applied. That will leave the item open on the electronic system showing it incomplete.
- Any lesson that needs be repeated more than two times should be brought to the attention of the Chief or Assistant Chief Instructor for review.

Documentation

Students will document all flight and simulator training time used to earn the Instrument 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 Instrument 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 C. 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 an Instrument Pilot, Airplane Single Engine Land training course. Specifically, he/she must hold a commercial or airline transport pilot certificate, along with a current instrument flight instructor certificate, for an airplane, single engine land. He/she must also have logged at least 1,000 hours as pilot in command, including at least 100 hour of actual or simulated instrument experience, and have accumulated a total of 2 years and 250 hours, or 400 hours, of instrument flight instructor 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 an Instrument Pilot, Airplane Single Engine Land training course. Specifically, he/she must hold a commercial or airline transport pilot certificate, along with a current instrument flight instructor certificate, for an airplane, single engine land. He/she must also have logged at least 500 hours as pilot in command, including at least 50 hour of actual or simulated instrument experience, and have accumulated a total of 1 year and 125 hours, or 200 hours, of instrument flight instructor 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 an Instrument Pilot, Airplane Single Engine Land training course. Specifically, they must hold a commercial or airline transport pilot certificate, along with a current instrument 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 an instrument 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 instrument approach work. 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 Instrument 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 Instrument 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

INSTRUMENT PILOT GROUND SCHOOL LESSON LAYOUT

STAGE ONE (12 HOURS)

LESSON	DISCUSSION TOPIC	REQUIRED READING/STUDY	HOURS
1	Basic Instrument Flight to include FARs for IFR flight operations	Jeppesen Instrument/Commercial 1-A	1.2
2	Aeronautical Decision Making & Judgment, crew resource management to include crew communications & coordination, High Altitude Physiology	Jeppesen Instrument/Commercial 1-B	1.2
3	Flight Instruments	Jeppesen Instrument/Commercial 2-A	1.2
4	Attitude Instrument Flying – instrument scanning	Jeppesen Instrument/Commercial 2-B	1.2
5	IFR Navigation by use of navigations systems	Jeppesen Instrument/Commercial 2-C	1.2
6	Airports, Airspace and Flight Information	Jeppesen Instrument/Commercial 3-A	1.2
7	ATC System & Procedures for Instrument Flight Operations	Jeppesen Instrument/Commercial 3-B	1.2
8	Air Traffic Control System & Procedures – Instrument Clearances	Jeppesen Instrument/Commercial 3-C; AIM Chapter 4 section 4 & 5	1.2
9	IFR Departure Charts and Procedures	Jeppesen Instrument/Commercial 4-A & B	1.2
10	STAGE ONE EXAM	Lesson 1 - 9 Referenced Pages	1.2
	TOTAL		**12**
	CUMULATIVE TOTAL		**12**

STAGE TWO (10.8 HOURS)

LESSON	DISCUSSION TOPIC	REQUIRED READING/STUDY	HOURS
11	Use of IFR enroute charts - Low Altitude Enroute Chart and Area charts	Jeppesen Instrument/Commercial 5-A	1.2
12	Enroute Procedures	Jeppesen Instrument/Commercial 5-B	1.2
13	Holding Procedures	Jeppesen Instrument/Commercial 5-C	1.2
14	Use of IFR Arrival Charts / Arrival Procedures	Jeppesen Instrument/Commercial 6-A & B	1.2
15	Use of Instrument Approach Charts and Approach Procedures	Jeppesen Instrument/Commercial 7-A & B	1.2
16	Instrument Worksheet		1.2
17	Use of Instrument VOR and NDB Approaches Procedures Charts	Jeppesen Instrument/Commercial 8-A	1.2
18	Review for Exam - Lessons 11 - 17	Lesson 11 - 17 Referenced Pages	1.2
19	STAGE TWO EXAM	Lesson 11 - 17 Referenced Pages	1.2
	TOTAL		**10.8**
	CUMULATIVE TOTAL		**22.8**

STAGE THREE (13.2 HOURS)

	DISCUSSION TOPIC	REQUIRED READING/STUDY	HOURS
20	Use of Instrument ILS Approaches Procedures Charts	Jeppesen Instrument/Commercial 8-B	1.2
21	Use of Instrument RNAV Approach Procedures Charts	Jeppesen Instrument/Commercial 8-C	1.2
22	Elementary Meteorology	Jeppesen Instrument/Commercial 9-A	1.2
23	Recognition of Critical Weather Situations, Weather Hazards to include Windshear	Jeppesen Instrument/Commercial 9-B	1.2
24	Procurement & use of Aviation Weather Reports and Forecasts -Printed Weather Products, elements of forecasting weather trends and personal observation of weather conditions	Jeppesen Instrument/Commercial 9-C	1.2
25	Procurement & use of Aviation Weather Reports and Forecasts - Graphic Weather Products	Jeppesen Instrument/Commercial 9-D	1.2
26	Sources of Weather Information	Jeppesen Instrument/Commercial 9-E	1.2
27	IFR Emergencies	Jeppesen Instrument/Commercial 10-A	1.2
28	IFR Aeronautical Decision Making and judgment	Jeppesen Instrument/Commercial 10-B	1.2
29	Safe and efficient operation of aircraft under instrument flight rules and conditions	Jeppesen Instrument/Commercial 10-C	1.2
30	STAGE TRHEE EXAM (Final Exam)		1.2
	TOTAL		**13.2**
	CUMULATIVE TOTAL		**36**

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

INSTRUMENT PILOT GROUND SCHOOL

STAGE ONE (12 HOURS)

Lessons 1 - 10

STAGE ONE OBJECTIVES: The student will be instructed in Federal Aviation Regulations (FAR) for IFR flight operations, aeronautical decision making and judgment, crew resource management, instrument flying, advanced human factors concepts, flight instruments, IFR navigation, airports, airspace, air traffic control systems and procedures for instrument flight operations, and instrument approach and departure charts and procedures.

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
1.2 HOURS

LESSON OBJECTIVE
Gain an understanding of basic instrument flight to include basic regulations and ideas related to instrument flight operations.

ACADEMIC CONTENT
- ☐ Basic concepts of Instrument Flying
- ☐ IFR vs VFR
- ☐ FARs for IFR flight operations

COMPLETION STANDARDS
Through oral questions, the instructor will ensure the student has an understanding of basic concepts and regulations covering instrument flight.

REQUIRED READING/STUDY
- Jeppesen Instrument/ Commercial Pilot 1-A

GROUND LESSON 2
1.2 HOURS

LESSON OBJECTIVE

Understand the concept of Pilot in Command, and how it relates to (CRM) cockpit resource management, (ADM) aeronautical decision making and judgment, and LOFT. Also comprehend the physiology of instrument and high altitude flight.

ACADEMIC CONTENT

- ☐ Intro to Cockpit Resource Management, Aeronautical Decision Making and judgment, LOFT
- ☐ Crew resource management to include crew communications and coordination
- ☐ Pilot in Command
- ☐ Physiology
- ☐ Spatial disorientation
- ☐ high altitude physiology
- ☐ AIM Chapter 8, Medical Factors for Pilots

COMPLETION STANDARDS

Using oral questions, the student will display a solid knowledge of flight physiology problems. They will also be able to explain the PIC concept and how it is developed in a pilot.

REQUIRED READING/STUDY

- Jeppesen Instrument/ Commercial Pilot 1-B

GROUND LESSON 3
1.2 HOURS

LESSON OBJECTIVE
The student will comprehend the differences in the various cockpit instrument components and a basic understanding of how they operate.

ACADEMIC CONTENT
- ☐ Pitot Static
- ☐ Gyroscopic
- ☐ Magnetic compass
- ☐ Basic EFIS systems

COMPLETION STANDARDS
Based on oral questions, the instructor will determine the student has the basic knowledge of cockpit instrumentation (to include EFIS) and a basic knowledge of how it operates.

REQUIRED READING/STUDY
- Jeppesen Instrument/ Commercial Pilot 2-A

GROUND LESSON 4
1.2 HOURS

LESSON OBJECTIVE
The student will understand the instrument crosscheck/scan concept when flying IFR.

ACADEMIC CONTENT
- ☐ Crosscheck/scan
- ☐ Crosscheck errors
- ☐ Primary and secondary instruments
- ☐ Basic IFR flight maneuvers

COMPLETION STANDARDS
Based on oral and written questions, the student will demonstrate knowledge of the concept of instrument crosscheck and accomplishing basic instrument flight maneuvers

REQUIRED READING/STUDY
- Jeppesen Instrument/ Commercial Pilot 2-B

GROUND LESSON 5
1.2 HOURS

LESSON OBJECTIVE
The student will comprehend a basic understanding of VOR, NDB, and DME principles to include using them for flight navigation. A basic understanding of RNAV navigation and requirements will also be accomplished.

ACADEMIC CONTENT
- ☐ VOR
- ☐ Description/properties
- ☐ DME
- ☐ Description/properties
- ☐ NDB
- ☐ Description/properties
- ☐ Navigational instruments
- ☐ RNAV navigation
- ☐ AIM Chapter 1, Air Navigation

COMPLETION STANDARDS
The instructor, through oral questions, will ensure the student understands the requirements for RNAV navigation, and concepts of VOR, DME, and NDB systems and navigation.

REQUIRED READING/STUDY
- Jeppesen Instrument/ Commercial Pilot 2-C

GROUND LESSON 6
1.2 HOURS

LESSON OBJECTIVE
The student will understand airport lighting and signage and what they mean. They will also understand divisions of airspace and types of airspace and the NOTAMS that govern airports and airspace

ACADEMIC CONTENT
- ☐ Airport lighting and signage
- ☐ Airspace, general
- ☐ Special use airspace
- ☐ NOTAMS
- ☐ AIM Chapter 2, Airport Visual Aids
- ☐ AIM Chapter 3, Airspace
- ☐ AIM Chapter 4, Air Traffic Control

COMPLETION STANDARDS
By way of oral questions, the student will demonstrate knowledge of airport signs and lights as well as the various airspace designations and the NOTAM system covering these areas.

REQUIRED READING/STUDY
- Jeppesen Instrument/ Commercial Pilot 3-A

GROUND LESSON 7
1.2 HOURS

LESSON OBJECTIVE
The student will gain a basic understanding of the Air Traffic Control system and procedures with emphasis on radar, transponders, and the procedures pilots fly with while under ATC control.

ACADEMIC CONTENT
- ☐ Radar
- ☐ Transponders
- ☐ IFR flight procedures
- ☐ AIM Chapter 4, (Section 1 and Section 2)

COMPLETION STANDARDS
Based on oral questioning, the instructor will determine the student has a basic understanding of the ATC system and procedures and the in-flight procedures associated with it.

REQUIRED READING/STUDY
- Jeppesen Instrument/ Commercial Pilot 3-B

GROUND LESSON 8
1.2 HOURS

LESSON OBJECTIVE
The student will understand the role of ATC clearances for flight, what they mean, how to use them and the procedures to acknowledge them.

ACADEMIC CONTENT
- ☐ IFR clearances
- ☐ Enroute clearances
- ☐ AIM Chapter 4, Section 4, ATC Clearances & Aircraft Separation
- ☐ AIM Chapter 4, Section 5, Surveillance Systems

COMPLETION STANDARDS
By way of oral questions, the instructor will determine the student comprehends the role of ATC clearances, how to acknowledge them, and how to use them.

REQUIRED READING/STUDY
- Jeppesen Instrument/ Commercial Pilot 3-C

GROUND LESSON 9
1.2 HOURS

LESSON OBJECTIVE

The student will be able to read and comprehend departure charts. In addition they will have a basic understanding of procedures associated with IFR navigation by use of departure charts and procedures. Finally, they will understand what takeoff visibility and other restrictions are and where to find them.

ACADEMIC CONTENT

- ☐ Standard Instrument Departures
- ☐ Depiction/reading the chart
- ☐ Takeoff requirements
- ☐ Visibility requirements
- ☐ Aim Chapter 5, Section 2, Departure Procedures

COMPLETION STANDARDS

By means of pictures and oral questions, the student will demonstrate a basic knowledge of departure charts, procedures, takeoff requirements, and visibility.

REQUIRED READING/STUDY

- Jeppesen Instrument/ Commercial Pilot 4-A&B

GROUND LESSON 10
1.2 HOURS

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

ACADEMIC CONTENT
Stage One Exam

COMPLETION STANDARDS
This lesson is complete when the student passes the Stage One Exam with a minimum score of 70%

REQUIRED READING/STUDY

INSTRUMENT PILOT GROUND SCHOOL

STAGE TWO (10.8 HOURS)

Lessons 11 - 19

STAGE TWO OBJECTIVES: The student will be instructed in the use of low altitude enroute charts and area charts, holding procedures, arrival charts and procedures, instrument approaches using various navigation systems (e.g. VOR and NDB), instrument approach procedures, and printed and graphic weather products.

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 11
1.2 HOURS

LESSON OBJECTIVE
The student will comprehend use of low altitude Enroute and area charts to include a basic understanding of chart symbols, IR routes and the definition of various altitudes depicted throughout these charts.

ACADEMIC CONTENT
- ☐ Chart symbols
- ☐ Reading/interpreting the chart
- ☐ IR routes
- ☐ Altitudes depicted on low altitude charts

COMPLETION STANDARDS
Based on low altitude Enroute chart pictures and oral questions, the student will show a basic understanding of how to read and interpret the low Enroute chart including IFR routes and altitude depictions.

REQUIRED READING/STUDY
- Jeppesen Instrument/ Commercial Pilot 5-A

GROUND LESSON 12
1.2 HOURS

LESSON OBJECTIVE
The student will gain a basic understanding of Enroute flight procedures to include the various pilot reports, required navigation performance, RVSM airspace/requirements and preferred routing.

ACADEMIC CONTENT
- ☐ Required pilot reports
- ☐ RNP for RNAV
- ☐ Altitudes
- ☐ RVSM airspace
- ☐ Preferred routes
- ☐ AIM Chapter 1, Section 1, Navigation Aids
- ☐ AIM Chapter 5, Section 3, Enroute Procedures

COMPLETION STANDARDS
By means of oral questions, the instructor will ensure the student has a basic understanding of enroute procedures, RVSM requirements, any preferred routing, and the RNP now used for RNAV navigation.

REQUIRED READING/STUDY
- Jeppesen Instrument/ Commercial Pilot 5-B

GROUND LESSON 13
1.2 HOURS

LESSON OBJECTIVE
The student will gain a basic knowledge of holding patterns to include entry procedures, speeds, clearances, depictions and in-flight procedures when flying a holding pattern.

ACADEMIC CONTENT
- ☐ Clearances
- ☐ Depictions
- ☐ Entry
- ☐ Airspeeds
- ☐ Other in-flight procedures

COMPLETION STANDARDS
Through written and oral questioning, the instructor will determine the student has a basic understanding of all aspects of holding patterns to include the in-flight procedures used when flying one.

REQUIRED READING/STUDY
- Jeppesen Instrument/ Commercial Pilot 5-C

GROUND LESSON 14
1.2 HOURS

LESSON OBJECTIVE
The student will obtain a basic knowledge of Standard Arrival charts and procedures. The student will be able to read and interpret the various charts.

ACADEMIC CONTENT
- ☐ Depictions/reading the STAR
- ☐ Understanding the STAR
- ☐ AIM Chapter 5, Section 4, Arrival Procedures

COMPLETION STANDARDS
Based on STAR depictions and oral questions, the student will show a basic knowledge of Standard Arrival charts and flight procedures when flying them.

REQUIRED READING/STUDY
- Jeppesen Instrument/ Commercial Pilot 6-A&B

GROUND LESSON 15
1.2 HOURS

LESSON OBJECTIVE

The student will acquire a basic understanding of use of instrument approach procedure charts for precision and non-precision approaches including reading and understanding the chart depictions, approach categories, circling approaches and missed approaches.

ACADEMIC CONTENT

- ☐ Precision approaches
- ☐ Chart depictions
- ☐ Non-precision approaches
- ☐ Chart depictions
- ☐ Approach categories
- ☐ Circling approaches
- ☐ Missed approaches

COMPLETION STANDARDS

Based on oral questions and approach depictions, the student will show a basic understanding of precision and non-precision approaches to include approach categories, missed approaches and circling approaches.

REQUIRED READING/STUDY

- Jeppesen Instrument/ Commercial Pilot 7-A&B

GROUND LESSON 16
1.2 HOURS

LESSON OBJECTIVE
The student will complete an instrument worksheet covering departure, enroute, arrival and airport questions. The worksheet will be in the form of an actual planned flight.

ACADEMIC CONTENT
- ☐ Instrument Worksheet

COMPLETION STANDARDS
The student will complete the planned worksheet with at least a 90% completion standard.

REQUIRED READING/STUDY

GROUND LESSON 17
1.2 HOURS

LESSON OBJECTIVE
The student will obtain a basic knowledge of use of instrument VOR and NDB approach charts, approach procedures, approach requirements and the techniques for flying these approaches.

ACADEMIC CONTENT
- ☐ Chart depictions/reading the chart
- ☐ Procedures
- ☐ Techniques
- ☐ Approach requirements

COMPLETION STANDARDS
Using oral questions, and chart depictions, the student will show a basic understanding of VOR and NDB approaches, requirements, and some techniques to use when flying these approaches.

REQUIRED READING/STUDY
- Jeppesen Instrument/ Commercial Pilot 8-A

GROUND LESSON 18
1.2 HOURS

LESSON OBJECTIVE
The student will review those discussion areas covered in lesson 11 through lesson 17.

ACADEMIC CONTENT
- ☐ Review for exam
- ☐ All topics covered in Lesson 11 through Lesson 17.

COMPLETION STANDARDS
The student will show a comprehensive knowledge through oral questions and chart depictions of subjects and topics discussed in lesson 11 through lesson 17.

REQUIRED READING/STUDY

GROUND LESSON 19
1.2 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

INSTRUMENT PILOT GROUND SCHOOL

STAGE THREE (13.2 HOURS)

Lessons 20 - 30

STAGE THREE OBJECTIVES: The student will be instructed in the use of instrument approach procedures and charts for ILS and RNAV approaches. This stage also emphasizes weather, including elementary meteorology, recognition of critical weather situations, weather hazards (e.g. windshear), procurement of aviation weather reports and forecasts, elements of forecasting weather trends, and personal observation of weather conditions. Finally, this stage covers IFR emergencies and reviews IFR aeronautical decision making and judgment for the safe and efficient operation of an aircraft under instrument flight rules and conditions.

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 20
1.2 HOURS

LESSON OBJECTIVE
The student will gain a basic knowledge of ILS approaches to include how to read their depictions, in-flight procedures, localizer only type approaches and the requirements for each of these approaches.

ACADEMIC CONTENT
- ☐ ILS components
- ☐ Chart depictions/reading the chart
- ☐ Flight procedures
- ☐ Localizer only
- ☐ Approach requirements

COMPLETION STANDARDS
The instructor, through oral questions and chart depictions, will determine the student has a basic knowledge of ILS and Localizer only approaches, their requirements and how to interpret the approach charts.

REQUIRED READING/STUDY
- Jeppesen Instrument/ Commercial Pilot 8-B

GROUND LESSON 21
1.2 HOURS

LESSON OBJECTIVE
The student will obtain basic comprehension of RNAV approaches to include how to read and interpret RNAV approach charts, the types of RNAV approaches, in-flight procedures, RNP and WAAS concepts and approaches.

ACADEMIC CONTENT
- ☐ RNAV depictions/reading the chart
- ☐ GPS
- ☐ VNAV/LNAV
- ☐ WAAS
- ☐ Procedures

COMPLETION STANDARDS
Through oral questions and chart depictions and pictures, the instructor will ensure the student has a basic comprehension of RNAV approaches, charts, requirements, RNP and WAAS.

REQUIRED READING/STUDY
- Jeppesen Instrument/ Commercial Pilot 8-C

GROUND LESSON 22
1.2 HOURS

LESSON OBJECTIVE
The student will gain a basic understanding of atmospheric conditions and how they affect weather to include wind, clouds, and atmospheric stability.

ACADEMIC CONTENT
- ☐ Weather factors
- ☐ Wind
- ☐ Atmosphere
- ☐ Stability
- ☐ Clouds
- ☐ Moisture
- ☐ AIM Chapter 7, Section 1, Meteorology
- ☐ AIM Chapter 7, Section 2, Altimeter Setting Procedures

COMPLETION STANDARDS
The instructor will use oral questions to determine the student has a basic knowledge of atmospheric properties and how they affect stability, wind, clouds, and moisture.

REQUIRED READING/STUDY
- Jeppesen Instrument/ Commercial Pilot 9-A

GROUND LESSON 23
1.2 HOURS

LESSON OBJECTIVE
The student will obtain the basic knowledge of significant weather hazards and recognition of critical weather situations which affect flight to include thunderstorms (and all associated issues), ice, and windshear/windshear avoidance.

ACADEMIC CONTENT
- ☐ Thunderstorms
- ☐ Ice
- ☐ Windshear
- ☐ Windshear avoidance
- ☐ AIM Chapter 7, Section 1, Meteorology
- ☐ AIM Chapter 7, Section 3, Wake Turbulence

COMPLETION STANDARDS
The instructor will determine through oral questioning the student has the basic knowledge of the significant weather hazards to flight, thunderstorms and windshear.

REQUIRED READING/STUDY
- Jeppesen Instrument/ Commercial Pilot 9-B

GROUND LESSON 24
1.2 HOURS

LESSON OBJECTIVE
The student will comprehend how to find, read, and use the various printed weather products available to pilots and elements of forecasting weather trends with added personal observation of weather conditions.

ACADEMIC CONTENT
- ☐ METAR
- ☐ TAF
- ☐ PIREPS
- ☐ Area forecasts
- ☐ Other less essential products
- ☐ Elements of forecasting weather trends
- ☐ Personal observation of weather conditions

COMPLETION STANDARDS
Through oral questioning and pictorials of various printed weather products, the instructor will determine the student comprehends how to find, read, and use these various weather products.

REQUIRED READING/STUDY
- Jeppesen Instrument/ Commercial Pilot 9-C

GROUND LESSON 25
1.2 HOURS

LESSON OBJECTIVE
The student will comprehend how to find, read, and use the various graphic weather products available to pilots.

ACADEMIC CONTENT
- ☐ Prognostic charts
- ☐ Radar summary
- ☐ Symbols on charts

COMPLETION STANDARDS
Through oral questioning and pictorials of various graphic weather products, the instructor will determine the student comprehends how to find, read, and use these various weather products.

REQUIRED READING/STUDY
- Jeppesen Instrument/ Commercial Pilot 9-D

GROUND LESSON 26
1.2 HOURS

LESSON OBJECTIVE
The student will comprehend how to find and use various sources of weather information, in-flight weather information, airborne radar, and automated weather sources.

ACADEMIC CONTENT
- ☐ FAA/online reports
- ☐ Weather advisories
- ☐ SIGMETs, AIRMETs, other reports
- ☐ On board radar
- ☐ AWOS/ASOS
- ☐ AIM Chapter 4, Section 1, Services Available to Pilots

COMPLETION STANDARDS
The instructor will use oral questioning to ensure the student has a basic comprehension of where to find and how to use various weather sources, in-flight weather sources, on board aircraft radar, and automated weather sources.

REQUIRED READING/STUDY
- Jeppesen Instrument/ Commercial Pilot 9-E

GROUND LESSON 27
1.2 HOURS

LESSON OBJECTIVE
The student will gain a basic understanding of handling emergencies in an IFR environment. Radio failure, fuel problems, ASR approaches, and some practical applications will be included.

ACADEMIC CONTENT
- ☐ Elements in declaring an emergency
- ☐ Communication failure
- ☐ ASR approaches
- ☐ Fuel issues
- ☐ Practical applications
- ☐ AIM Chapter 6, Emergency Procedures

COMPLETION STANDARDS
The instructor will use oral questioning to determine the student has a basic understanding of in-flight emergency conditions, communication failure, ASR approaches, and other practical issues for IFR emergencies.

REQUIRED READING/STUDY
- Jeppesen Instrument/ Commercial Pilot 10-A

GROUND LESSON 28
1.2 HOURS

LESSON OBJECTIVE
The student will obtain a basic comprehension of IFR decision making to include CRM and SRM and the processes, benefits, and pitfalls associated with them.

ACADEMIC CONTENT
- ☐ CRM/SRM
- ☐ Communication within the cockpit
- ☐ Communication with ATC
- ☐ Processes
- ☐ Pitfalls

COMPLETION STANDARDS
Through oral questioning, the instructor will determine the student has a basic comprehension of IFR decision making, CRM, and SRM.

REQUIRED READING/STUDY
- Jeppesen Instrument/ Commercial Pilot 10-B

GROUND LESSON 29
1.2 HOURS

LESSON OBJECTIVE
The student will gain a basic knowledge of the factors to be reviewed for flight planning safe and efficient operation of an aircraft under IFR flight rules and conditions. The required documents and how to complete and use them will be included.

ACADEMIC CONTENT
- ☐ Necessary information
- ☐ Route/altitude
- ☐ Alternates
- ☐ Flight plan form
- ☐ Navigation log
- ☐ AIM Chapter 5, Section 1, Preflight

COMPLETION STANDARDS
The instructor will determine through oral questioning the student has the basic knowledge for safe and accurate IFR flight planning. They will also show they understand the required forms and how to complete and use them.

REQUIRED READING/STUDY
- Jeppesen Instrument/ Commercial Pilot 10-C

GROUND LESSON 30
1.2 HOURS

LESSON OBJECTIVE
This lesson assesses the student's comprehension of all material covered in the Instrument Ground School.

ACADEMIC CONTENT
Stage Three Exam (Final Exam)

COMPLETION STANDARDS
This lesson is complete when the student passes the Stage Three Exam (Final Exam) with a minimum score of 70%

REQUIRED READING/STUDY

SECTION FIVE

Flight Training

INSTRUMENT PILOT FLIGHT TRAINING LESSON LAYOUT

STAGE ONE (15.1 HOURS)

LESSON	TOTAL (ASEL/SIM)	DUAL (ASEL/SIM)	ASEL	DUAL X/C	INST (SIM/ACTL)*	SIM	PRE/POST
1							2.0
2	1.2	1.2	1.2		1.0		0.5
3	1.2	1.2	1.2		1.0		0.5
4	1.3	1.3	1.3		1.1		0.5
5							2.0
6	1.0	1.0			1.0	1.0	0.2
7	1.3	1.3	1.3		1.1		0.5
8	1.3	1.3	1.3		1.1		0.5
9							2.0
10	1.8	1.8			1.8	1.8	0.2
11	1.5	1.5	1.5		1.3		0.5
12	1.5	1.5	1.5		1.3		0.5
13	1.5	1.5	1.5		1.3		0.5
14							2.0
15	1.5	1.5	1.5		1.3		1.5
Stage 1 Totals	15.1	15.1	12.3		13.3	2.8	13.9

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: All training maneuvers (e.g. steep turns, unusual attitudes, stalls, slow flight) are to be performed in simulated instrument conditions using a view limiting device*.

STAGE TWO (28.7 HOURS)

LESSON	TOTAL (ASEL/SIM)	DUAL (ASEL/SIM)	ASEL	DUAL X/C	INST (SIM/ACTL)	SIM	PRE/POST
16							3.0
17	1.8	1.8			1.8	1.8	0.2
18	1.7	1.7	1.7		1.5		0.3
19							2.0
20	1.8	1.8			1.8	1.8	0.2
21	3.0	3.0	3.0	3.0	2.8		1.0
22	1.5	1.5	1.5		1.3		0.5
23	1.5	1.5			1.5	1.5	0.5
24							1.0
25	3.0	3.0	3.0	3.0	2.8		1.0
26	1.4	1.4			1.4	1.4	0.6
27	3.0	3.0	3.0	3.0	2.8		1.0
28	4.0	4.0	4.0	4.0	3.7		1.0
29	1.5	1.5	1.5		1.3		0.5
30	1.5	1.5			1.5	1.5	0.5
31	1.5	1.5	1.5		1.3		0.5
32							2.5
33	1.5	1.5	1.5		1.3		2.0
Stage 2 Totals	28.7	28.7	20.7	13.0	26.8	8	18.3
Totals	43.8	43.8	33.0	13.0	40.1	10.8*	32.2

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 C.

**Note: Per 14 CFR 141 Appendix C, Section 4(b)(3), credit for flight training in a flight training device cannot exceed 40% of the total training requirement of the course or this section, whichever is less. Therefore, up to 14 hours (40% of 35) may be credited in the Redbird AATD. See the Redbird Letter of Authorization (LOA) in Appendix C.*

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

INSTRUMENT PILOT FLIGHT TRAINING

STAGE ONE (15.1 HOURS)

Lessons 1-15

STAGE ONE OBJECTIVES: The student will be instructed in the basic flying procedures and skills necessary to operate an aircraft in the IFR environment, including basic attitude instrument flying, holding procedures, and an introduction to instrument approaches.

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

LESSON 1: PRE/POST GROUND 2.0 HOURS

LESSON OBJECTIVE

This lesson will introduce the student to flying by reference to instruments. The student will become acquainted with human factors, aerodynamic factors, flight instruments and general operations/limitations.

GROUND TRAINING

Enrollment – ensure the student:

- ☐ Is taking, or has taken, Instrument Ground School
- ☐ Possesses a 1st, 2nd, or 3rd class medical
- ☐ Possesses a Private Pilot Certificate, Single Engine Land
- ☐ 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

Required Equipment

- ☐ 91.205 required for IFR
- ☐ Kinds of Equipment List (POH)

Systems and Instruments

- ☐ Pitot-static systems
- ☐ Pitot-static instrument & errors
- ☐ Compass and errors
- ☐ Compass turns
- ☐ Gyroscopic instruments
- ☐ Vacuum system

Cockpit Configurations

- ☐ Electronic Flight Information System (EFIS)
  - Attitude Heading Reference System (AHRS)
  - Air Data Computer (ADS)
- ☐ Standard “6 Pack”

Instrument Control Techniques

- ☐ Control/performance method
  - Control instruments
  - Performance instruments
  - Navigation instruments
  - Procedural steps
  - Attitude control
  - Power control
- ☐ Primary/supporting method
  - Pitch instruments
  - Bank instruments
  - Power instruments

IFR Preflight Briefing

- ☐ Apply risk management checklist to an IFR flight (PAVE)
- ☐ Weather Briefing Using 1800WXBRIEF.COM (or similar briefing tool)
- ☐ Additional required maintenance and inspections for IFR
- ☐ Instrument cockpit check and limitations
- ☐ Runway incursions
  - Low visibility
  - Importance of briefing taxi/hotspots
  - Parallel runways
- ☐ Departure clearance
  - Required information
  - Format (e.g. CRAFT)

COMPLETION STANDARDS

The student will have a basic understanding of instrument attitude flying techniques, systems related to IFR flight.

REQUIRED READING/STUDY

- Federal Aviation Regulations (FARs) 91.205
- Instrument Flying Handbook (IFH) FAA-H-8083-15B Ch 5, 6 and 7
- Instrument Airmen Certification Standards (ACS) I. Task A
- ACS II. Tasks A-C
- ACS IV Tasks A & B

LESSON 2: FLIGHT
1.2 HOURS DUAL
1.0 HOURS INSTRUMENT
0.5 HOURS PRE/POST

LESSON OBJECTIVE

The student will be introduced to controlling the aircraft by sole reference to instruments. He/she should gain an understanding of known power settings, and he/she should begin to develop instrument scanning skills.

GROUND TRAINING

Preflight Preparation & Procedures

- ☐ Additional inspections for IFR
  - Pitot/static
  - VOR
  - GPS database currency
- ☐ VOR check
- ☐ Instrument cockpit check
  - Altimeter(s) w/n 75' of field elev. (and 50' of stby altimeter)
  - Attitude indicator(s) ≤ 5° bank
  - Inclinometer opposite turn
  - Rate of turn indicator opposite turn
  - HSI showing direction of turn
  - VSI indicating zero
  - Airspeed(s) indicating zero
  - Compass showing known headings and full of fluid
- ☐ Cockpit management
- ☐ PFD/MFD screen configuration
  - Set MFD screen to taxi diagram (if applicable)
- ☐ Taxi brief
- ☐ Departure clearance (simulated)

FLIGHT TRAINING:

Fundamentals of Instrument Flying

- ☐ Aircraft control (pitch/power/trim)
- ☐ Known power settings
- ☐ Straight-and-level flight
- ☐ Standard-rate-turns
- ☐ Timed turns
- ☐ Turns at different bank angles ≤ 45°
- ☐ Steep turns
- ☐ Constant rate climbs and level offs
- ☐ Constant airspeed climbs and level offs
- ☐ Constant rate descent and level offs
- ☐ Constant airspeed descent and levels offs
- ☐ Turns to specific headings

Navigation

- ☐ Vectors to the practice area
- ☐ GPS to the airport

Post Flight Procedures

- ☐ After landing checklist
- ☐ Close flightplan (simulated)
- ☐ Taxi diagram
- ☐ Post flight walk around

COMPLETION STANDARDS

The student will begin to develop basic instrument control and scanning skills. The student should be able to control the aircraft without getting into unintentional unusual attitude situations.

REQUIRED READING/STUDY

- IFH Ch 5, 6, and 7

LESSON 3: FLIGHT
1.2 HOURS DUAL
1.0 HOURS INSTRUMENT
0.5 HOURS PRE/POST

LESSON OBJECTIVE
The student will further develop instrument scanning skills and aircraft control by reference to instruments. The student will be introduced to slow flight, stalls, and unusual attitudes by reference to instruments.

GROUND TRAINING: Review
Preflight Preparation & Procedures
- ☐ Additional Inspections for IFR
  - Pitot/static
  - VOR
  - GPS database currency
- ☐ VOR check
- ☐ Instrument cockpit check
  - Altimeter(s) w/n 75' of field elev. (and 50' of stby altimeter)
  - Attitude indicator(s) ≤ 5° bank
  - Inclinometer opposite turn
  - Rate of turn indicator opposite turn
  - HSI showing direction of turn
  - VSI indicating zero
  - Airspeed(s) indicating zero
  - Compass showing known headings and full of fluid
- ☐ Cockpit management
- ☐ PFD/MFD screen configuration
  - Set MFD screen to taxi diagram (if applicable)
- ☐ Taxi brief
- ☐ Departure clearance (simulated)

FLIGHT TRAINING: Review
Fundamentals of Instrument Flying
- ☐ Aircraft control (pitch/power/trim)
- ☐ Known power settings
- ☐ Straight-and-level flight
- ☐ Standard-rate-turns
- ☐ Timed turns
- ☐ Steep turns
- ☐ Constant rate climbs and level offs
- ☐ Constant airspeed climbs and level offs
- ☐ Constant rate descent and level offs
- ☐ Constant airspeed descent and levels offs
- ☐ Turns to specific headings

Navigation
- ☐ Vectors to the practice area
- ☐ GPS to the airport

Post Flight Procedures
- ☐ After landing checklist
- ☐ Close flightplan (simulated)
- ☐ Taxi diagram
- ☐ Post flight walk around

FLIGHT TRAINING
Stall/Spin Awareness Instrument Training
- ☐ Maneuvering during slow flight
- ☐ Power-off stalls
- ☐ Power-on stalls
- ☐ Recovery from unusual attitudes

COMPLETION STANDARDS
The student will demonstrate increased proficiency in instrument scanning and aircraft control by reference to instruments. He/she should be able to maintain altitude ±150', airspeed ±15 knots, and heading ±15°.

REQUIRED READING/STUDY
- IFH Ch 5, 6 and 7

LESSON 4: FLIGHT
1.3 HOURS DUAL
1.1 HOURS INSTRUMENT
0.5 HOURS PRE/POST

LESSON OBJECTIVE
The student will further develop instrument scanning skills and aircraft control by reference to instruments. The student will be introduced to partial panel instrument flying, practice patterns, and Vertical S Maneuvers.

GROUND TRAINING: Review
Preflight Preparation & Procedures
- ☐ Additional inspections for IFR
  - Pitot/static
  - VOR
  - GPS database currency
- ☐ VOR check
- ☐ Instrument cockpit check
  - Altimeter(s) w/n 75' of field elev. (and 50' of stby altimeter)
  - Attitude indicator(s) ≤ 5° bank
  - Inclinometer opposite turn
  - Rate of turn indicator opposite turn
  - HSI showing direction of turn
  - VSI indicating zero
  - Airspeed(s) indicating zero
  - Compass showing known headings and full of fluid
- ☐ Cockpit management
- ☐ PFD/MFD screen configuration
  - Set MFD screen to taxi diagram (if applicable)
- ☐ Taxi brief
- ☐ Departure clearance (simulated)

GROUND TRAINING
- ☐ Partial panel
- ☐ Vertical S**

FLIGHT TRAINING: Review
Fundamentals of Instrument Flying
- ☐ Aircraft control (pitch/power/trim)
- ☐ Known power settings
- ☐ Straight-and-level flight
- ☐ Constant airspeed climbs & level offs
- ☐ Turns to specific headings

Navigation
- ☐ Vectors
- ☐ GPS

Post Flight Procedures
- ☐ After landing checklist
- ☐ Close flightplan (simulated)
- ☐ Taxi diagram
- ☐ Post flight walk around

FLIGHT TRAINING
Partial Panel Instrument Flying*
- ☐ Straight and level flight
- ☐ Standard rate turns
- ☐ Timed turns
- ☐ Magnetic compass turns
- ☐ Constant airspeed climbs and descents
- ☐ Constant rate climbs and descents
- ☐ Climbing and descending turns
- ☐ Maneuvering during slow flight
- ☐ Power off stalls
- ☐ Power on stalls
- ☐ Recovery from unusual attitudes

**Note: Recommend Pattern D to practice timed/compass turns. See Appendix F*

System and Equipment Malfunctions
- ☐ Electrical system failure
- ☐ Vacuum or PFD failure

Full Panel Instrument Flying
- ☐ Vertical S-1**

***Note: See Appendix G "Vertical S Procedures"*

COMPLETION STANARDS
The student will increase proficiency in full panel instrument flying, and he/she will begin to develop aircraft control and instrument scanning skills for partial panel aircraft control. He/she should be able to maintain altitude ±150', airspeed ±15 knots, and heading ±15°.

REQUIRED READING/STUDY
- IFH Ch 5, 6 and 7

LESSON 5: PRE/POST GROUND 2.0 HOURS

LESSON OBJECTIVE
The student will become familiar with the function, use, and limitations of VOR, DME, and GPS systems. He/she will also be introduced to holding procedures.

GROUND TRAINING

VORs

- ☐ VOR service volumes
  - High
  - Low
  - Terminal
- ☐ Radials
- ☐ Distance between radials
  - 1º = 1nm at 60 DME
  - Time, speed, and distance calculations
- ☐ Omni bearing selector
- ☐ To/From indications
- ☐ HSI vs moveable card
- ☐ Cross radials
- ☐ DME Arc
- ☐ VOR identification
  - Visual identification (G500)
  - Audio identification (Tune/identify/twist)
- ☐ VOR Checks
  - Date/place/error/signature
  - VOT
  - Dual
  - Airborne
  - Ground
  - VOR check publications (where to find)
- ☐ Cone of confusion

DME

- ☐ Slant range
- ☐ GPS in lieu of DME

GPS

- ☐ How GPS works
- ☐ Approved GPS for navigation
- ☐ Minimum satellites
  - Minimum for 3D position
  - Minimum for RAIM
- ☐ RAIM
  - Definition
  - Prediction
  - Loss of RAIM
- ☐ Database currency
- ☐ WAAS
- ☐ Navigation performance
  - Enroute
  - Terminal
  - Approach
- ☐ OBS mode

Holding Procedures

- ☐ Types of holds (standard vs nonstandard)
- ☐ VOR/LOC and GPS
- ☐ Holding at intersections
- ☐ Holding at stations
- ☐ Holding at waypoints
- ☐ How to enter the hold
- ☐ Speed for holding
- ☐ Expect Further Clearance (EFC) time
- ☐ ATC holding instructions
- ☐ Standard holding pattern
- ☐ Nonstandard holding pattern
- ☐ Outbound and inbound timing
- ☐ Crosswind correction

COMPLETION STANDARDS
The student will understand the operation and function of VORs, GPS, and DME as well as understanding holding procedures.

REQUIRED READING/STUDY

- AIM 5-3-8(2)
- IFH Ch 9 “VOR, DME, GPS”
- IFH Ch 10 “Holding Procedures”
- ACS V Task A (Navigation Systems)

LESSON 6: SIMULATOR
1.0 HOURS DUAL
1.0 HOURS INSTRUMENT
0.2 HOURS PRE/POST

LESSON OBJECTIVE

Introduces the student to VOR and GPS navigation, including radial interception, tracking, holding, and DME arcs (VOR only.) The student should be exposed to different holding entries and types (DME, fix, etc.)

SIMULATOR TRAINING

VOR Navigation

- ☐ VOR orientation
- ☐ VOR radial interception
- ☐ VOR tracking IB and OB exercises
- ☐ Intercept and track a DME arc through 30 degrees or more
- ☐ Time, speed, and distance calculation
- ☐ Holding instructions (clearance, copy, readback)
- ☐ VOR hold entry
- ☐ VOR holding

GPS Navigation

- ☐ GPS checks
- ☐ GPS orientation
- ☐ GPS radial interception
- ☐ GPS hold over fix
    - Use OBS mode and a fix in practice area or published hold on an approach
- ☐ Hold over station

COMPLETION STANDARDS

The student will become familiar with VOR and GPS navigation and holding. He/she should be able to maintain situational awareness while entering VOR and GPS holds.

REQUIRED READING/STUDY

- AIM 5-3-8(2)
- IFH Ch 9 “VOR, DME, GPS”
- IFH Ch 10 “Holding Procedures”
- ACS V Task A (Navigation Systems)

LESSON 7: FLIGHT
1.3 HOURS DUAL
1.1 HOURS INSTRUMENT
0.5 HOURS PRE/POST

LESSON OBJECTIVE
This lesson reinforces what was covered in the simulator, applying VOR navigation to radial interception, tracking, holding, and DME arcs while in the airplane. The student should be exposed to different holding entries and types (DME, fix, etc.)

GROUND TRAINING: Review
VOR Navigation
- ☐ Inbound/outbound
- ☐ Course sensitivity
- ☐ Cone of confusion
- ☐ VOR Identification

Holds
- ☐ Standard and non-standard
- ☐ Timed and DME
- ☐ Hold entries

Preflight Preparation & Procedures
- ☐ Additional inspections for IFR
- ☐ VOR check
- ☐ Instrument cockpit check
- ☐ Cockpit management
- ☐ PFD/MFD screen configuration
  - Set MFD screen to taxi diagram (if applicable)
- ☐ Taxi brief

FLIGHT TRAINING: Review
Full or Partial Panel Instrument Flying
- ☐ Vertical S-1, S-2, or S-3
- ☐ OPTIONAL: unusual attitude
- ☐ OPTIONAL: steep turn

FLIGHT TRAINING
VOR Navigation
- ☐ VOR orientation
- ☐ VOR radial interception
- ☐ VOR tracking IB and OB exercises
- ☐ Intercept and track a DME arc through 30 degrees or more
- ☐ Time, speed, and distance calculation
- ☐ Holding instructions
- ☐ VOR hold entry
- ☐ VOR DME holding
- ☐ VOR station holding
- ☐ OPTIONAL: vectors to the VOR final approach

COMPLETION STANDARDS
The student should be able to intercept and track radials, fly a DME arc, and execute a VOR holding pattern with little CFI assistance. Throughout the flight he/she will be able to control the aircraft within ACS standards.

REQUIRED READING/STUDY
- AIM 5-3-8(2)
- IFH Ch 9 “VOR, DME, GPS”
- IFH Ch 10 “Holding Procedures”
- ACS V Task A (Navigation Systems)

LESSON 8: FLIGHT
1.3 HOURS DUAL
1.1 HOURS INSTRUMENT
0.5 HOURS PRE/POST

LESSON OBJECTIVE
The student will be introduced to the operation of the GPS and holding procedures using the GPS for course guidance.

GROUND TRAINING: Review
Holds
- ☐ Published
- ☐ Non-published
- ☐ Holding using OBS
- ☐ Hold over fix
- ☐ Hold over station

Preflight Preparation & Procedures
- ☐ Additional inspections for IFR
- ☐ VOR check
- ☐ Instrument cockpit check
- ☐ Cockpit management
- ☐ PFD/MFD screen configuration
  - Set MFD screen to taxi diagram (if applicable)
- ☐ Taxi brief

FLIGHT TRAINING: Review
Full Panel Instrument Flying
- ☐ Standard rate turns
- ☐ Turns at different bank angles
- ☐ Constant airspeed climbs and descents
- ☐ Constant rate climbs and descents
- ☐ Climbing and descending turns
- ☐ Vertical S-1, S-2, or S-3

Partial Panel Instrument Flying
- ☐ Straight and level flight
- ☐ Standard rate turns
- ☐ Constant airspeed climbs and descents
- ☐ Constant rate climbs and descents
- ☐ Pattern D
  - Compass turn
  - Timed turn

FLIGHT TRAINING
GPS Navigation
- ☐ GPS checks
- ☐ GPS orientation
- ☐ GPS radial interception
- ☐ GPS hold over fix
  - Use OBS mode and a fix in practice area or published hold on an approach
- ☐ Hold over station
- ☐ DME arc OBS or RMI

COMPETION STANDARDS
The student should be able to program the GPS for basic navigation and fly holding procedures within ACS standards.

REQUIRED READING/STUDY
- AIM 5-3-8(2)
- IFH Ch 9 “VOR, DME, GPS”
- IFH Ch 10 “Holding Procedures”
- ACS V Task A (Navigation Systems)

LESSON 9: PRE/POST GROUND 2.0 HOURS

LESSON OBJECTIVE
This lesson introduces the student to arrival, departure, and approach charts. The student will learn how to interpret and brief each type of chart, and he/she will begin to develop an understanding of IFR procedures.

GROUND TRAINING

Approach Chart Layout

- ☐ Heading section
  - Pilot briefing information
- ☐ Plan view
  - Initial Approach Fix (IAF)
  - Intermediate Fix (IF)
  - Final Approach Fix (FAF)
- ☐ Profile view
  - Step down fix
  - VDP

Landing Minimums

- ☐ Aircraft approach categories
- ☐ 91.175 descent below MDA Requirements
  - Visibility
  - Runway environment
  - A/C in a position to make a normal descent to land

VOR Approaches

- ☐ VOR approach procedures
- ☐ Operating principles
- ☐ VOR/DME RNAV approaches
- ☐ Off-airport facility
- ☐ On-airport facility
- ☐ VOR/DME approach procedures
- ☐ Vectors to final
- ☐ Missed Approach Point (MAP)

GPS Approaches

- ☐ Approach design
- ☐ GPS approaches
- ☐ GPS equipment requirements
- ☐ Navigation database
- ☐ Required Nav. Performance (RNP)
  - RAIM
- ☐ GPS overlay approach
- ☐ GPS stand alone approach
- ☐ Vectors to a GPS approach
- ☐ MAP/DA

Missed Approaches

- ☐ Initial response
- ☐ Flying the published missed
- ☐ Alternative climb-out from ATC
- ☐ Reporting
- ☐ Fuel planning

COMPLETION STANDARDS
The student should demonstrate basic skills interpreting and briefing instrument procedure charts and basic understanding of instrument procedure layouts.

REQUIRED READING/STUDY

- IFH Ch 1 pages 10-30
- ACS VI. Tasks A-E (Instrument Approach Procedures)
- Instrument Procedures Handbook (IPH) Ch 4

LESSON 10: SIMULATOR
1.8 HOURS DUAL
1.8 HOURS INSTRUMENT
0.2 HOURS PRE/POST

LESSON OBJECTIVE

The student will be introduced to GPS and VOR approach and missed approach procedures. The instructor should simulate an ATC controller, beginning the lesson with a departure clearance.

Note: In addition to the student's logbook, the instructor should include the approaches flown in the remarks section of the grade sheet.

SIMULATOR TRAINING

VOR Approach

- ☐ Approach briefing
- ☐ GPS overlay*
- ☐ ATC clearance
- ☐ In range memory item (WIRE)
  - **W**eather
  - **I**nstruments
  - **R**adios
  - **E**nvironment
- ☐ IAF memory item
  - BCCGUMPS
- ☐ Vectors to final
- ☐ FAF memory item
  - Time/Gear/Power/Tower
  - Lights x3 Flaps
- ☐ Straight-in to land
- ☐ Missed approach
- ☐ Go-around memory item (5 C's)
  - **C**ram
  - **C**limb
  - **C**lean
  - **C**ool
  - **C**all

**Note: To build situational awareness skills one VOR approach should be flown without GPS overlay.*

GPS Approach

- ☐ Approach briefing
- ☐ GPS overlay
- ☐ ATC clearance
- ☐ In range memory item (WIRE)
- ☐ IAF memory item (BCCGUMPS)
- ☐ Vectors to final
- ☐ FAF memory item
- ☐ Straight-in to land
- ☐ Missed approach
- ☐ Go-around memory item (5 C's)

COMPLETION STANDARDS

Through instructor guidance the student should demonstrate understanding and application of instrument approach procedures by flying each approach to the desired outcome (i.e. landing, missed approach.)

REQUIRED READING/STUDY

- IFH Ch 1 pages 10-30
- ACS VI. Tasks A-E (Instrument Approach Procedures)
- IPH Ch 4

LESSON 11: FLIGHT
1.5 HOURS DUAL
1.3 HOURS INSTRUMENT
0.5 HOURS PRE/POST

LESSON OBJECTIVE
The student will begin flying instrument approaches (VOR and GPS) in the airplane. Vectors to final are used so he/she can concentrate on course intercepts, tracking, and altitude and airspeed control while descending to the runway environment.

Note: In addition to the student's logbook, the instructor should include the approaches flown in the remarks section of the grade sheet.

GROUND TRAINING: review

Preflight Preparation & Procedures

- ☐ Additional inspections for IFR
- ☐ VOR check
- ☐ Instrument cockpit check
- ☐ Cockpit management
- ☐ PFD/MFD screen configuration
- ☐ Taxi brief

FLIGHT TRAINING

VOR Approach

- ☐ Approach briefing
- ☐ GPS overlay
- ☐ ATC clearance
- ☐ In range memory item
- ☐ IAF memory item
- ☐ Vectors to final
- ☐ FAF memory item
- ☐ OPTIONAL: missed approach
- ☐ Go-around memory item

GPS Approach

- ☐ Approach briefing
- ☐ GPS overlay
- ☐ ATC clearance
- ☐ In range memory item
- ☐ IAF memory item
- ☐ Vectors to final
- ☐ FAF memory item
- ☐ OPTIONAL: missed approach
- ☐ Go-around memory item

Approach Completion

- ☐ Straight-in to land
- ☐ Missed approach and hold

Post Flight Procedures

- ☐ After landing
- ☐ Checking instruments and equipment at engine shutdown
- ☐ Parking and securing the aircraft
- ☐ Instrument checks and antennas

COMPLETION STANDARDS:
Basic aircraft control (heading, altitude, airspeed) should be to ACS standards. With some CFI assistance the student should be able to brief each approach, set up the appropriate NAVAIDS and displays, and intercept and track each course inbound while descending safely to the runway environment.

REQUIRED READING/STUDY

- IFH Ch 1 pages 10-30
- ACS VI. Tasks A-E (Instrument Approach Procedures)
- IPH Ch 4

LESSON 12: FLIGHT
1.5 HOURS DUAL
1.3 HOURS INSTRUMENT
0.5 HOURS PRE/POST

LESSON OBJECTIVE
The student will review instrument flight maneuvers, partial panel instrument flying, VOR instrument approaches and holding in preparation for the Stage One check

Note: In addition to the student's logbook, the instructor should include the approaches flown in the remarks section of the grade sheet.

GROUND TRAINING: Review
Instrument Procedures
- ☐ Preflight preparation and procedures
- ☐ VOR approaches
- ☐ VOR holding
- ☐ Missed approach

FLIGHT TRAINING: Review
Full Panel Maneuvers
- ☐ Vertical S-1, S-2, or S-3
- ☐ Unusual attitudes
- ☐ DME arc (unpublished; VOR only)

Partial Panel Instrument Flying
- ☐ Straight-and-level flight
- ☐ Standard-rate turns
- ☐ Constant airspeed climbs and descents
- ☐ Constant rate climbs and descents
- ☐ Pattern D
    - Compass turn
    - Timed turn

VOR Approach
- ☐ Approach briefing
- ☐ GPS overlay
- ☐ ATC clearance
- ☐ In range memory item
- ☐ IAF memory item
- ☐ Vectors to final
- ☐ FAF memory item

Instrument Procedures
- ☐ Holding (IAF, missed, or unpublished)
- ☐ OPTIONAL: missed approach
- ☐ OPTIONAL: landing from an approach

Post Flight Procedures
- ☐ After landing
- ☐ Checking instruments and equipment at engine shutdown
- ☐ Parking and securing the aircraft
- ☐ Instrument checks and antennas

COMPLETION STANDARDS
The student should be able to maintain basic aircraft control to ACS standards. Additionally, he/she should be able to fly each task, including briefing, tuning, setting-up, intercepting, and tracking a VOR approach course, with little guidance from the instructor.

REQUIRED READING/STUDY
- IFH Ch 1 pages 10-30
- ACS VI. Tasks A-E (Instrument Approach Procedures)
- IPH Ch 4

LESSON 13: FLIGHT
1.5 HOURS DUAL
1.3 HOURS INSTRUMENT
0.5 HOURS PRE/POST

LESSON OBJECTIVE
The student will review instrument flight maneuvers, partial panel instrument flying, GPS instrument approaches and holding in preparation for the Stage One check. The student will be assigned the NSA "Basic Instrument Exam" at the completion of this lesson.

Note: In addition to the student's logbook, the instructor should include the approaches flown in the remarks section of the grade sheet.

GROUND TRAINING: Review

Instrument Procedures

- ☐ Preflight preparation and procedures
- ☐ GPS approaches
- ☐ GPS holding
- ☐ Missed approach

FLIGHT TRAINING: Review

Full Panel Maneuvers

- ☐ Vertical S-1, S-2, or S-3
- ☐ Unusual attitudes
- ☐ DME arc (unpublished)

Partial Panel Instrument Flying

- ☐ Straight-and-level flight
- ☐ Standard-rate turns
- ☐ Constant airspeed climbs and descents
- ☐ Constant rate climbs and descents
- ☐ Pattern D
    - Compass turn
    - Timed turn

GPS Approach

- ☐ Approach briefing
- ☐ ATC clearance
- ☐ In range memory item
- ☐ IAF memory item
- ☐ Vectors to final
- ☐ FAF memory item

Instrument Procedures

- ☐ Holding (IAF, missed, or unpublished)
- ☐ OPTIONAL: missed approach
- ☐ OPTIONAL: landing from an approach

Post Flight Procedures

- ☐ After landing
- ☐ Checking instruments and equipment at engine shutdown
- ☐ Parking and securing the aircraft
- ☐ Instrument checks and antennas

COMPLETION STANDARDS
The student should be able to maintain basic aircraft control to ACS standards. Additionally, he/she should be able to fly each task, including briefing, programming, setting-up, intercepting, and tracking a GPS approach course, with little guidance from the instructor.

REQUIRED READING/STUDY

- ***Basic Instrument Exam***

LESSON 14: PRE/POST GROUND 2.0 HOURS

LESSON OBJECTIVES
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

Basic Instrument Exam
- ☐ Correct to 100%

General Knowledge
- ☐ Flight instruments
- ☐ Navigation equipment
- ☐ Instrument cockpit check
- ☐ Holding procedures

Preflight Preparation
- ☐ Weather briefing
- ☐ Risk management
- ☐ Practice area selection

Aircraft Airworthiness
- ☐ 91.205 required equipment
- ☐ Required maintenance and inspections

Systems, Instruments, and Errors
- ☐ Gyroscopic instruments
- ☐ Pitot static instruments
- ☐ AHRS/ADC
- ☐ GPS/WAAS/RAIM
- ☐ VORs/DME

GROUND TRAINING

Records Audit (Student must be present)
- ☐ Complete the *Instrument 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 Instrument Stage One auditing checklist."

COMPLETION STANDARDS
Through oral quizzing the student should demonstrate a basic understanding of safe aircraft operating principles in the IFR environment, including instrument systems, control of an aircraft by reference to instruments, partial panel control, and basic instrument 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 15: STAGE ONE CHECK
1.5 HOURS DUAL
1.3 HOURS INSTRUMENT
1.5 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 can operate the aircraft safely in the local environment, and to determine if he/she is ready to begin Stage Two.

Note: In addition to the student's logbook, the instructor should include the approaches flown in the remarks section of the grade sheet.

GROUND TRAINING: Review

General Knowledge
- ☐ Instrument cockpit check
- ☐ Holding procedures

Preflight Preparation
- ☐ Pilot qualifications
- ☐ Weather briefing
- ☐ Risk management
- ☐ Practice area selection

Aircraft Airworthiness
- ☐ 91.205 required equipment
- ☐ 91.213 inoperative equipment
- ☐ Required maintenance and inspections

Systems, Instruments, and Errors
- ☐ Gyroscopic instruments
- ☐ Pitot static instruments
- ☐ AHRS/ADC
- ☐ GPS/WAAS/RAIM
- ☐ VORs/DME

Approaches
- ☐ Approach chart
  - Approach briefing
  - Frequencies
  - Landing minimums
  - Categories
  - Missed approach

Preflight Procedures
- ☐ VOR check
- ☐ Instrument cockpit check
- ☐ Cockpit management
- ☐ PFD/MFD screen configuration
- ☐ Taxi brief

FLIGHT TRAINING: Review

Full Panel Maneuvers
- ☐ Basic aircraft control
- ☐ Vertical S-1, S-2, or S-3
- ☐ Unusual attitudes

Systems and Equipment Malfunctions
- ☐ Electrical failure
- ☐ Vacuum or PFD failure

Partial Panel
- ☐ Basic aircraft control
- ☐ Pattern D
- ☐ Timed turns
- ☐ Compass turns

VOR Navigation
- ☐ Radial interception and tracking
- ☐ VOR hold and timing procedures
- ☐ DME Arc (VOR only)

GPS Navigation
- ☐ Course interception and tracking
- ☐ GPS hold
- ☐ OBS function

Instrument Approach
- ☐ VOR or GPS approach
- ☐ Vectors to final
- ☐ Landing from an approach

COMPLETION STANDARDS

Basic aircraft control via instruments should be to ACS standards (including climb/descent rates on the Vertical S w/n ±100 f.p.m. of the rate assigned by the check pilot.) The student should be able to enter holding patterns via recommended procedures, staying on the protected side. When vectored to an approach, the student should be able to brief, tune or program, set-up, intercept, and track a VOR or GPS approach course while maintaining proper altitudes and/or descent rates to the runway.

REQUIRED READING/STUDY

(None)

INSTRUMENT PILOT FLIGHT TRAINING

STAGE TWO (28.7 HOURS)

Lessons 16 – 33

STAGE TWO OBJECTIVES: In this stage the student will build upon the skills gainied in Stage One by learning how to operate safely in the National Airspace System (NAS). This includes instrument approach procedures, instrument cross country flights, and air traffic control communications. Stage One lessons, such as area maneuvers and emergency procedures, will continue to be refined in preparation for the end of course stage check/instrument 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 Instrument 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 C.

Students are expected to complete the FAA Instrument 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 16: PRE/POST GROUND 3.0 HOURS

LESSON OBJECTIVE
This lesson introduces the student to arrival/departure procedures and precision approaches. The student will learn how to interpret and brief each type of chart.

GROUND TRAINING: Review

Approach Chart Layout
- ☐ Heading section
- ☐ Plan view
- ☐ Profile view

Landing Minimums
- ☐ Aircraft approach categories
- ☐ 91.175 descent below MDA requirements

GROUND TRAINING

ILS Approach Procedures
- ☐ Design of ILS approaches
- ☐ Course sensitivity
- ☐ DME arcs
- ☐ Vectors for ILS
- ☐ Glide Slope Intercept
- ☐ Descent power setting
- ☐ Setting/airspeed/vertical speed
- ☐ Decision height/decision altitude
- ☐ Descent below DA
- ☐ Missed approach

Localizer Only Approaches
- ☐ In lieu of ILS
- ☐ Timing to MAP

Localizer Back Course
- ☐ Reverse sensing
- ☐ Stabilized descent for non-precision

GPS WAAS
- ☐ How to know of your GPS is WAAS capable
- ☐ Differences of precision and non-precision GPS approaches
- ☐ MAP vs. DA
- ☐ Missed approach procedure
- ☐ What SUSPEND mode is and when to turn it off
- ☐ GPS hold from missed

Approach
- ☐ Procedure turn
- ☐ Holding in lieu of procedure turn
- ☐ RNAV Terminal Arrival Areas (TAA)
- ☐ No PT
- ☐ Circle to land
  - Obstacle clearance
  - MDA
  - Losing sight of the runway

Departure Charts
- ☐ Instrument departure procedures
- ☐ Pilot navigation instrument departure procedure
- ☐ Vector instrument departure procedure
- ☐ Chart format and symbols

Departure Procedures
- ☐ Takeoff minimums
- ☐ Departure options
- ☐ IFR departure procedures
- ☐ Radar departures
- ☐ VFR departures
- ☐ RNAV departures
- ☐ Selecting a departure method

Arrival Charts
- ☐ Standard Terminal Arrival Route (STAR)
- ☐ Interpreting the STARs
- ☐ Vertical navigation planning
- ☐ RNAV arrival

Arrival Procedures
- ☐ Preparing for the arrival
- ☐ Reviewing the approach
- ☐ Altitude
- ☐ Airspeeds/power settings at various points of an approach

COMPLETION STANDARDS
The student should be able to interpret and brief instrument procedure charts, and he/she should understand instrument procedure layouts.

REQUIRED READING/STUDY
- IPH Ch 1, 3, and 4
- IFH Ch 9 “ILS”
- ACS V. Task B. (Arrival/Departure Procedures)
- ACS VI. Tasks A-E (Instrument Approach Procedures)

LESSON 17: SIMULATOR
1.8 HOURS DUAL
1.8 HOURS INSTRUMENT
0.2 HOURS PRE/POST

LESSON OBJECTIVE

The student will be introduced to flying instrument procedures for ILS and LOC Back Course Approaches as well as missed approach procedures. The instructor should simulate an ATC controller, beginning the lesson with a departure clearance.

Note: In addition to the student's logbook, the instructor should include the approaches flown in the remarks section of the grade sheet.

SIMULATOR TRAINING

ILS Approach

- ☐ Approach briefing
- ☐ GPS overlay
- ☐ ATC clearance
- ☐ In range memory item
- ☐ DME arc
- ☐ Initial approach fix memory item
- ☐ Procedure turn
- ☐ FAF
- ☐ Missed approach
- ☐ Go-around memory item

Localizer Back Course Approach

- ☐ Back course localizer approach
- ☐ Reverse sensing
- ☐ Setting OBS to front course inbound
- ☐ Missed approach
- ☐ OPTIONAL: circle to a missed approach (lose sight of the runway)

COMPLETION STANDARDS

Through instructor guidance the student should demonstrate understanding and application of ILS and LOC Back Course instrument approach procedures by flying each approach to the desired outcome (i.e. landing, missed approach.)

REQUIRED READING/STUDY

- ACS VI. Tasks A-E (Instrument Approach Procedures)

LESSON 18: FLIGHT
1.7 HOURS DUAL
1.5 HOURS INSTRUMENT
0.3 HOURS PRE/POST

LESSON OBJECTIVE
The student will perform ILS and LOC approaches for the first time in the aircraft. Time and weather permitting, this lesson should be flown IFR to another airport with an ILS approach, giving the student exposure to the IFR environment (log as X/C if 50NM away.)* Perform 3 approaches if time allows (including a VOR approach), with at least one concluding in a circle-to-land or missed approach.

Note: In addition to the student's logbook, the instructor should include the approaches flown in the remarks section of the grade sheet.

**Suggested Route 1: KMKT KOWA(ILS) KACQ(VOR A) KMKT(LOC)*

**Suggested Route 2: KMKT KFCM(ILS) KMKT(LOC)*

GROUND TRAINING: Review

Preflight Preparation & Procedures

- ☐ VOR check
- ☐ Instrument cockpit check
- ☐ Cockpit management
- ☐ PFD/MFD screen configuration
  - Set MFD screen to taxi diagram (if applicable)
- ☐ Taxi brief
- ☐ IFR departure clearance

FLIGHT TRAINING

ILS Approach

- ☐ Approach briefing
- ☐ GPS overlay
- ☐ ATC clearance
- ☐ In range memory item
- ☐ OPTIONAL: DME arc
- ☐ OPTIONAL: vectors to final
- ☐ OPTIONAL: procedure turn
- ☐ IAF memory item
- ☐ FAF

Localizer Only Approach

- ☐ Approach briefing
- ☐ GPS overlay
- ☐ ATC clearance
- ☐ In range memory item
- ☐ OPTIONAL: DME arc
- ☐ OPTIONAL: vectors to final
- ☐ OPTIONAL: procedure turn
- ☐ IAF memory item
- ☐ FAF

VOR Approach

- ☐ OPTIONAL: vectors to final
- ☐ OPTIONAL: full procedure

Approach Completion

- ☐ Straight in to land
- ☐ OPTIONAL: circle to land
- ☐ OPTIONAL: missed approach

After Landing & Post Flight Procedures

- ☐ Close IFR flight plan
- ☐ After landing checklist
- ☐ Parking and securing the aircraft
- ☐ Post flight inspection

COMPETION STANDARDS
Basic aircraft control should be to ACS standards. The student should be able to fly each task, including briefing, tuning, setting-up, intercepting, and tracking a ILS/LOC/VOR approach course, with little guidance from the instructor.

REQUIRED READING/STUDY

- ACS I. Tasks A-C (Preflight Preparation)
- ACS II. Tasks A-C (Preflight Procedures)
- ACS VI. Tasks A-E (Instrument Approach Procedures)
- ACS VIII. (Post Flight Procedures)

LESSON 19: PRE/POST GROUND 2.0 HOURS

LESSON OBJECTIVE

The student will learn about low enroute charts, ATC procedures, and cross country related regulations. The student will be introduced to instrument cross country planning, weather briefing, and cross country emergencies. The instructor and student should plan the cross flights for lessons 20 and 21.

GROUND TRAINING

ATC Procedures

- ☐ Departure clearance and readback
- ☐ Required calls
- ☐ Canceling IFR flight plans
- ☐ "Pop Up" clearances

Cross Country Regulations

- ☐ IFR cruising altitudes
- ☐ Minimum fuel requirements
- ☐ Alternate requirements
- ☐ Alternate minimums

Low Enroute Chart

- ☐ Airways
- ☐ Stations and station information
- ☐ Reporting points
  - Compulsory
  - Non-compulsory
- ☐ Altitudes
  - MEA
  - MOCA
  - MRA
  - MCA
  - OROCA
  - MVA
- ☐ Airspace
- ☐ Special use airspace
  - Military Operations Area (MOA)
  - Restricted
  - Prohibited
  - Military Training Routes (MTR)
- ☐ Enroute weather information

Electronic Flight Bag

- ☐ Database currency
- ☐ AFD information
- ☐ Chart information
- ☐ Weather
- ☐ Flight planning
- ☐ W&B

Cross Country Planning

- ☐ Performance calculations
- ☐ Limitations
- ☐ Systems
- ☐ Navigation Log
- ☐ Calculating ETEs and ETAs
- ☐ Plan departure from non-towered and towered airports
- ☐ Enroute phase
- ☐ Approach phase
- ☐ Open and close IFR flight plans

Weather Briefing

- ☐ Briefing tools
- ☐ Prog chart WX theory
- ☐ EFB weather briefing
- ☐ Convective activity
- ☐ Icing
  - Conditions
  - Types
- ☐ Hail
- ☐ On board Wx systems
  - NXRAD

Emergencies

- ☐ Minimum fuel advisory
- ☐ Emergency fuel advisory
- ☐ Icing
- ☐ System failures
- ☐ Loss of communication

COMPLETION STANDARDS

The student should have the knowledge necessary to safely plan and execute an instrument cross country flight.

REQUIRED READING/STUDY

- IPH Ch 2
- IFH Ch 1
- ACS Areas I-VII.

LESSON 20: SIMULATOR
1.8 HOURS DUAL
1.8 HOURS INSTRUMENT
0.2 PRE/POST

LESSON OBJECTIVE
The student will perform a practice cross country lesson in the simulator in preparation for IFR cross country flights. The instructor will assign a scenario to introduce the student to ATC procedures in the IFR environment.

Note: In addition to the student's logbook, the instructor should include the approaches flown in the remarks section of the grade sheet.

SIMULATOR TRAINING

Cross Country Procedures

- ☐ Departure
- ☐ Enroute navigation
- ☐ Airway interception
- ☐ ATC communications
- ☐ In range procedures

Instrument Approach Procedures

- ☐ ILS approach to DA
- ☐ GPS approach
- ☐ VOR approach
- ☐ One of the above partial panel
- ☐ Vectors to final
- ☐ Full approach procedure

Approach Completion

- ☐ Missed approach procedure
- ☐ Circle to land
- ☐ Straight-in to land

Holding

- ☐ Holding entry
- ☐ OPTIONAL: IAF hold
- ☐ OPTIONAL: missed approach hold
- ☐ EFC

Emergency Procedures

- ☐ Minimum fuel advisory
- ☐ Ice build up
- ☐ Loss of electrical power
- ☐ Vacuum or PFD failure
- ☐ Loss of communication

COMPLETION STANDARDS
The student should be able to execute approach procedures with little to no instructor guidance, and he/she should demonstrate sound ADM skills throughout the flight.

REQUIRED READING/STUDY

- ACS I. (Preflight Preparation)
- ACS II. (Preflight Procedures)
- ACS VI. (Instrument Approach Procedures)
- ACS VII Tasks A and D (Emergency Procedures)
- ACS VIII. (Post Flight Procedures)

LESSON 21: FLIGHT
3.0 HOURS DUAL X/C
2.8 HOURS INSTRUMENT
1.0 HOURS PRE/POST

LESSON OBJECTIVE

The student will be introduced to instrument cross country flights and ATC communications by conducting an IFR cross country flight along victor airways as assigned by the instructor. Segments should meet or exceed the 50NM cross country requirement for training. The flight should be performed to at least one towered airport underlying Class B airspace, and at least 3 instrument approaches should be flown to further develop the student's instrument confidence and skills.

Note: In addition to the student's logbook, the instructor should include the approaches flown in the remarks section of the grade sheet.

GROUND TRAINING: Review

Cross Country Flight Planning

- ☐ Weather briefing
- ☐ Filing a flight plan
- ☐ Enroute calculations
- ☐ Alternate requirements
- ☐ Alternate minimums
- ☐ ATC procedures

Preflight Preparation & Procedures

- ☐ VOR check
- ☐ Instrument cockpit check
- ☐ Cockpit management
  - GPS loaded
- ☐ PFD/MFD screen configuration
  - Set MFD screen to taxi diagram (if applicable)
- ☐ Taxi brief
- ☐ IFR departure clearance

FLIGHT TRAINING

Cross Country Procedures

- ☐ Departure
- ☐ Enroute navigation
  - Victor airways
  - Direct-to
- ☐ ATC communications
- ☐ In range procedures

FLIGHT TRAINING: Review

Instrument Approach Procedures

- ☐ Precision approach to DA
- ☐ Non precision approach
- ☐ Additional approaches
- ☐ One of the above partial panel
- ☐ OPTIONAL: vectors to final
- ☐ Full approach procedure

Approach Completion

- ☐ Missed approach procedure
- ☐ Circle to land
- ☐ Straight-in to land

After Landing & Post Flight Procedures

- ☐ Close IFR flight plan
- ☐ After landing checklist
- ☐ Parking and securing the aircraft
- ☐ Post flight inspection

COMPLETION STANDARDS

The student should be able to perform all approaches with little to no instructor guidance. The student should demonstrate sound judgment and ADM skills throughout the flight.

REQUIRED READING/STUDY

- IPH Ch 2
- IFH Ch 1
- ACS I-VII.

LESSON 22: FLIGHT
1.5 HOURS DUAL
1.3 HOURS INSTRUMENT
0.5 HOURS PRE/POST

LESSON OBJECTIVE
The student will review ILS and localizer approaches in the aircraft. The instructor should try to get at least one circle approach, one straight in approach, and one missed approach if time permits.

Note: In addition to the student's logbook, the instructor should include the approaches flown in the remarks section of the grade sheet.

GROUND TRAINING: Review

ILS Approaches
- ☐ DME arc
- ☐ LOC only
- ☐ Procedure turn
- ☐ Missed approach procedures
- ☐ GPS overlay
- ☐ ILS minimums
  - ILS
  - LOC
  - Circling

GPS Approaches
- ☐ "No PT"
- ☐ WAAS
- ☐ GPS minimums
  - LPV
  - LP
  - LNAV/VNAV
  - LNAV
  - Circling

Preflight Preparation & Procedures
- ☐ VOR check
- ☐ Instrument cockpit check
- ☐ Cockpit management
- ☐ PFD/MFD screen configuration
  - Set MFD screen to taxi diagram (if applicable)
- ☐ Taxi brief
- ☐ IFR departure clearance

FLIGHT TRAINING

ILS Approach
- ☐ Approach briefing
- ☐ GPS overlay
- ☐ ATC clearance
- ☐ In range memory item
- ☐ DME Arc
- ☐ IAF memory item
- ☐ FAF (glide slope intercept)

Localizer Approach
- ☐ Approach briefing
- ☐ GPS overlay
- ☐ ATC clearance
- ☐ In range memory item
- ☐ Procedure turn
- ☐ IAF memory item
- ☐ FAF

Approach Completion
- ☐ Missed approach at DA or MAP
- ☐ OPTIONAL: straight-in to land
- ☐ OPTIONAL: circle to land
- ☐ OPTIONAL: circle to a missed approach (lose sight of the runway)

After Landing & Post Flight Procedures
- ☐ Close IFR flight plan
- ☐ After landing checklist
- ☐ Parking and securing the aircraft
- ☐ Post flight inspection

COMPLETION STANDARDS
The student should be able to complete the approaches within instrument ACS standards with little instructor guidance

REQUIRED READING/STUDY
(None)

LESSON 23: SIMULATOR
1.5 HOURS DUAL
1.5 HOURS INSTRUMENT
0.5 HOURS PRE/POST

LESSON OBJECTIVE
The student will review approach procedures, emergencies, and ADM scenarios.

Note: In addition to the student's logbook, the instructor should include the approaches flown in the remarks section of the grade sheet.

SIMULATOR TRAINING

Partial Panel Procedures
- ☐ Precision approach straight/circle
- ☐ Non-precision approach straight/circle
- ☐ Holding
- ☐ Missed approach

Emergency Procedures
- ☐ Communication failure
- ☐ System failure
- ☐ Instrument failure
- ☐ Engine failure
- ☐ Oil pressure low or failed
- ☐ Mode C Failure
- ☐ Mag Failure
- ☐ Icing accumulating
- ☐ Flying into an area of precipitation start light then progress to severe

System Malfunctions
- ☐ Engine problems
- ☐ Electrical failure
- ☐ Vacuum failure
- ☐ Pitot/static failure

Engine Problems
- ☐ Oil pressure/temperature scenario
- ☐ Drop in RPM
- ☐ Low fuel indicator
- ☐ Engine failure

Electrical Failure
- ☐ Single item failure alternator failure
- ☐ Total electrical failure

Vacuum Failure
- ☐ Heading indicator failure
- ☐ DG failure
- ☐ Vacuum pump failure

Pitot/Static Failure
- ☐ Airspeed indicator at zero
- ☐ Airspeed indicator acts like altimeter
- ☐ Static port blocked with ice or another object

COMPLETION STANDARDS
The student should demonstrate sound ADM/SPRM skills and increased proficiency in approach procedures.

REQUIRED READING/STUDY
- ACS VI. (Instrument Approach Procedures)
- ACS VII Tasks A and D (Emergency Procedures)

LESSON 24: PRE/POST GROUND 1.0 HOURS

LESSON OBJECTIVE
The student will review low enroute charts, ATC procedures, cross country related regulations, and cross country planning, to include weather briefing and anticipated emergencies. Additionally, this lesson introduces ASR and Visual approaches as part of the IFR environment. The instructor and student should use this lesson to plan the cross country flight for lesson 25.

GROUND TRAINING: Review

ATC Procedures
- ☐ Departure clearance and readback
- ☐ Required calls
- ☐ Canceling IFR flight plans
- ☐ "Pop Up" clearances

Cross Country Regulations
- ☐ IFR cruising altitudes
- ☐ Minimum fuel requirements
- ☐ Alternate requirements
- ☐ Alternate minimums

Low Enroute Chart
- ☐ Airways
- ☐ Stations and station information
- ☐ Reporting points
- ☐ Altitudes
- ☐ Airspace
- ☐ Special use airspace
- ☐ Enroute weather information

Cross Country Planning
- ☐ Performance calculations
- ☐ Limitations
- ☐ Systems
- ☐ Navigation Log
- ☐ Calculating ETEs and ETAs
- ☐ Plan departure from non-towered and towered airports
- ☐ Enroute phase
- ☐ Approach phase
- ☐ Open and close IFR flight plans

Weather
- ☐ Briefing tools
  - EFB weather briefing
  - 1-800-WX-Brief
- ☐ SIGMETS/AIRMETS
- ☐ Prog chart WX theory
  - High/low pressure
  - Frontal passage
  - Wind patterns/isogonic bars
- ☐ Convective activity
- ☐ Icing
  - Conditions
  - Types
- ☐ Hail
- ☐ On Board WX systems
  - NXRAD
  - ADS-B (IN)

Emergencies
- ☐ Minimum fuel advisory
- ☐ Emergency fuel advisory
- ☐ Icing
- ☐ System failures
- ☐ Loss of communication

GROUND TRAINING

Other IFR Approaches
- ☐ ASR
  - Where to find
  - No-gryo vs. "normal"
  - Minimums
  - How to execute
- ☐ Visual approach
  - Visibility requirements
  - How to execute

COMPLETION STANDARDS
The student should have the knowledge necessary to safely plan and execute an instrument cross country flight. Additionally, the student should be able to perform a thorough pre-flight briefing, including NOTAMS, TFRs, and expected weather.

REQUIRED READING/STUDY
- IPH Ch 2
- IPH Ch 4 "Visual Approach" and "ASR"
- IFH Ch 1
- ACS I-V

LESSON 25: FLIGHT
3.0 HOURS DUAL X/C
2.8 HOURS INSTRUMENT
1.0 HOURS PRE/POST

LESSON OBJECTIVE

During this lesson the student will gain exposure to the IFR environment by conducting an IFR cross country flight along victor airways as assigned by the instructor. Segments should meet or exceed the 50NM cross country requirement for training. The flight should be performed to at least one towered airport, and at least 3 instrument approaches should be flown to further develop the student's instrument confidence and skills.

Note: In addition to the student's logbook, the instructor should include the approaches flown in the remarks section of the grade sheet.

GROUND TRAINING: Review

Cross Country Flight Planning

- ☐ Weather briefing
- ☐ Filing a flight plan
- ☐ Enroute calculations
- ☐ Alternate requirements
- ☐ Alternate minimums
- ☐ ATC procedures

Preflight Preparation & Procedures

- ☐ VOR check
- ☐ Instrument cockpit check
- ☐ Cockpit management
  - GPS loaded
- ☐ PFD/MFD screen configuration
  - Set MFD screen to taxi diagram (if applicable)
- ☐ Taxi brief
- ☐ IFR departure clearance

FLIGHT TRAINING: Review

Cross Country Procedures

- ☐ Departure
- ☐ Enroute navigation
  - Victor airways
  - Direct-to
- ☐ ATC communications
- ☐ In range procedures

Holding

- ☐ Holding entry
- ☐ OPTIONAL: ATC assigned
- ☐ OPTIONAL: published

Instrument Approach Procedures

- ☐ Precision approach to DA
- ☐ Non-precision approach
- ☐ Additional approaches
- ☐ One of the above partial panel
- ☐ OPTIONAL: vectors to final
- ☐ OPTIONAL: visual approach
- ☐ Full approach procedure

Approach Completion

- ☐ Missed approach procedure
- ☐ Circle to land
- ☐ Straight-in to land

After Landing & Post Flight Procedures

- ☐ Close IFR flight plan
- ☐ After landing checklist
- ☐ Parking and securing the aircraft
- ☐ Post flight inspection

COMPLETION STANDARDS

The student should be able to perform all approaches with little to no instructor guidance. The student should demonstrate sound judgment and ADM skills throughout the flight.

REQUIRED READING/STUDY

- IPH Ch 2
- IPH Ch 4 "Visual Approach" and "ASR"
- IFH Ch 1
- ACS I-VIII.

LESSON 26: SIMULATOR
1.4 HOURS DUAL
1.4 HOURS INSTRUMENT
0.6 HOURS PRE/POST

LESSON OBJECTIVE
The student will perform a cross country flight in the simulator to further increase ADM skills while the instructor introduces various complications to the scenario.

Note: In addition to the student's logbook, the instructor should include the approaches flown in the remarks section of the grade sheet.

GROUND TRAINING: Review

Cross Country Flight Planning
- ☐ Weather briefing
- ☐ Filing a flight plan
- ☐ Enroute calculations
- ☐ Alternate requirements
- ☐ Alternate minimums
- ☐ ATC procedures

SIMULATOR TRAINING: Review

Cross Country Procedures
- ☐ Departure
- ☐ Enroute navigation
- ☐ ATC communications
- ☐ In range procedures

Approaches
- ☐ Precision approach
- ☐ Non-precision approach
- ☐ One of the above partial panel

Engine Problems
- ☐ Oil pressure/temperature scenario
- ☐ Drop in RPM
- ☐ Low fuel indicator
- ☐ Engine failure

Electrical Failure
- ☐ Single item failure alternator failure
- ☐ Communication failure
- ☐ Total electrical failure

Vacuum Failure
- ☐ Heading indicator failure
- ☐ DG failure
- ☐ Vacuum pump failure

Pitot/Static Failure
- ☐ Airspeed indicator at zero
- ☐ Airspeed indicator acts like altimeter
- ☐ Static port blocked with ice or another object

Aeronautical Decision Making
- ☐ Re-entering clouds on a circling approach to land
- ☐ Minimum fuel on approach with no break out
- ☐ Minimum fuel while holding
- ☐ Partial loss of power
- ☐ Loss of RAIM

SIMULATOR TRAINING

ASR Approach
- ☐ ASR Approach
- ☐ OPTIONAL: no-gyro ASR

COMPLETION STANDARDS
The student will demonstrate sound ADM skills while performing simulated instrument approaches.

REQUIRED READING/STUDY
- ACS VI. (Instrument Approach Procedures)
- ACS VII. Tasks A and D (Emergency Procedures)

LESSON 27: FLIGHT
3.0 HOURS DUAL X/C
2.8 HOURS INSTRUMENT
1.0 HOURS PRE/POST

LESSON OBJECTIVE

The student will continue to develop experience and confidence in the IFR environment by conducting an IFR cross country flight along victor airways as assigned by the instructor. Segments should meet or exceed the 50NM cross country requirement for training. The flight should be performed to at least one towered airport, and at least 3 instrument approaches should be flown to further develop the student's instrument confidence and skills. Request an ASR approach if available.

Note: In addition to the student's logbook, the instructor should include the approaches flown in the remarks section of the grade sheet.

GROUND TRAINING: Review

Cross Country Flight Planning

- ☐ Weather briefing
- ☐ Filing a flight plan
- ☐ Enroute calculations
- ☐ Alternate requirements
- ☐ Alternate minimums
- ☐ ATC procedures

Preflight Preparation & Procedures

- ☐ VOR check
- ☐ Instrument cockpit check
- ☐ Cockpit management
  - GPS loaded
- ☐ PFD/MFD screen configuration
  - Set MFD screen to taxi diagram (if applicable)
- ☐ Taxi brief
- ☐ IFR departure clearance

FLIGHT TRAINING: Review

Cross Country Procedures

- ☐ Departure
- ☐ Enroute navigation
  - Airways (victor or RNAV)
  - Direct-to
- ☐ ATC communications
- ☐ In range procedures

Holding

- ☐ Holding entry
- ☐ OPTIONAL: ATC assigned
- ☐ OPTIONAL: published

Instrument Approach Procedures

- ☐ Precision approach to DA
- ☐ Non-precision approach
- ☐ Additional approaches
- ☐ One of the above partial panel
- ☐ OPTIONAL: vectors to final
- ☐ OPTIONAL: ASR approach
- ☐ Full approach procedure

Approach Completion

- ☐ Missed approach procedure
- ☐ Circle to land
- ☐ Straight-in to land

After Landing & Post Flight Procedures

- ☐ Close IFR flight plan
- ☐ After landing checklist
- ☐ Parking and securing the aircraft
- ☐ Post flight inspection

COMPLETION STANDARDS

The student should be able to navigate under IFR in the NAS and perform all approaches with little to no instructor guidance. Additionally, the student should demonstrate sound judgment and ADM skills throughout the flight.

REQUIRED READING/STUDY

- IPH Ch 2
- IPH Ch 4 "Visual Approach" and "ASR"
- IFH Ch 1
- ACS Areas I-VII.

LESSON 28: FLIGHT
4.0 HOURS DUAL X/C*
3.7 HOURS INSTRUMENT
1.0 HOURS PRE/POST

LESSON OBJECTIVE

The student will continue to develop instrument cross country experience and ATC communications.

NOTE: This cross country lesson meets or exceeds 14 CFR 141 Appendix C, 4(c)(1)(i-iv), which requires a cross country flight performed under IFR consisting of a distance of at least 250 nautical miles along airways or ATC-directed routing, and with one segment of the flight consisting of at least a straight-line distance of 100 nautical miles between airports. At least one instrument approach will be flown at each airport, and at least 3 different kinds of approaches with the use of navigation systems (ILS, VOR/LOC, GPS) will be performed.

Note: In addition to the student's logbook, the instructor should include the approaches flown in the remarks section of the grade sheet.

GROUND TRAINING: Review

Cross Country Flight Planning

- ☐ Weather briefing
- ☐ Filing a flight plan
- ☐ Enroute calculations
- ☐ Alternate requirements
- ☐ Alternate minimums
- ☐ ATC procedures

Preflight Preparation & Procedures

- ☐ VOR check
- ☐ Instrument cockpit check
- ☐ Cockpit management
  - GPS loaded
- ☐ PFD/MFD screen configuration
  - Set MFD screen to taxi diagram (if applicable)
- ☐ Taxi brief
- ☐ IFR departure clearance

FLIGHT TRAINING: Review

Cross Country Procedures

- ☐ Departure
- ☐ Enroute navigation
- ☐ ATC communications
- ☐ In range procedures

Holding

- ☐ Holding entry
- ☐ OPTIONAL: ATC assigned
- ☐ OPTIONAL: published

Approaches

- ☐ ILS approach
- ☐ GPS approach
- ☐ VOR/LOC approach
- ☐ One of the above partial panel
- ☐ OPTIONAL: no-gyro ASR approach
- ☐ OPTIONAL: visual approach

Approach Completion

- ☐ Straight-in to land
- ☐ OPTIONAL: missed approach procedure
- ☐ OPTIONAL: circle to land

After Landing & Post Flight Procedures

- ☐ Close IFR flight plan
- ☐ After landing checklist
- ☐ Parking and securing the aircraft
- ☐ Post flight inspection

COMPLETION STANDARDS

The student should be able to perform the entire cross country flight, including all ATC communications, with little to no instructor help. Basic aircraft control should meet ACS standards. **This lesson is not complete until the requirements of 14 CFR 141 Appendix C, 4(c)(1)(i-iv)* have been met.**

REQUIRED READING/STUDY

- 14 CFR 141 Appendix C, 4(c)(1)(i-iv)

LESSON 29: FLIGHT
1.5 HOURS DUAL
1.3 HOURS INSTRUMENT
0.5 HOURS PRE/POST

LESSON OBJECTIVE
The student should review GPS, ILS, VOR and partial panel approach procedures. If time allows, at least one missed, one straight-in, and one circle-to-land should be completed on this lesson.

Note: In addition to the student's logbook, the instructor should include the approaches flown in the remarks section of the grade sheet.

GROUND TRAINING: Review

Approach Procedures
- ☐ ILS
- ☐ VOR
- ☐ GPS
- ☐ Partial panel
- ☐ Missed approach
- ☐ Holding

FLIGHT TRAINING: Review

Cross Country Procedures
- ☐ Departure
- ☐ Enroute navigation
- ☐ ATC communications
- ☐ In range procedures

Holding
- ☐ Holding entry
- ☐ OPTIONAL: ATC assigned
- ☐ OPTIONAL: published

Instrument Approach Procedures
- ☐ Precision approach
- ☐ Non-precision approach
- ☐ OPTIONAL: additional approach
- ☐ One of the above partial panel
- ☐ OPTIONAL: vectors to final
- ☐ Full approach procedure

Approach Completion
- ☐ Missed approach procedure
- ☐ OPTIONAL: circle-to-land
- ☐ OPTIONAL: straight-in to land

After Landing & Post Flight Procedures
- ☐ Close IFR flight plan
- ☐ After landing checklist
- ☐ Parking and securing the aircraft
- ☐ Post flight inspection

COMPLETION STANDARDS
The student should be able to complete each approach at ACS standards with little to no guidance from the instructor.

REQUIRED READING/STUDY
- ***FAA Instrument Knowledge Exam (logbook endorsement required.)***

LESSON 30: SIMULATOR
1.5 HOURS DUAL
1.5 HOURS INSTRUMENT
0.5 HOURS PRE/POST

LESSON OBJECTIVE

The student will prepare for the instrument stage check by reviewing ILS, GPS, and VOR/LOC approaches and cross country procedures. The instructor should have the student perform 1 straight-in to land, one circle-to-land, and one missed approach, in addition to at least one holding pattern.

Note: In addition to the student's logbook, the instructor should include the approaches flown in the remarks section of the grade sheet.

SIMULATOR TRAINING: Review

Cross Country Procedures

- ☐ Departure
- ☐ Enroute navigation
- ☐ Airway interception
- ☐ ATC communications
- ☐ In range procedures

Holding

- ☐ Holding entry procedures
- ☐ OPTIONAL: ATC assigned
- ☐ OPTIONAL: published (IAF or missed)

Instrument Approach Procedures

- ☐ Full panel non-precision approach
- ☐ Partial panel non-precision approach
- ☐ Precision approach to DA
- ☐ GPS approach
- ☐ VOR approach

Approach Completion

- ☐ Missed approach procedure
- ☐ Circle-to-land
- ☐ Straight-in to land

Emergency Procedures

- ☐ Minimum fuel advisory
- ☐ Ice build up
- ☐ Loss of electrical power
- ☐ Vacuum or PFD failure
- ☐ Loss of communication
- ☐ Recovery from an unusual attitude

COMPLETION STANDARDS

The student should be able to execute approach procedures with little to no instructor guidance. The student should demonstrate sound ADM and SPRM skills throughout the lesson.

REQUIRED READING/STUDY

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

LESSON 31: FLIGHT
1.5 HOURS DUAL
1.3 HOURS INSTRUMENT
0.5 HOURS PRE/POST

LESSON OBJECTIVE
The student will prepare for the instrument stage check by practicing instrument approaches and cross country procedures. Unusual attitude recoveries should be practiced if time allows.

Note: In addition to the student's logbook, the instructor should include the approaches flown in the remarks section of the grade sheet.

GROUND TRAINING: Review

Preflight Preparation
- ☐ Pilot qualifications
- ☐ Weather information
- ☐ Cross-country flight planning

Instrument Procedures
- ☐ Departure and clearance
- ☐ Cross country procedures
- ☐ Approaches
  - ILS
  - GPS/WAAS
  - VOR/LOC

FLIGHT TRAINING: Review

Cross Country Procedures
- ☐ Departure
- ☐ Enroute navigation
- ☐ Airway interception
- ☐ ATC communications
- ☐ In range procedures

Instrument Approach Procedures
- ☐ Precision approach
- ☐ Non-precision approach
- ☐ OPTIONAL: additional approach
- ☐ One of the above partial panel
- ☐ OPTIONAL: vectors to final
- ☐ Full approach procedure

Approach Completion
- ☐ Missed approach procedure
- ☐ OPTIONAL: circle to land
- ☐ OPTIONAL: straight-in to land

Maneuvers
- ☐ OPTIONAL: unusual attitudes

Emergency Procedures
- ☐ Vacuum or PFD failure
- ☐ Loss of communication

Holding
- ☐ IAF hold
- ☐ OPTIONAL: missed approach hold

After Landing & Post Flight Procedures
- ☐ Close IFR flight plan
- ☐ After landing checklist
- ☐ Parking and securing the aircraft
- ☐ Post flight inspection

COMPLETION STANDARDS
The student should be able to perform all tasks with little to no instructor guidance at ACS standards in preparation for the stage check.

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

LESSON 32: PRE/POST GROUND 2.5 HOURS

LESSON OBJECTIVE

This lesson may immediately precede Lesson 31 (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 Instrument Pilot ACS for a detailed list of knowledge and risk management elements (at least one of each should be assessed from every task.)

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

GROUND TRAINING: Review*

Preflight Preparation

- ☐ Pilot qualifications
- ☐ Weather information and theory
- ☐ Cross country flight planning

Preflight Procedures

- ☐ Aircraft systems related to IFR operations
- ☐ Aircraft flight instruments and navigation equipment
- ☐ Instrument and equipment cockpit check

ATC Clearances and Procedures

- ☐ Compliance with ATC clearances
- ☐ Holding procedures

Flight by Reference to Instruments

- ☐ Instrument flight
- ☐ Recovery from unusual flight attitudes

Navigation Systems

- ☐ Intercepting and tracking navigation systems and DME arcs
- ☐ Departure, enroute, and arrival procedures

Instrument Approach Procedures

- ☐ Non-precision approach
- ☐ Precision approach
- ☐ Missed approach
- ☐ Circling approach
- ☐ Landing from an instrument approach

Emergency Operations

- ☐ Loss of communications
- ☐ Approach with loss of primary flight instrument indicators

Postflight Procedures

- ☐ Checking instruments and equipment

GROUND TRAINING

Records Audit (Student must be present)

- ☐ Complete the *Instrument 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 Instrument Pilot Stage Two auditing checklist."

COMPLETION STANDARDS

The student should demonstrate the required knowledge to pass the oral portion of the instrument stage check.

REQUIRED READING/STUDY

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

LESSON 33: STAGE 2 CHECK
1.5 HOURS DUAL
1.3 HOURS 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 an Instrument Rating, Airplane. The check pilot will prepare a plan of action, emphasizing knowledge areas that were missed on the FAA written test. Refer to the Instrument ACS for a detailed list of knowledge and risk management elements (at least one of each must be assessed from every task.)

GROUND TRAINING: Review**
***Note: At least one knowledge and risk management element must be assessed for each task in the Instrument ACS (single engine land only.) All tasks are grouped in areas of operation listed below (or refer to Lesson 32):*

ACS Areas of Operation
- ☐ Preflight preparation
- ☐ Preflight procedures
- ☐ ATC clearances and procedures
- ☐ Flight by reference to instruments
- ☐ Navigation systems
- ☐ Instrument approach procedures
- ☐ Emergency operations
- ☐ Postflight procedures

FLIGHT TRAINING: review***
****All in-flight applicable skills from all tasks in the ACS should be evaluated*

Preflight Procedures
- ☐ VOR check
- ☐ Instrument cockpit check
- ☐ Cockpit management
- ☐ PFD/MFD screen configuration
- ☐ Taxi brief
- ☐ IFR departure clearance

ATC Procedures
- ☐ Compliance with ATC clearance
- ☐ Holding procedures

Flight by Reference to Instruments
- ☐ Instrument flight
- ☐ Recovery from unusual attitudes

Navigation Systems
- ☐ Intercept and track a DME arc
- ☐ Intercept and track a navigation system
- ☐ Departure, enroute, and arrival operations

Instrument Approach Procedures (3 Req'd)*
- ☐ Non-precision approach
- ☐ Partial panel non-precision approach
- ☐ Precision approach to DA (ILS or WAAS)
- ☐ GPS approach
- ☐ Missed approach
- ☐ Circling approach
- ☐ Landing from an instrument approach

**Note: Must evaluate two non-precision approaches (different NAVAIDS), and one precision approach. One must be a GPS approach if the aircraft is equipped.*

Emergency Procedures
- ☐ Loss of communication
- ☐ Partial panel approach

Postflight Procedures
- ☐ Checking instruments and equipment

COMPLETION STANDARDS
The student must meet Instrument Pilot ACS standards in all areas of operation.

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

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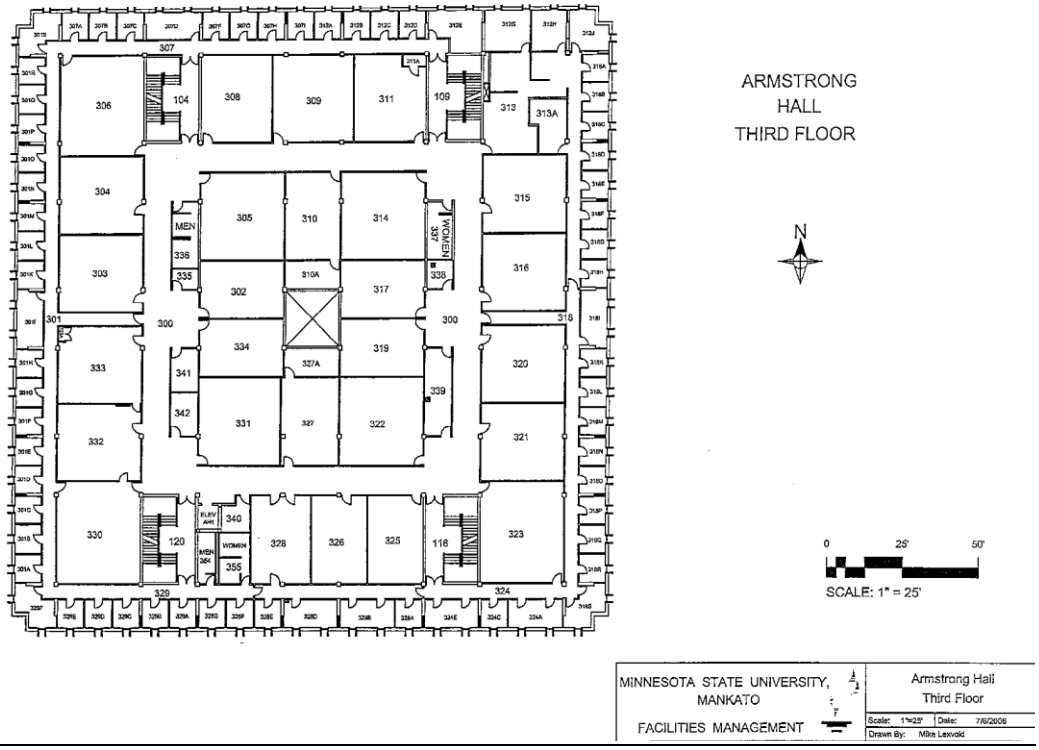
APPENDIX A
Ground Instruction Facilities

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.

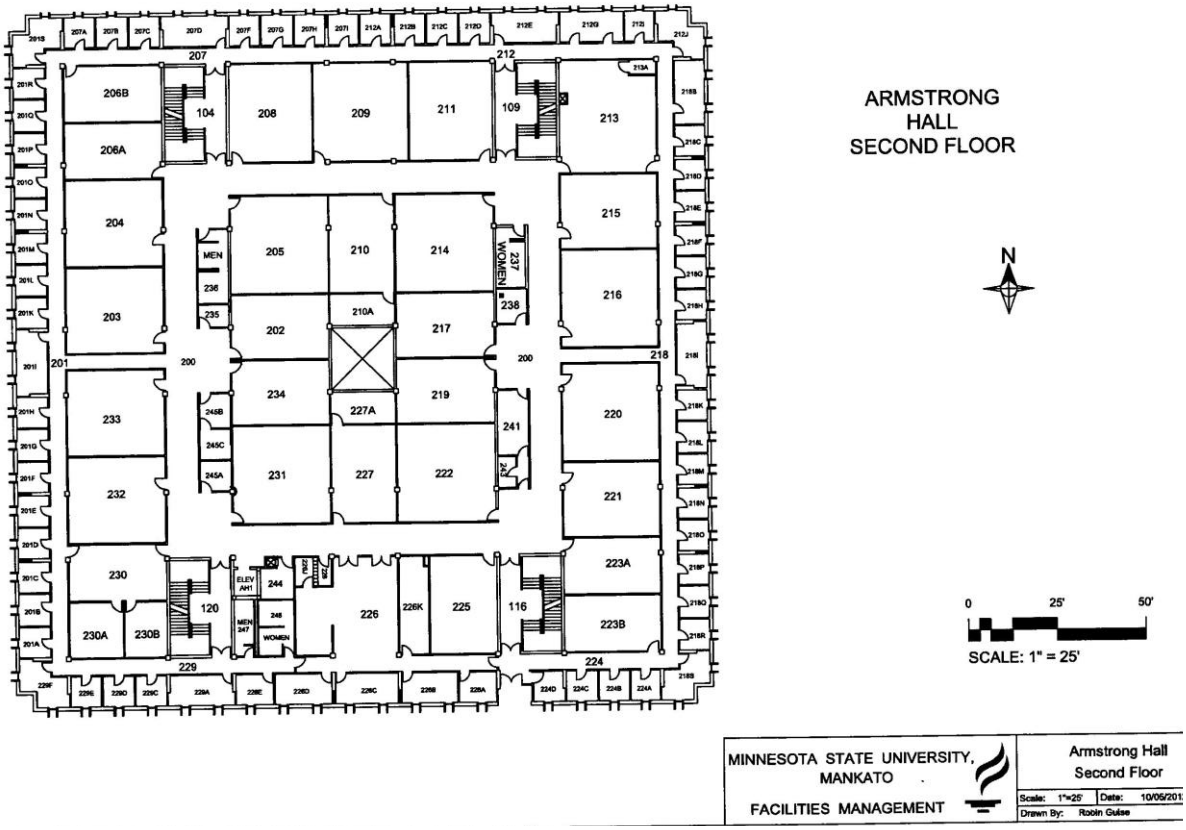
MNSU Armstrong Hall Room Capacity and Square Footage

Room #	Capacity	Sq. Ft.	Room #	Capacity	Sq. Ft.
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			

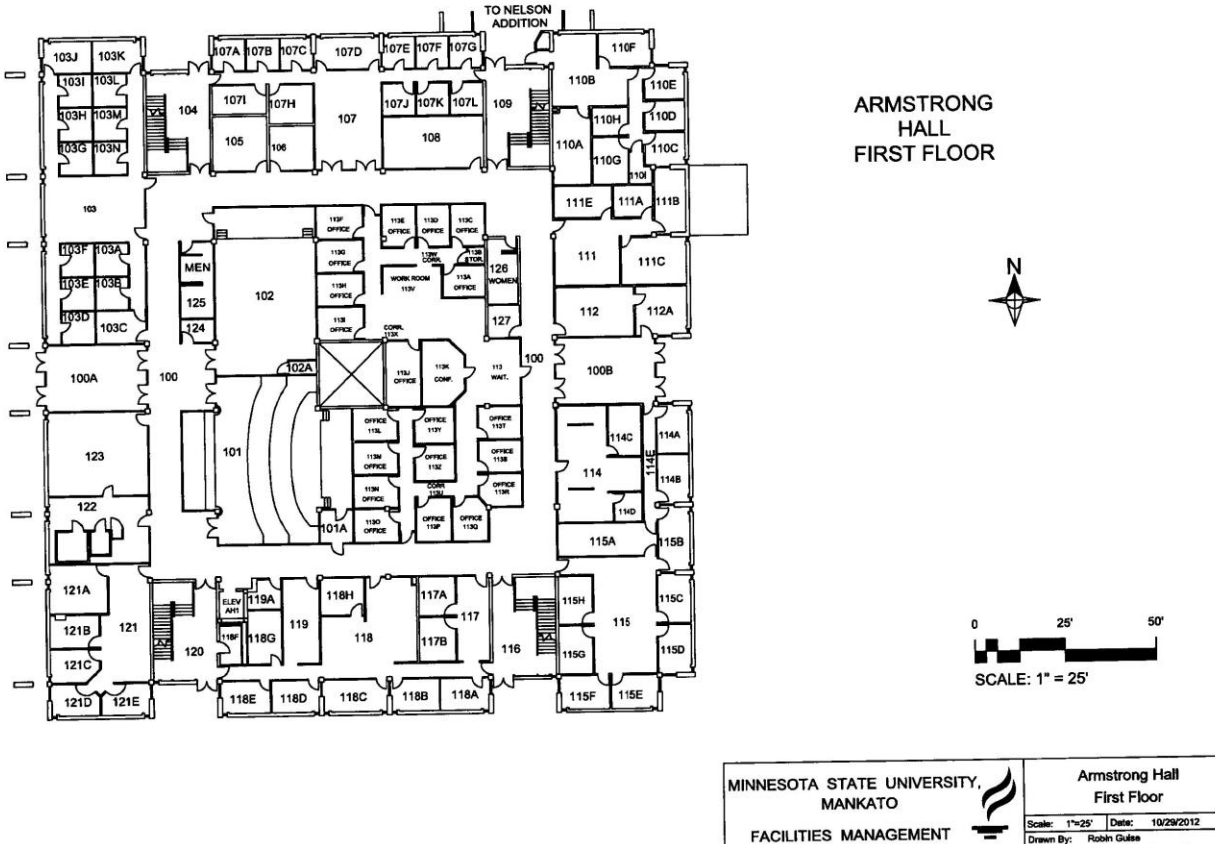
MNSU Armstrong Hall Room Third Floor



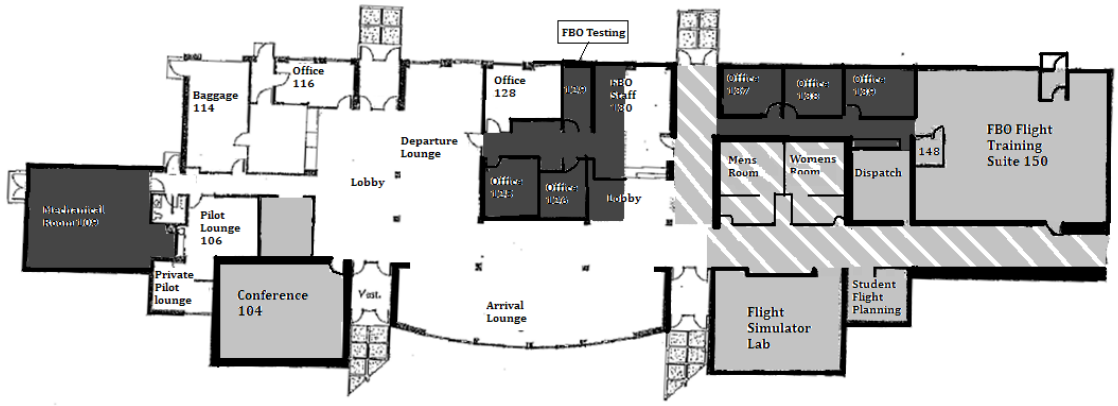
MNSU Armstrong Hall Room Second Floor



MNSU Armstrong Hall Room First Floor



APPENDIX B
Airport Facilities



Legend

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

0 25 50

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 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 flights 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,

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

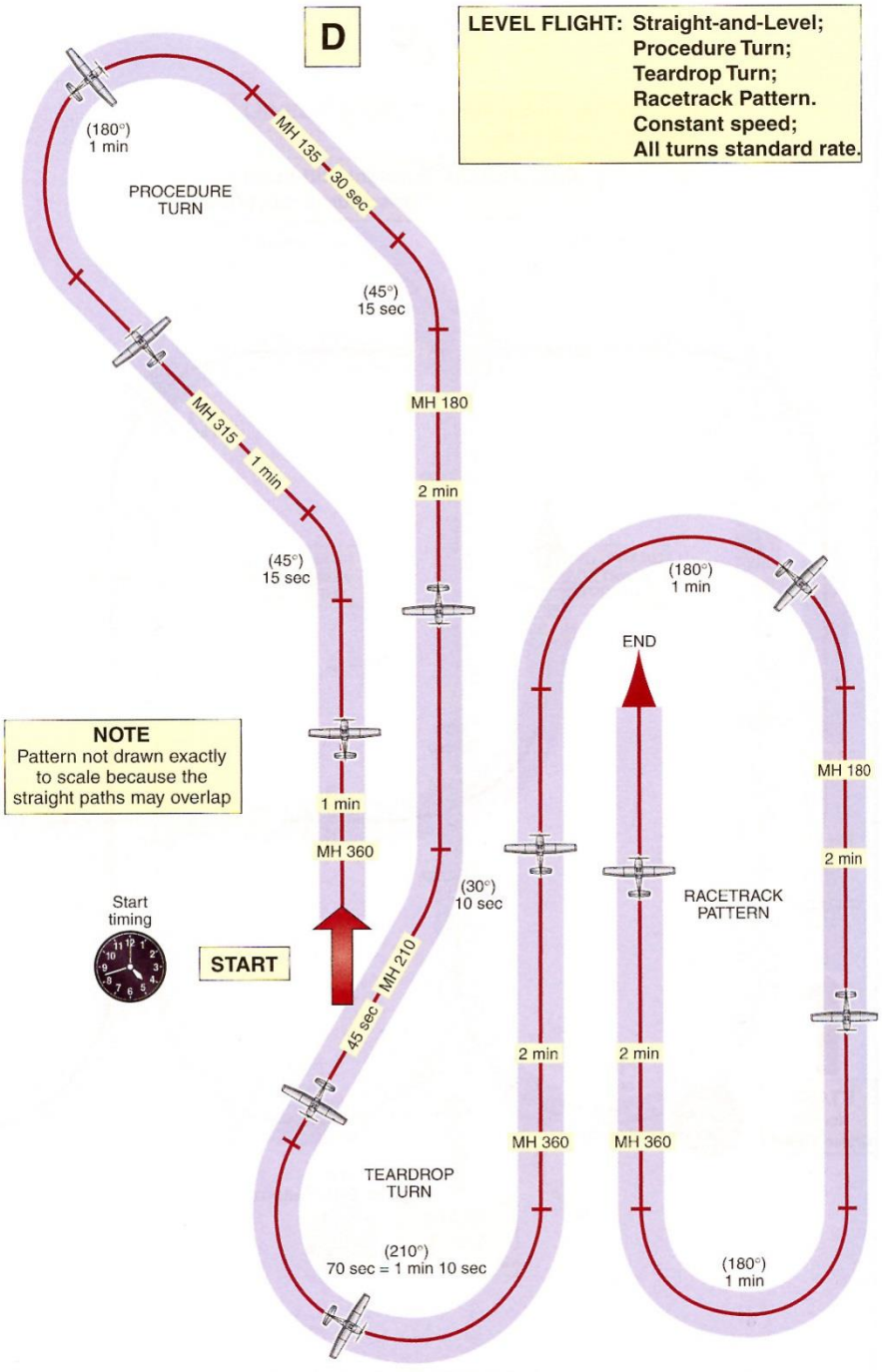
- AC 60-22: Aeronautical Decision Making
- AC 61-65: Certification - Pilots and Flight Instructors
- AC 61-67: Stall and Spin Awareness Training
- AC 61-84: Role of Preflight
- AC 90-23E: Aircraft Wake Turbulence
- AC 90-48C: Pilot's Role in Collision Avoidance
- AC 90-66A: Recommended Standard Traffic 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
AC	Advisory Circular
ACS	Airmen Certification Standards
AD's	Airworthiness Directive's
ADC	Air Data Computer
ADM	Aeronautical Decision Making
AFD	Airport/Facility Directory
AGL	Above Ground Level
AHRS	Attitude Heading Reference System
AIM	Aeronautical Information Manual
AIRMET	Airmen's Meteorological Information
ALS	Approach Lighting System
AME	Airmen Medical Examiner
AMEL	Airplane Multi Engine Land
AOA	Angle Of Attack
APP	Approach
ARR	Arrival
ARTCC	Air Route Traffic Control Center
ASAP	Aviation Safety Action Program
ASEL	Airplane Single Engine Land
ASI	Airspeed Indicator
ASR	Airport Surveillance Radar
ATC	Air Traffic Control
ATIS	Automated Terminal Information Service
AWOS	Automated Weather Observing System
CAP	Civil Air Patrol
CDI	Course Deviation Indicator
CDL	Configuration Deviation List
CFI	Certified Flight Instructor
CFIT	Controlled Flight Into Terrain
CFR	Code of Federal Regulations
CG	Center of Gravity
CRM	Crew Resource Management
DA/H	Decision Altitude/Height
DEP	Departure
DG	Directional Gyro
DME	Distance Measuring Equipment
DP	Departure Procedure
EFB	Electronic Flight Bag
EFC	Expect Further Clearance
EFIS	Electronic instrument flight system
ELT	Emergency Locator Transmitter
ETA	Estimated Time of Arrival
ETE	Estimated Time Enroute
FAA	Federal Aviation Administration
FAASTeam	FAA Safety Team
FAF	Final Approach Fix
FAR	Federal Aviation Regulation
FBO	Fixed Base Operator
FD	Flight Director
FOM	Flight Operations Manual
FSDO	Flight Standards District Office
FSS	Flight Service Station
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
GS	Glide Slope
HAT	High Above Touchdown
HIRL	High Intensity Runway Lights
HSI	Horizontal Situation Indicator
HWAS	Hazardous In-Flight Weather Advisory System
IAF	Initial Approach Fix
IAP	Instrument Approach Procedure
IF	Intermediate Fix
IFR	Instrument Flight Rules
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
KCAS	Knots Calibrated Airspeed
KIAS	Knots Indicted Airspeed
LDA	Localizer Directional Aid
LLWAS	Low Level Wind Shear Alert System
LNAV	Lateral Navigation
LOA	Letter Of Authorization
LOC	Localizer
LPV	Localizer Performance w/ Vertical Navigation
MAA	Maximum Authorized Altitude
MAP	Missed Approach Point
MCA	Minimum Crossing Altitude
MDA	Minimum Descent Altitude
MEA	Minimum Enroute Altitude
MEL	Minimum Equipment List

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

APPENDIX F
PATTERN D



Pattern D.

APPENDIX G
VERTICAL S

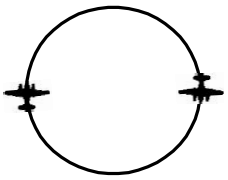
General Information
The Vertical S maneuver is used to practice instrument scanning and aircraft control. The goal of the Vertical S is to establish a constant climb/descent rate at a given airspeed. This requires precise pitch/power manipulation, and having the airplane trimmed for airspeed at the required bank angle before beginning the maneuver is critical. There are three Vertical S maneuvers: straight ahead (Vertical S-1), continuous turn (Vertical S-2), and turn reversal (Vertical S-3). The descending Vertical S-1, flown while maintaining a course, mimics the final segment of a stabilized instrument approach.

Vertical S-1
1. Fly a continuous heading or course (e.g. GPS; VOR; LOC) throughout the maneuver
2. Maintain altitude and trim the aircraft for a specified airspeed (e.g. 90 KIAS)
3. Begin a climb at a specified rate (e.g. 500 fpm) by adding power; adjust pitch to hold airspeed
4. After one minute the airplane should be 500 feet higher than its original altitude (in this example); reduce power and begin a descent at the same rate (e.g. 500 fpm) while maintaining airspeed
5. After one additional minute the airplane should return to its original altitude

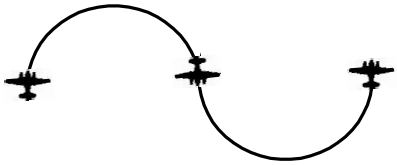
Vertical S-2
1. Enter a standard-rate turn, left or right; maintain throughout the maneuver
2. Maintain altitude and trim the aircraft for a specified airspeed (e.g. 90 KIAS)
3. When passing through a cardinal heading (N, S, E, or W) begin a climb at a specified rate (e.g. 500 fpm) by adding power; adjust pitch to hold airspeed
4. After one minute the airplane should be 500 feet higher than its original altitude (in this example), and 180-degrees away from its original heading; reduce power and begin a descent at the same rate (e.g. 500 fpm) while maintaining airspeed
5. After one additional minute the airplane should return to its original altitude and heading

Vertical S-3
1. The vertical S-2 is identical to the vertical S-1, except that the direction of turn is reversed with each reversal of vertical direction (i.e. if turning left in the climb, turn right in the descent.)
2. After two minutes the airplane should return to its original altitude and heading.

Vertical S-1



Vertical S-2



Vertical S-3