Commercial Pilot Certification Course

Airplane Multiengine Land

Training Course Outline (TCO)

Revision 8C

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

LIST OF EFFECTIVE PAGES

Page Title	Page #	Revision #	Date
Title	1	8C	7/8/2019
List of Effective Pages	2	8C	7/8/2019
List of Effective Pages cont'd	3	8C	7/8/2019
List of Effective Pages cont'd	4	8C	7/8/2019
Intentionally Left Blank	5	8	6/1/2017
Table of Contents	6	8	6/1/2017
Record of Revisions	7	8C	7/8/2019
Record of Revisions cont'd	8	8	6/1/2017
Intentionally Left Blank	9	8	6/1/2017
Section One: Course Description	10	8	6/1/2017
Section One: Course Description cont'd	11	8	6/1/2017
Section One: Course Description cont'd	12	8C	7/8/2019
Section One: Course Description cont'd	13	8C	7/8/2019
Section Two: Personnel	14	8	6/1/2017
Section Two: Personnel cont'd	15	8	6/1/2017
Section Three: Resources	16	8b	8/31/2017
Section Three: Resources cont'd	17	8	6/1/2017
Section Four: Ground School	18	8	6/1/2017
Lesson Layout: Stage One	19	8	6/1/2017
Lesson Layout: Stage Two & Three	20	8	6/1/2017
Ground Lesson Template	21	8	6/1/2017
Stage One Objectives & Completion Standards	22	8	6/1/2017
- Ground Lesson 1	23	8	6/1/2017
- Ground Lesson 2	24	8	6/1/2017
- Ground Lesson 3	25	8	6/1/2017
- Ground Lesson 4	26	8	6/1/2017
- Ground Lesson 5	27	8	6/1/2017
- Ground Lesson 6	28	8	6/1/2017
- Ground Lesson 7	29	8	6/1/2017
- Ground Lesson 8	30	8	6/1/2017
- Ground Lesson 9	31	8	6/1/2017
Stage Two Objectives & Completion Standards	32	8	6/1/2017
- Ground Lesson 10	33	8	6/1/2017
- Ground Lesson 11	34	8	6/1/2017
- Ground Lesson 12	35	8	6/1/2017
- Ground Lesson 13	36	8	6/1/2017
- Ground Lesson 14	37	8	6/1/2017
- Ground Lesson 15	38	8	6/1/2017
- Ground Lesson 16	39	8	6/1/2017
- Ground Lesson 17	40	8	6/1/2017
- Ground Lesson 18	41	8	6/1/2017
- Ground Lesson 19	42	8	6/1/2017
- Ground Lesson 20	43	8	6/1/2017
Stage Three Objectives & Completion Standards	44	8	6/1/2017
- Ground Lesson 21	45	8	6/1/2017
- Ground Lesson 22	46	8	6/1/2017
- Ground Lesson 23	47	8	6/1/2017
- Ground Lesson 24	48	8	6/1/2017

FAA APPROVED
MSP FSDO

GREGORY H SMITH
2019.07.17 08:00:54 -05'00'

LIST OF EFFECTIVE PAGES cont'd

Page Title	Page #	Revision #	Date
- Ground Lesson 25	49	8	6/1/2017
- Ground Lesson 26	50	8	6/1/2017
- Ground Lesson 27	51	8	6/1/2017
- Ground Lesson 28	52	8	6/1/2017
- Ground Lesson 29	53	8	6/1/2017
- Ground Lesson 30	54	8	6/1/2017
Section Five: Flight Training	55	8	6/1/2017
Lesson Layout: Stage One	56	8	6/1/2017
Lesson Layout: Stage Two	57	8	6/1/2017
Lesson Layout: Stage Three	58	8	6/1/2017
Flight Lesson Template	59	8	6/1/2017
Stage One Objectives & Completion Standards	60	8	6/1/2017
- Lesson 1: Pre/Post Ground	61	8	6/1/2017
- Lesson 2: Dual X/C	62	8	6/1/2017
- Lesson 3: Simulator	63	8	6/1/2017
- Lesson 4: Pre/Post Ground	64	8	6/1/2017
- Lesson 5: Dual X/C	65	8	6/1/2017
- Lesson 6: Solo X/C	66	8C	7/8/2019
- Lesson 7: Solo X/C	67	8C	7/8/2019
- Lesson 8: Solo X/C	68	8C	7/8/2019
- Lesson 9: Dual X/C	69	8	6/1/2017
- Lesson 10: Simulator	70	8	6/1/2017
- Lesson 11: Solo X/C	71	8C	7/8/2019
- Lesson 12: Dual X/C	72	8	6/1/2017
- Lesson 13: Solo X/C	73	8C	7/8/2019
- Lesson 14: Dual X/C	74	8	6/1/2017
- Lesson 15: Solo X/C	75	8C	7/8/2019
- Lesson 16: Solo X/C	76	8C	7/8/2019
- Lesson 17: Solo X/C	77	8C	7/8/2019
- Lesson 18: Solo X/C	78	8	6/1/2017
- Lesson 19: Dual X/C	79	8	6/1/2017
- Lesson 20: Pre/Post Ground	80	8	6/1/2017
- Lesson 21: Stage One Check	81	8	6/1/2017
Stage Two Objectives & Completion Standards	82	8	6/1/2017
- Lesson 22: Pre/Post Ground	83	8	6/1/2017
- Lesson 23: Flight	84	8	6/1/2017
- Lesson 24: Flight	85	8	6/1/2017
- Lesson 25: Pre/Post Ground	86	8	6/1/2017
- Lesson 26: Flight	87	8	6/1/2017
- Lesson 27: Solo	88	8	6/1/2017
- Lesson 28: Flight	89	8	6/1/2017
- Lesson 29: Flight	90	8	6/1/2017
- Lesson 30: Solo	91	8	6/1/2017
- Lesson 31: Flight	92	8	6/1/2017
- Lesson 32: Solo	93	8	6/1/2017
- Lesson 33: Flight	94	8	6/1/2017
- Lesson 34: Flight	95	8	6/1/2017
- Lesson 35: Pre/Post Ground	96	8	6/1/2017

FAA APPROVED
MSP FSDO

GREGORY H SMITH
2019.07.17 08:01:51 -05'00'

LIST OF EFFECTIVE PAGES cont'd

Page Title	Page #	Revision #	Date
- Lesson 36: Stage Two Check	97	8	6/1/2017
Stage Three Objectives & Completion Standards	98	8	6/1/2017
- Lesson 37: Pre/Post Ground	99	8	6/1/2017
- Lesson 38: Simulator	100	8	6/1/2017
- Lesson 39: Pre/Post Ground	101	8	6/1/2017
- Lesson 40: Flight	102	8	6/1/2017
- Lesson 41: Flight	103	8	6/1/2017
- Lesson 42: Pre/Post Ground	104	8	6/1/2017
- Lesson 43: Simulator	105	8	6/1/2017
- Lesson 44: Flight	106	8	6/1/2017
- Lesson 45: Pre/Post Ground	107	8	6/1/2017
- Lesson 46: Dual X/C	108	8	6/1/2017
- Lesson 47: Dual X/C	109	8	6/1/2017
- Lesson 48: Simulator	110	8	6/1/2017
- Lesson 49: Pre/Post Ground	111	8	6/1/2017
- Lesson 50: Flight	112	8	6/1/2017
- Lesson 51: Simulator	113	8	6/1/2017
- Lesson 52: Simulator	114	8	6/1/2017
- Lesson 53: Dual X/C	115	8	6/1/2017
- Lesson 54: Dual X/C	116	8	6/1/2017
- Lesson 55: Solo X/C	117	8	6/1/2017
- Lesson 56: Solo Night X/C	118	8	6/1/2017
- Lesson 57: Solo Night X/C	119	8	6/1/2017
- Lesson 58: Pre/Post Ground	120	8C	7/8/2019
- Lesson 59: Flight	121	8	6/1/2017
- Lesson 60: Flight	122	8	6/1/2017
- Lesson 61: Simulator	123	8	6/1/2017
- Lesson 62: Flight	124	8	6/1/2017
- Lesson 63: Flight	125	8	6/1/2017
- Lesson 64: Flight	126	8	6/1/2017
- Lesson 65: Pre/Post Ground	127	8	6/1/2017
- Lesson 66: Stage Three Check	128	8	6/1/2017
Intentionally Left Blank	129	8	6/1/2017
Appendix A: Ground Instruction Facilities	130	8	6/1/2017
Appendix A: Ground Instruction Facilities cont'd	131	8	6/1/2017
Appendix A: Ground Instruction Facilities cont'd	132	8	6/1/2017
Appendix A: Ground Instruction Facilities cont'd	133	8	6/1/2017
Appendix B: Airport Facilities	134	8	6/1/2017
Appendix C: Red Bird Letter of Authorization	135	8	6/1/2017
Appendix C: Red Bird Letter of Authorization cont'd	136	8	6/1/2017
Appendix C: Red Bird Letter of Authorization cont'd	137	8	6/1/2017
Appendix D: Reference Books and Materials	138	8	6/1/2017
Appendix D: Reference Books and Materials	139	8	6/1/2017
Appendix E: Acronyms	140	8	6/1/2017
Appendix E: Acronyms cont'd	141	8	6/1/2017

FAA APPROVED
MSP FSDO

GREGORY H SMITH
2019.07.17 08:02:52 -05'00'

INTENTIONALLY
LEFT
BLANK

TABLE OF CONTENTS

Section Title	Page #
List of Effective Pages	2
Table of Contents	6
Record of Revisions	7
Section One – Course Description	10
Section Two – Personnel	14
Section Three – Resources	16
Section Four – Ground School	18
Ground School Stage One	22
Ground School Stage Two	32
Ground School Stage Three	44
Section Five – Flight Training	55
Flight Training Stage One	60
Flight Training Stage Two	82
Flight Training Stage Three	98
Appendix A – Ground Instruction Facilities	130
Appendix B – Airport Facilities	134
Appendix C – Red Bird Letter of Authorization (LOA)	135
Appendix D – Reference Books and Materials	138
Appendix E – Acronyms	140

RECORD OF REVISIONS

Number	Date	Summary of Changes	Affected Pages
Original	June 05, 2011	Original certification of entire TCO	1–85
Revision 1	Oct. 01, 2011	Corrections and updates	1,2,7,9,11,14,16, 70,84,85
Revision 2	Feb. 15, 2012	Entire manual revision	1–111
Revision 3	Oct. 15, 2012	Merged ground and flight TCO's 1-131	
Revision 4	April 30, 2013		1-8,10,12,14,15,16,24, 44,45,46,49,50,52,53, 55-133
Revision 5	Dec. 01, 2013	Added flight lesson completion record Pg. 114, and some typo corrections	1-3,6–8,10–16,19,20, 25-45,48,63,68,76,85, 89,90,92,96,107,108, 111,112,114–129
Revision 6	Nov. 17, 2014	Chief flight instructor change	1,2,3,8,19
Revision 7	Dec. 21, 2015	Rewrite of flight TCO	1–12,15-21,24,44–133
Revision 8	Jun 1, 2017	Entire manual revision	1–141
Rev. 8b	Aug 31, 2017	Updated to reflect the addition of Piper Archers for ASEL training	1,2,7,16
Rev 8C	July 8, 2019	Revision to grading and lesson progression sections. Addition of the OPTIONAL designation to holding and approach completion topics on solo lessons in stage one. Removed safety pilot statement on solos.	1,2,3,4,7,12,13,66, 67, 68,71,73,75,76,77,120

RECORD OF REVISIONS cont'd

Number	Date	Summary of Changes	Affected Pages

INTENTIONALLY LEFT BLANK

SECTION ONE

Course Description

Commercial Pilot Certification Course
Airplane Multiengine Land

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

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

Introduction
This Training Course Outline (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 (120 hours), and each course is further divided into stages. The ground school and flight training both consist of three stages. A student may attend ground school and flight training concurrently, or he/she may complete ground training first and then begin flight training. When a student successfully passes the final stage check of the flight training course he/she will graduate from this TCO.

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

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 D.

Course Objective
The student will obtain the knowledge, skill, and aeronautical experience necessary to meet the requirements for a Commercial Pilot certificate, Airplane Multiengine Land.

Completion Standard
The student must demonstrate through written tests, practical tests, and appropriate records that he/she has attained the knowledge, skill, aeronautical decision making abilities, and experience necessary to obtain a Commercial Pilot certificate, Airplane Multiengine Land.

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

> Ground School Prerequisites: Prior to beginning ground school a student must possess a valid Private Pilot certificate with an Instrument Rating, or he/she must have taken the Private Pilot ground school and be enrolled in, or have taken, Instrument ground school, or he/she must have passed the Private Pilot and Instrument written exams with scores of 70% or better within the preceding 24 calendar months.
>
> Flight Training Prerequisites: Prior to beginning the flight training syllabus a student must be enrolled in, or have completed, Commercial Pilot ground school, and he/she must possess a valid and current FAA medical (first, second, or third class), and a Private Pilot, Airplane Single Engine Land certificate with an Instrument Rating, Airplane.

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

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

Disenrollment

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

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

Lesson Progression

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

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

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

Ground School Testing

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

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

Flight Training Lesson Grading

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

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

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

Documentation

Students will document all flight and simulator training time used to earn the Commercial 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 Commercial 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 D. 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, and a graduation certificate, signed by the Chief or Assistant Chief Instructor will be issued.

SECTION TWO

Personnel

Chief Instructor
The Chief Instructor must meet the minimum qualification requirements per 14 CFR 141.35 for a Commercial Pilot, Airplane Multiengine Land training course. Specifically, he/she must hold a commercial or airline transport pilot certificate, along with a current flight instructor certificate appropriate to the category, classes, and rating taught in this TCO (i.e. CFI airplane single and multiengine land; instrument airplane.) He/she must also have logged at least 2,000 hours as pilot in command and have accumulated a total of 3 years and 1000 hours, or 1,500 hours, of primary flight training experience.

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

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

Assistant Chief Instructor
The Assistant Chief Instructor must meet the minimum qualification requirements per 14 CFR 141.36 for a Commercial Pilot, Airplane Multiengine Land training course. Specifically, he/she must hold a commercial or airline transport pilot certificate, along with a current flight instructor certificate appropriate to the category, classes, and rating taught in this TCO (i.e. CFI airplane single and multiengine land; instrument airplane.) He/she must also have logged at least 1000 hours as pilot in command and have accumulated a total of 1.5 years and 500 hours, or 750 hours, of primary flight training experience.

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

Check Instructors
Check Instructors must meet the minimum qualification requirements per 14 CFR 141.37 for a Commercial Pilot, Airplane Multiengine Land training course. Specifically, they must hold a commercial or airline transport pilot certificate, along with a current flight instructor certificate appropriate to the category, classes, and rating taught in this TCO (i.e. CFI airplane single and multiengine land; instrument airplane.) 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 and multiengine land, and a current flight instructor certificate appropriate to the category, classes, and rating taught in this TCO (i.e. CFI airplane single and multiengine land; instrument airplane.) Flight Instructors will train students per this course outline, 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 North Star Aviation'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 North Star Aviation 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 North Star Aviation 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. North Star Aviation will train dispatchers on how to enter aircraft and student information, how to review student flight logs and documents for appropriate endorsements and currency, how to print dispatch releases, and how to understand aircraft maintenance due dates, among other duties.

SECTION THREE

Resources

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

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

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

Aircraft
North Star Aviation uses the Piper Warrior/Archer (PA-28) and Piper Seminole (PA-44) for Commercial Pilot training. The PA-28 is a fixed-gear, non-complex four-place aircraft with dual flight controls that meets the requirements of 14 CFR 141.39. The Seminole is a twin-engine, complex four-place airplane with dual flight controls that also 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 multiengine 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, the PA-44 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

COMMERCIAL PILOT GROUND SCHOOL LESSON LAYOUT

STAGE ONE (10.8 HOURS)

LESSON	DISCUSSION TOPIC	REQUIRED READING/STUDY	HOURS
1	Federal Aviation Regulations that apply to Commercial Pilot privileges, limitations, Accident reporting requirements of NTSB	Jeppesen Instrument/Commercial 1-A	1.2
2	Principles and Functions of Advanced Aircraft Systems	Jeppesen Instrument/Commercial 11-A	1.2
3	Oxygen Systems, Pressurization Systems, Ice Control Systems	Jeppesen Instrument/Commercial 11-B	1.2
4	Principles and Functions of Advanced Aircraft Systems - Retractable Landing Gear Systems	Jeppesen Instrument/Commercial 11-C	1.2
5	Principles and Functions of Advanced Aircraft Systems - Electrical Systems	Jeppesen Instrument/Commercial 11-A	1.2
6	Principles and Functions of Advanced Aircraft Systems - Propeller Systems	Jeppesen Instrument/Commercial 11-A	1.2
7	Primary Flight Instruments	Jeppesen Instrument/Commercial 2-A	1.2
8	Airplane Flight Instruments and Basic Attitude Instrument Flight	Jeppesen Instrument/Commercial 2-B	1.2
9	STAGE ONE EXAM	Lesson 1 - 8 Referenced Pages	1.2
	TOTAL		**10.8**
	CUMULATIVE TOTAL		**10.8**

STAGE TWO (13.2 HOURS)

LESSON	DISCUSSION TOPIC	REQUIRED READING/STUDY	HOURS
10	Use of Air Navigation Facilities & Instrument Navigation Systems	Jeppesen Instrument/Commercial 2-C	1.2
11	Review Air Navigation Facilities & Instrument Navigation Systems	Jeppesen Instrument/Commercial 2-C	1.2
12	Airports, Airspace and Flight Info, Airspace, ATC	Jeppesen Instrument/Commercial 3-A, B & C	1.2
13	VFR Enroute Charts, magnetic Compass for Pilotage and Dead Reckoning, Low & High Altitude Enroute Charts	Jeppesen Instrument/Commercial 5	1.2
14	Navigation Charts and Procedures, Departure Procedures & STAR'S	Jeppesen Instrument/Commercial 4 & 6	1.2
15	Approach Charts & Approach Procedures, Visual, IFR	Jeppesen Instrument/Commercial 7 & 8	1.2
16	Basic & Advanced Aerodynamics, Principles of Flight	Jeppesen Instrument/Commercial 12 -A	1.2
17	Performance & Pilot Operating Handbook	Jeppesen Instrument/Commercial 12 -B	1.2
18	Weight and Balance Computations, and Weight Shift Computations	Jeppesen Instrument/Commercial 12-C	1.2
19	Airports, Airspace and Flight Info, Airspace, ATC, Precision and Non-precision Approaches	Jeppesen Instrument/Commercial 3-A, B & C	1.2
20	STAGE TWO EXAM	Lesson 10 - 19 Referenced Pages	1.2
	TOTAL		**13.2**
	CUMULATIVE TOTAL		**24**

STAGE THREE (12 HOURS)

LESSON	DISCUSSION TOPIC	REQUIRED READING/STUDY	HOURS
21	Meteorology, Aviation Weather Fundamentals	Jeppesen Instrument/Commercial 9 A & B	1.2
22	Meteorology - Recognition of Critical Weather Situations, Turbulence and Wind shear	Jeppesen Instrument/Commercial 9 A & B	1.2
23	Meteorology - Use of Aeronautical Weather Reports & Forecasts	Jeppesen Instrument/Commercial 9-C, D & E	1.2
24	Meteorology - Use of Aeronautical Weather Reports & Forecasts	Jeppesen Instrument/Commercial 9-C, D & E	1.2
25	Aviation Physiology, Night and High Altitude Operations	Jeppesen Instrument/Commercial 1-B	1.2
26	Aeronautical Decision making and judgment, Maneuvers, Procedures, and Emergency Operations Appropriate to Aircraft	Jeppesen Instrument/Commercial 1-B, 10-B, 13- A & B	1.2
27	Maximum Performance Takeoff and Landings	Jeppesen Instrument/Commercial 14-A	1.2
28	Commercial Flight Maneuvers	Jeppesen Instrument/Commercial 14-A, B, C, & D	1.2
29	Federal Aviation Regulations for Commercial Pilot Privileges, Limitations, and Flight Operations, Safe & Efficient Operation of Aircraft	FAR's	1.2
30	STAGE THREE EXAM (Final Exam)	Lesson 1 - 29 Referenced Pages	1.2
	TOTAL		**12**
	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

COMMERCIAL PILOT GROUND SCHOOL

STAGE ONE (10.8 HOURS)

Lessons 1 - 9

STAGE ONE OBJECTIVES: The student will be instructed in commercial flight operations, federal aviation regulations that apply to the commercial pilot privileges, limitations, and flight operations, principals and functions of advanced aircraft systems – (oxygen systems, pressurization systems, ice control systems, retractable landing gear systems, advanced aircraft electrical systems, advanced propeller systems), primary flight instruments, airplane flight instruments and basic attitude instrument flight.

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

Introduce commercial flight operations, commercial pilot privileges, limitations and flight operations and accident reporting requirements of the national transportation safety board.

ACADEMIC CONTENT

- ☐ FAR's that apply to privileges & limitations of the Commercial Pilot Certificate.
- ☐ Review responsibilities and authority of the pilot-in-command, other required crew, owner-operator, certificate holder and other responsible parties of commercial operations.
- ☐ Accident reporting requirements of NTSB 830
- ☐ Introduction to commercial flight operations.

COMPLETION STANDARDS

This lesson will be complete when the student demonstrates through oral questions that they have met the objective above.

REQUIRED READING/STUDY

- Jeppesen Instrument/Commercial Pilot 1-A

GROUND LESSON 2
1.2 HOURS

LESSON OBJECTIVE
Gain an understanding of principles and functions of advanced aircraft systems, including being able to describe the operation of high performance engines and constant speed propellers.

ACADEMIC CONTENT
- ☐ Review reciprocating engine cycles
- ☐ Fuel Systems
- ☐ Cause, effect and recognition of detonation and pre-ignition.
- ☐ Engine cooling and lubrication
- ☐ Extreme weather operations

COMPLETION STANDARDS
This lesson will be complete when the student demonstrates through oral questions that they have met the objective above.

REQUIRED READING/STUDY
- Jeppesen Instrument/Commercial Pilot 11-A

GROUND LESSON 3
1.2 HOURS

LESSON OBJECTIVE
Become familiar with principles and functions of advanced aircraft environmental and ice control systems.

ACADEMIC CONTENT
- ☐ Oxygen systems
- ☐ Pressurization systems
- ☐ Ice control systems

COMPLETION STANDARDS
This lesson will be complete when the student demonstrates through oral questions that they have met the objective above.

REQUIRED READING/STUDY
- Jeppesen Instrument/Commercial Pilot 11-B

GROUND LESSON 4
1.2 HOURS

LESSON OBJECTIVE
Become familiar with principles and functions of aircraft common retractable landing gear systems.

ACADEMIC CONTENT
- ☐ Electrical gear systems
- ☐ Hydraulic gear systems
- ☐ Gear position indicators and warning systems
- ☐ Emergency operations appropriate to the aircraft

COMPLETION STANDARDS
This lesson will be complete when the student demonstrates through oral questions that they have met the objective above.

REQUIRED READING/STUDY
- Jeppesen Instrument/Commercial Pilot 11-C

GROUND LESSON 5
1.2 HOURS

LESSON OBJECTIVE
Become familiar with advanced aircraft electrical systems.

ACADEMIC CONTENT
- ☐ Electrical systems
  - Definition of terms
  - Schematics
- ☐ Circuit protections
  - Fuses and circuit breakers
  - Voltage regulators
- ☐ Redundancies
- ☐ Electrical emergencies

COMPLETION STANDARDS
This lesson will be complete when the student demonstrates through oral questions that they have met the objective above.

REQUIRED READING/STUDY
- Jeppesen Instrument/Commercial Pilot 11-A

GROUND LESSON 6
1.2 HOURS

LESSON OBJECTIVE

Become familiar with advanced aircraft propeller systems.

ACADEMIC CONTENT

- ☐ Propeller systems
  - Definition of terms
- ☐ Typical fixed pitch
- ☐ Typical single engine constant speed
- ☐ Typical multiengine constant speed
- ☐ Typical turbo propeller system

COMPLETION STANDARDS

This lesson will be complete when the student demonstrates through oral questions that they have met the objective above.

REQUIRED READING/STUDY

- Jeppesen Instrument/Commercial Pilot 11-A

GROUND LESSON 7
1.2 HOURS

LESSON OBJECTIVE
Review and insure an understanding of primary flight instruments.

ACADEMIC CONTENT
- ☐ Pitot static instruments
- ☐ Gyroscopic instruments

COMPLETION STANDARDS
This lesson will be complete when the student demonstrates through oral questions that they have met the objective above

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

GROUND LESSON 8
1.2 HOURS

LESSON OBJECTIVE
Review and ensure an understanding of other airplane flight instruments and their use in basic attitude instrument flight.

ACADEMIC CONTENT
- ☐ Magnetic compass
- ☐ Other instrumentation
  - Engine monitoring
  - Navigation
  - Advanced cockpits (glass)
- ☐ Basic attitude instrument flight

COMPLETION STANDARDS
This lesson will be complete when the student demonstrates through oral questions that they have met the objective above.

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

GROUND LESSON 9
1.2 HOURS

LESSON OBJECTIVE
The student will complete a comprehensive written exam covering material in lesson 1 through 9

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
- Lessons 1-8

COMMERCIAL PILOT GROUND SCHOOL

STAGE TWO (13.2 HOURS)

Lessons 10 - 20

STAGE ONE OBJECTIVES: The student will be instructed in use of air navigation facilities and instrument navigation systems, airports, airspace and flight info, airspace, ATC, VFR enroute charts, magnetic compass for pilotage, dead reckoning, IFR low and high altitude enroute navigation charts & procedures, IFR approach charts & approach procedures, visual, IFR, basic and advanced aerodynamics, principals of flight, performance & pilot operating handbook, weight and balance and weight shift computations, airports, Airspace and precision and non-precision approaches.

STAGE ONE 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 10

1.2 HOURS

LESSON OBJECTIVE
Review and insure an understanding of instrument navigation systems.

ACADEMIC CONTENT

- ☐ VOR
- ☐ DME
- ☐ NDB
- ☐ HSI and RMI

COMPLETION STANDARDS
This lesson will be complete when the student demonstrates through oral questions that they have met the objective above.

REQUIRED READING/STUDY

- Jeppesen Instrument/Commercial Pilot 2-C

GROUND LESSON 11
1.2 HOURS

LESSON OBJECTIVE
Review and insure an understanding of instrument navigation systems.

ACADEMIC CONTENT
- ☐ ILS, RNAV, GPS, INS, RNP
- ☐ Integrated displays, PFD, MFD

COMPLETION STANDARDS
This lesson will be complete when the student demonstrates through oral questions that they have met the objective above.

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

GROUND LESSON 12
1.2 HOURS

LESSON OBJECTIVE

Review and insure an understanding of the National Airspace System, airport markings, lighting systems and other flight information. Review and insure understanding and be able to use appropriate sources of flight information. Review and insure an understanding of the air traffic control system and ATC clearances.

ACADEMIC CONTENT

- ☐ Airports, airspace and flight information
  - Runway and taxiway markings
  - Airport signs and additional markings
  - Airport lighting systems
- ☐ National Airspace System
  - Airspace classifications and requirements
  - Special use and other airspace
- ☐ Flight information
  - AFD, AIM, NOTAMs and Other Sources
- ☐ Air Traffic Control
- ☐ ATC clearances

COMPLETION STANDARDS

This lesson will be complete when the student demonstrates through oral questions that they have met the objective above.

REQUIRED READING/STUDY

- Jeppesen Instrument/Commercial Pilot 3-A, B, C

GROUND LESSON 13
1.2 HOURS

LESSON OBJECTIVE

Review and insure an understanding of VFR enroute charts, IFR high and low altitude enroute charts and procedures, magnetic compass for pilotage and dead reckoning.

ACADEMIC CONTENT

- ☐ VFR enroute charts
- ☐ Magnetic compass for pilotage and dead reckoning
- ☐ Low and high altitude enroute IFR charts
- ☐ Enroute procedures
    - Communications (reporting procedures)
    - Direct vs airway
    - Airspeed and altitudes
    - VFR on top / over the top
    - Composite flight plans
- ☐ Holding procedures

COMPLETION STANDARDS

This lesson will be complete when the student demonstrates through oral questions that they have met the objective above.

REQUIRED READING/STUDY

- Jeppesen Instrument/Commercial Pilot 5

GROUND LESSON 14
1.2 HOURS

LESSON OBJECTIVE
Review and insure an understanding of Navigation Charts and Procedures, SIDs and STARs.

ACADEMIC CONTENT
- ☐ VFR charts
- ☐ Departure and arrival charts and procedures
    - Pilot navigation, vector navigation

COMPLETION STANDARDS
This lesson will be complete when the student demonstrates through oral questions that they have met the objective above.

REQUIRED READING/STUDY
- Jeppesen Instrument/Commercial Pilot 4 & 6

GROUND LESSON 15
1.2 HOURS

LESSON OBJECTIVE
Review and insure an understanding of approach charts and procedures, visual, IFR precision and non-precision.

ACADEMIC CONTENT
- ☐ Visual vs contact vs VFR approaches
- ☐ Non-precision approach
  - Charts
  - Procedures
  - NAVAID on and off airport
  - VOR, NDB, LOC, LDA, RNAV, GPS
- ☐ Precision approach
  - Charts
  - Procedures
  - ILS, LNP, RNP

COMPLETION STANDARDS
This lesson will be complete when the student demonstrates through oral questions that they have met the objective above.

REQUIRED READING/STUDY
- Jeppesen Instrument/Commercial Pilot 7&8

GROUND LESSON 16
1.2 HOURS

LESSON OBJECTIVE
Become familiar with basic and advanced principles of aerodynamics including the VG diagram and principles of flight.

ACADEMIC CONTENT
- ☐ Review four forces, forces in a climb, forces in a turn, stability, drag and power curves.
- ☐ VG diagram'
- ☐ Thrust and power curves
- ☐ Effects of weight and load factors
- ☐ Rate & radius of turns
- ☐ Stalls and spins
- ☐ Principles of flight

COMPLETION STANDARDS
This lesson will be complete when the student demonstrates through oral questions that they have met the objective above.

REQUIRED READING/STUDY
- Jeppesen Instrument/Commercial Pilot 12-A

GROUND LESSON 17
1.2 HOURS

LESSON OBJECTIVE
Further develop the ability to explain and use performance charts, tables, and other data to determine performance, including take off, climb, cruise, endurance, landing distance and adverse effects of exceeding aircraft performance limitations.

ACADEMIC CONTENT
- ☐ Factors affecting performance
  - Density altitude
  - Wind
  - Weight
  - Runway conditions
- ☐ Pilots operating handbook
  - Take off charts & tables
  - Rate of climb
  - Time, fuel, and distance to climb
  - Cruise performance (speed, range, and endurance)
  - Time, fuel, distance to descend
  - Landing distance
  - Use of performance charts takeoff, landing, climb cruise
- ☐ Glide distance
- ☐ Stall speed
- ☐ Significance and effects of exceeding limitations

COMPLETION STANDARDS
This lesson will be complete when the student demonstrates through oral questions that they have met the objective above.

REQUIRED READING/STUDY
- Jeppesen Instrument/Commercial Pilot 12-B

GROUND LESSON 18
1.2 HOURS

LESSON OBJECTIVE

Review and further develop the understanding of the basic principles of weight and balance. Review and be able to perform weight and balance computations and shifting weight problems.

ACADEMIC CONTENT

- ☐ Weight and balance
- ☐ Weight and balance limitations
- ☐ Computing weight and balance
  - Computation method
  - Graft method
- ☐ Weight shift computation
  - Moving, adding or subtracting weights

COMPLETION STANDARDS

This lesson will be complete when the student demonstrates through oral questions that they have met the objective above.

REQUIRED READING/STUDY

- Jeppesen Instrument/Commercial Pilot 12-C

GROUND LESSON 19
1.2 HOURS

LESSON OBJECTIVE

Review and description of and procedures for operating within National Airspace System, airport markings, lighting systems and other flight information. Review and insure understanding and be able to use appropriate sources of flight information. Review and insure an understanding of the air traffic control system and ATC Clearances.

ACADEMIC CONTENT

- ☐ Airports, airspace, and flight information
  - Runway and taxiway markings
  - Airport signs and additional markings
  - Airport lighting systems
- ☐ National airspace system
  - Airspace classifications, requirements, and description to operate within
  - Special use and other airspace
- ☐ Flight information
  - AFD, AIM, NOTAMs and other sources
- ☐ Air traffic control
- ☐ ATC clearances

COMPLETION STANDARDS

This lesson will be complete when the student demonstrates through oral questions that they have met the objective above.

REQUIRED READING/STUDY

- Jeppesen Instrument/Commercial Pilot 3-A, B, C

GROUND LESSON 20
1.2 HOURS

LESSON OBJECTIVE
The student will complete a written examination covering all material from lesson 10 through lesson 19.

ACADEMIC CONTENT
Stage Two Exam

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

REQUIRED READING/STUDY
- Lessons 10-19

COMMERCIAL PILOT GROUND SCHOOL

STAGE THREE (12 HOURS)

Lessons 21 - 30

STAGE THREE OBJECTIVES: The student will be instructed in aviation weather fundamentals, recognition of critical weather situations, turbulence and wind shear recognition an avoidance, meteorology, use of aviation weather services reports and forecasts, night and high altitude operations, aeronautical decision making and judgment, maneuvers, procedures, and emergency operations appropriate to the aircraft, aviation physiology, advanced human factors, maximum performance takeoff and landings, commercial flight maneuvers and review of federal aviation regulations commercial pilot privileges, limitations and flight operations, and review NTSB accident and incident reporting requirements.

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

GROUND LESSON 21

1.2 HOURS

LESSON OBJECTIVE
Review and insure an understanding of aviation weather fundamentals.

ACADEMIC CONTENT
- ☐ Causes of weather
- ☐ High/low pressure areas
- ☐ Jet stream
- ☐ Temperature
- ☐ Clouds
- ☐ Fog

COMPLETION STANDARDS
This lesson will be complete when the student demonstrates through oral questions that they have met the objective above.

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

GROUND LESSON 22
1.2 HOURS

LESSON OBJECTIVE
Review and insure an understanding of aviation weather fundamentals (meteorology).

ACADEMIC CONTENT
- ☐ Recognition of critical weather situations
  - Stability
  - Thunderstorms
  - Icing
  - Turbulence and windshear recognition and avoidance

COMPLETION STANDARDS
This lesson will be complete when the student demonstrates through oral questions that they have met the objective above.

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

GROUND LESSON 23
1.2 HOURS

LESSON OBJECTIVE
Review and insure an understanding of aviation weather services (meteorology). Use of aeronautical weather reports and forecasts.

ACADEMIC CONTENT
- ☐ Sources of weather information
- ☐ Aviation routine weather report (METAR)
- ☐ Terminal Aerodrome Forecast (TAF)

COMPLETION STANDARDS
This lesson will be complete when the student demonstrates through oral questions that they have met the objective above.

REQUIRED READING/STUDY
- Jeppesen Instrument/Commercial Pilot 9 C, D, & E

GROUND LESSON 24
1.2 HOURS

LESSON OBJECTIVE

Review and insure an understanding of aviation weather services continued (meteorology). Use of aeronautical weather reports and forecasts.

ACADEMIC CONTENT

- ☐ Radar report (SD)
- ☐ Surface analysis chart
- ☐ Constant pressure chart
- ☐ Aviation area forecast (FA)
- ☐ In-flight weather advisories
- ☐ Low-level and high-level prognostic charts
    - Other charts and forecast

COMPLETION STANDARDS

This lesson will be complete when the student demonstrates through oral questions that they have met the objective above.

REQUIRED READING/STUDY

- Jeppesen Instrument/Commercial Pilot 9 C, D, & E

GROUND LESSON 25
1.2 HOURS

LESSON OBJECTIVE
Review and insure an understanding of aviation physiology, night, and high altitude operations.

ACADEMIC CONTENT
- ☐ Spatial disorientation
- ☐ Vestibular disorientation
- ☐ Motion sickness
- ☐ Hypoxia
- ☐ Use of supplemental oxygen
- ☐ Hyperventilation
- ☐ Stress
- ☐ Dehydration
- ☐ Fatigue
- ☐ Alcohol and drugs
- ☐ Fitness for flight
- ☐ I'M SAFE checklist
- ☐ Night and high altitude operations

COMPLETION STANDARDS
This lesson will be complete when the student demonstrates through oral questions that they have met the objective above.

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

GROUND LESSON 26
1.2 HOURS

LESSON OBJECTIVE
Review and insure an understanding of advanced human factors concepts and aeronautical decision making and judgment.

ACADEMIC CONTENT
- ☐ Aeronautical decision making and judgment
- ☐ Crew resource management
- ☐ The decision-making process
  - DECIDE model
- ☐ Pilot-in-command responsibility
- ☐ Hazardous attitudes
- ☐ Workload management
- ☐ Situational awareness
- ☐ Emergencies VFR and IFR
  - Minimum fuel
  - Partial panel
  - Communication failure
  - No-gyro approach
  - Malfunction reports
- ☐ Maneuvers, procedures, and emergency operations appropriate to the aircraft

COMPLETION STANDARDS
This lesson will be complete when the student demonstrates through oral questions that they have met the objective above.

REQUIRED READING/STUDY
- Jeppesen Instrument/Commercial Pilot 1-B, 10-B, 13-A&B

GROUND LESSON 27
1.2 HOURS

LESSON OBJECTIVE
Review and insure an understanding of maximum performance takeoffs and landings.

ACADEMIC CONTENT
- ☐ Soft field operations
- ☐ Short field operations

COMPLETION STANDARDS
This lesson will be complete when the student demonstrates through oral questions that they have met the objective above.

REQUIRED READING/STUDY
- Jeppesen Instrument/Commercial Pilot 14-A

GROUND LESSON 28
1.2 HOURS

LESSON OBJECTIVE

Introduce and develop an understanding of the elements involved with maximum performance commercial flight maneuvers, steep turns, chandelles, lazy-eights, steep spirals, and eights-on-pylons

ACADEMIC CONTENT

- Commercial pilot maneuvers
    - Steep turns
    - Chandelles
    - Lazy-eights
    - Steep spirals
    - Eights-on-pylons

COMPLETION STANDARDS

This lesson will be complete when the student demonstrates through oral questions that they have met the objective above.

REQUIRED READING/STUDY

- Jeppesen Instrument/Commercial Pilot 14-A, B, C, D

GROUND LESSON 29
1.2 HOURS

LESSON OBJECTIVE

Review and ensure an understanding of Federal Aviation Regulations with respect to commercial pilot privileges, limitations, and flight operations. Safe operation of aircraft.

ACADEMIC CONTENT

- ☐ FAR part 1 definitions
- ☐ FAR 23 aircraft categories
- ☐ FAR 61 applicable to the commercial pilot certificate, airplane
- ☐ FAR 91 applicable to the commercial flight operations
- ☐ FAR 119 applicability to commercial pilot operations
- ☐ NTSB accident and incident reporting requirements
- ☐ Safe and efficient operation of aircraft

COMPLETION STANDARDS

This lesson will be complete when the student demonstrates through oral questions that they have met the objective above.

REQUIRED READING/STUDY

- FAR's

GROUND LESSON 30
1.2 HOURS

LESSON OBJECTIVE
The student will complete a comprehensive written exam covering material in lesson 1 through lesson 29.

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% or better.

REQUIRED READING/STUDY

- Lessons 1-29

SECTION FIVE

Flight Training

COMMERCIAL PILOT FLIGHT TRAINING LESSON LAYOUT

STAGE ONE (54.2 HOURS)

LESSON	TOTAL	ME Complex	ASEL	DUAL	SOLO	DUAL X/C	SOLO X/C	NIGHT	INST	SIM	PRE/POST
1											3.0
2	4.0		4.0	4.0		4.0		2.0			0.5
3	1.6			1.6					1.6	1.6	0.2
4											2.0
5	3.0		3.0	3.0		3.0			2.5		0.5
6	3.0		3.0		3.0		3.0	2.0			0.3
7	3.0		3.0		3.0		3.0				0.3
8	3.0		3.0		3.0		3.0				0.3
9	4.0		4.0	4.0		4.0			3.3		0.5
10	1.6			1.6					1.6	1.6	0.2
11	3.0		3.0		3.0		3.0				0.3
12	3.0		3.0	3.0		3.0			2.0		0.5
13	3.0		3.0		3.0		3.0				0.3
14	4.0		4.0	4.0		4.0			3.0		0.5
15	3.0		3.0		3.0		3.0				0.3
16	3.0		3.0		3.0		3.0				0.3
17	4.0		4.0		4.0		4.0				0.3
18	2.0		2.0		2.0		2.0				0.3
19	3.0		3.0	3.0		3.0					0.5
20											1.0
21	3.0		3.0	3.0					1.5		1.0
Stage 1 Totals	**54.2**		**51.0**	**27.2**	**27.0**	**21.0**	**27.0**	**4.0**	**15.5**	**3.2**	**13.1**

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

STAGE TWO (18.5 HOURS)

LESSON	TOTAL	ME Complex	ASEL	DUAL	SOLO	DUAL X/C	SOLO X/C	NIGHT	INST	SIM	PRE/POST
22											1.0
23	1.5		1.5	1.5							0.5
24	1.5		1.5	1.5							0.5
25											1.0
26	1.5		1.5	1.5							0.5
27	1.5		1.5		1.5						
28	1.5		1.5	1.5							0.5
29	1.5		1.5	1.5							0.5
30	1.5		1.5		1.5						
31	1.5		1.5	1.5							0.5
32	1.5		1.5		1.5						
33	1.5		1.5	1.5							0.5
34	1.5		1.5	1.5							0.5
35											2.0
36	2.0		2.0	2.0							1.0
Stage 2 Totals	**18.5**		**18.5**	**14.0**	**4.5**						**9.0**

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

STAGE THREE (47.3 HOURS)

LESSON	TOTAL	ME Complex	ASEL	DUAL	SOLO*	DUAL X/C	SOLO X/C*	NIGHT	INST	SIM	PRE/POST
37											2.0
38	1.5			1.5					1.5	1.5	0.5
39											2.0
40	1.5	1.5		1.5							0.5
41	1.5	1.5		1.5							0.5
42											2.0
43	1.5			1.5						1.5	0.2
44	1.8	1.8		1.8							0.2
45											2.0
46	2.0	2.0		2.0		2.0					0.5
47	2.0	2.0		2.0		2.0		2.0			0.5
48	1.5			1.5					1.5	1.5	0.5
49											2.0
50	1.5	1.5		1.5					1.3		0.5
51	1.5			1.5					1.5	1.5	0.5
52	1.5			1.5					1.5	1.5	0.5
53	4.0	4.0		4.0		4.0			2.0		0.5
54	4.0	4.0		4.0		4.0			2.0		0.5
55	5.0	5.0			5.0		5.0				0.5
56	2.5	2.5			2.5		2.5	2.5			0.5
57	2.5	2.5			2.5		2.5	2.5			0.5
58											2.0
59	1.5	1.5		1.5							0.5
60	1.5	1.5		1.5							0.5
61	1.5			1.5					1.5	1.5	0.5
62	1.5	1.5		1.5					1.3		0.5
63	1.5	1.5		1.5					0.2		0.5
64	2.0	2.0		2.0					0.3		0.5
65											3.0
66	2.0	2.0		2.0					0.3		2.5
Stage 3 Totals	**47.3**	**38.3**		**37.3**	**10**	**12**	**10**	**7.0**	**14.9**	**9.0**	**27.9**
Totals	**120**	**38.3**	**69.5**	**78.5**	**41.5**	**33**	**37**	**11**	**30.4**	**12.2**	**50**

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 D (maximum simulator credit = 20%, or 24 hours: see the Red Bird LOA, Appendix C.)

**Note: Student performing duties of PIC under supervision of an authorized instructor*

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

COMMERCIAL PILOT FLIGHT TRAINING

STAGE ONE (54.2 HOURS)

Lessons 1 - 21

STAGE ONE OBJECTIVES: Stage One of the syllabus is designed to provide the student with a strong foundation in the single engine airplane to prepare him/her for commercial pilot certification. The student will increase proficiency in cross country operations with a focus on IFR navigation in day and night operations.

STAGE ONE COMPLETION STANDARDS: At the completion of this stage the student will perform all the maneuvers and procedures for IFR and VFR cross country flight. The student will perform IFR and VFR cross country navigation at a proficiency level that meets the criteria set forth in the current FAA Private Pilot and Instrument Pilot Airmen Certification Standards.

LESSON 1: PRE/POST GROUND 3.0 HOURS

LESSON OBJECTIVE
This lesson reviews VFR operations to develop a deeper commercial level of understanding. The instructor will use multiple scenarios to drive the student into an application/correlation level for each scenario provided.

GROUND TRAINING

Enrollment – ensure the student:

- ☐ Is taking, or has taken, Commercial Pilot Ground School
- ☐ Has a valid medical
- ☐ Has Private Pilot Cert. with an Instrument Rating on file
- ☐ 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
- ☐ Review of North Star Aviation FOM
  - Professionalism on cross countries (dress code)
  - Problems occurring on cross countries (popped tire, etc.)

Aeromedical Factors

- ☐ Hypoxia
- ☐ Supplemental oxygen
- ☐ Hyperventilation
- ☐ Middle ear/ sinus problems
- ☐ Spatial disorientation
- ☐ Motion sickness
- ☐ Carbon monoxide poisoning
- ☐ Stress/fatigue
- ☐ Dehydration
- ☐ Causes, effects, and corrective actions for all the above factors.

National Airspace

- ☐ Class A,B,C,D,E, and G
  - VFR weather minimums
  - Pilot certification
  - Aircraft equipment requirements
- ☐ Special use airspace

Emergency Equipment & Survival Gear

- ☐ Winter operations
- ☐ Emergency equipment on each of our aircraft

Night Operations

- ☐ Night vision: rods and cones
- ☐ Night illusions
- ☐ FAAST program: “Operation Lights On”

Navigation

- ☐ Pilotage and dead reckoning
- ☐ Diversion
- ☐ Lost procedures
- ☐ Navigation systems
- ☐ Radar services

Airport Operations

- ☐ Radio communications
  - Professional, standard communications
  - Proper phraseology

Preflight Preparation

- ☐ Certificates and documents
  - What to look for in the Aircraft
- ☐ Passenger and taxi briefings
- ☐ Airworthiness requirements
- ☐ PIC Responsibilities
- ☐ Cockpit management
- ☐ Required logging of time

Preflight Briefing Information*

- ☐ Weather reports
  - METAR, AWOS, ATIS
  - TAF, FA, Prog Charts, etc.
  - AIRMETs, SIGMETs
- ☐ NOTAMs

**Note: Each Task in this section can be satisfied using 1800WXBRIEF or a similar source prior to the first cross country.*

COMPLETION STANDARDS
Using a scenario from the instructor, the student should be able to apply his/her knowledge and risk management skills to determine a safe course of action.

REQUIRED READING/STUDY

- Pilot’s Handbook of Aeronautical Knowledge (PHAK) Chapter 17 “Aeromedical Factors”

LESSON 2: FLIGHT
4.0 HOURS DUAL X/C
2.0 HOURS NIGHT
0.5 HOURS PRE/POST

LESSON OBJECTIVE

The instructor should develop a cross country flight scenario that will allow the student to further his/her ADM skills by handling situations as they would occur on a normal flight. Use of a control-towered airport is recommended. This lesson will review VFR cross country procedures from the Private Pilot Course.

GROUND TRAINING

Cross Country Preparation

- ☐ Preflight orientation and preparation
- ☐ Explain the VFR cross country flight plan
- ☐ External power start procedures
- ☐ Procedures for self-service fueling

Preflight Weather Information

- ☐ Electronic briefing and filing of flight
  - Present to the instructor a weather briefing from 1800WXBrief or a similar source
- ☐ Relate to risk management for the flight

FLIGHT TRAINING

Preflight Procedures

- ☐ Use of checklist
- ☐ Preflight inspection
- ☐ Cockpit organization
- ☐ Passenger and taxi briefings
- ☐ Review hot spots & runway incursions avoidance
- ☐ Positive change of controls
- ☐ Run up procedures

Airport Operations

- ☐ Radio communications
- ☐ Traffic pattern

Takeoffs, Landings, and Go-Arounds

- ☐ Normal/crosswind takeoff and climb
- ☐ Normal/crosswind approach and landing

Aircraft Performance

- ☐ Leaning procedures
- ☐ Endurance calculations
- ☐ Ground speed verification against planning
- ☐ Use of electronic flight log vs paper

Night Operations

- ☐ Night illusions

Navigation

- ☐ Pilotage and dead reckoning
- ☐ Use of navigation systems and radar services
- ☐ Diversion
- ☐ Lost procedures
- ☐ Radio-communications
- ☐ OPTIONAL: Taxi to FBO at control tower
- ☐ OPTIONAL: Marshalled
- ☐ Situational awareness
- ☐ ADM
- ☐ SPRM

Emergency Operations

- ☐ Loss of engine enroute
- ☐ OPTIONAL: ATC light signals
- ☐ Systems and equipment malfunctions
- ☐ Emergency approach and landing procedures
- ☐ Emergency equipment and survival gear

COMPLETION STANDARDS

The student will perform the flight within current Private Pilot ACS standards, and will demonstrate the use of sound ADM.

REQUIRED READING/STUDY

- Airplane Flying Handbook (AFH) Chapter 17 “Emergency Procedures”
- FAA Commercial Pilot – Airplane Single Engine Land Practical Test Standards/Airmen Certification Standards (ASEL PTS/ACS) Area of Operation (AOO) VII. Task A-D. “Navigation”

LESSON 3: SIMULATOR
1.6 HOURS DUAL
1.6 HOURS INSTRUMENT
0.2 HOURS PRE/POST

LESSON OBJECTIVE
The student will continue to develop his/her instrument skills by being introduced to advanced instrument departure and arrival procedures in busy airspace and/or mountainous airports.

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

Taxi Procedures

- ☐ Low visibility taxi at a complex airport
  - *Suggested: KMSP, KORD, KMIC, etc.*

Departure Procedures

- ☐ Clearance copying and readback
- ☐ Low visibility take off
- ☐ Climb gradient
  - Calculate the aircrafts ability to meet any required gradient
- ☐ Instructors choice of DP to be flown
  - *Suggested: BLUE MESA THREE out of KMTJ*
  - *Suggested: PIKES NINE or PLANES EIGHT out of KAPA*

Enroute Procedures

- ☐ Victor airway navigation involving a MCA/MRA
  - *Suggested: Starting at CRETO Fly East to West over KRAP on the V26, and be able to identify RULER at 17 DME using the cross radial. Take note of the MCA and MRA along the route.*

Emergency Operations

- ☐ Vacuum or PFD failure
- ☐ Pitot tube blocked
- ☐ Lost communications procedures

Instrument Approach Procedures

- ☐ Non-precision approach
- ☐ Precision approach to DA
- ☐ Additional precision or non-precision
- ☐ Holding procedures

Approach Completion

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

Arrival Procedures

- ☐ Instructors choice of arrival to be flown
  - *Suggested: ENDEE FOUR via ENDEE into KMDW*

COMPLETION STANDARDS
The student should demonstrate an advanced knowledge of more complex instrument departure and arrival procedures. The student should also demonstrate additional proficiency operating under IFR conditions with a partial panel failure.

REQUIRED READING/STUDY

- Instrument Flying Handbook (IFH) Chapter 10 "IFR Flight"

LESSON 4: PRE/POST GROUND 2.0 HOURS

LESSON OBJECTIVE
This lesson will continue to develop and enhance the student's ability to make good aeronautical decisions through scenarios created by the instructor in each of the topics outlined in this lesson. This lesson can be used to plan the cross country that will be flown in lesson 5.

GROUND TRAINING: Review

Preflight Procedures and Preparation

- ☐ Certificates and documents
  - Pilot and aircraft
- ☐ Required logging of time
- ☐ Airworthiness requirements
- ☐ Cockpit management

Preflight Information Brief

- ☐ Risk management
- ☐ 1800WXBRIEF or similar tool
  - Filing of a Flight Plan
  - METAR, AWOS, ATIS
  - TAF, FA, Prog Charts, etc.
  - AIRMETs, SIGMETs
  - NOTAMS

GROUND TRAINING

Navigation

- ☐ VFR into IFR operations
- ☐ Composite flight plan
- ☐ Special VFR
- ☐ Pop up clearance
- ☐ Non- Radar environment procedures
  - Compulsory reporting points
  - Radio calls
- ☐ Visual approach
  - Descent planning
  - NAVAID backup
  - Clearance scenarios

Airport Operations

- ☐ Radio communication: Class B, C, D & non-towered airports
- ☐ Professional, abbreviated, standard communications

Night Operations

- ☐ Remaining on an IFR flight plan until on the ground at non-towered airports
- ☐ Use of a VDP
- ☐ FAAST Program: "Operation Lights On"

COMPLETION STANDARDS
Using a scenario from the instructor, the student should be able to apply his/her knowledge and risk management skills to determine a safe course of action.

REQUIRED READING/STUDY

- PHAK Ch 15 "Airspace"
- ASEL PTS/ACS Area of Operation I. Task A, B, C, and E. "Preflight Preparation"

LESSON 5: FLIGHT
3.0 HOURS DUAL X/C
2.5 HOURS INSTRUMENT
0.5 HOURS PRE/POST

LESSON OBJECTIVE

The instructor should develop a cross country flight scenario that will allow the student to further his/her ADM skills by handling situations as they would occur on a normal flight. Use of a control-towered airport is recommended. Additionally, this lesson should be conducted under IFR to practice IFR cross country procedures learned in the Instrument course. For added experience the student should be exposed to a visual approach procedure with descent planning on one of the arrivals.

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 Information Briefing

- ☐ IFR cross country planning
- ☐ Alternate airports
- ☐ Briefing and filing of flight plan
- ☐ Weather briefing given to CFI
  - 1800WXBRIEF or similar source
- ☐ Relate to risk management for the flight

Preflight Procedures

- ☐ Use of checklist
- ☐ Preflight inspection
- ☐ Cockpit organization
- ☐ Passenger briefing
- ☐ Taxi briefing
- ☐ Review hot spots & runway incursions avoidance
- ☐ Positive change of controls
- ☐ Run up procedures

FLIGHT TRAINING: Review

Takeoffs, Landings, and Go-Arounds

- ☐ Normal/crosswind takeoff and climb
- ☐ Normal/crosswind approach and landing
- ☐ OPTIONAL: Go-around

Instrument Procedures

- ☐ Air traffic control clearance
- ☐ Clearance copying and read back
- ☐ Departure procedures
- ☐ Use of radar
- ☐ Voice communications
- ☐ Enroute procedures and clearances

Instrument Approach Procedures

- ☐ Non-precision approach
- ☐ Precision approach to DA
- ☐ Visual approach
- ☐ Holding procedures

Approach Completion

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

Post Flight Procedures

- ☐ Parking and securing
- ☐ Post flight inspections

COMPLETION STANDARDS

During the preflight orientation the student should be able to plan the flight accurately making use of all applicable FAA publications and weather products. The student should demonstrate the ability to use standard ATC terminology, and he/she should conduct the flight within Private Pilot and Instrument ACS standards.

REQUIRED READING/STUDY

- ASEL PTS/ACS Area of Operation I. Task D. "Cross-Country Flight Planning"
- Instrument Procedures Handbook (IPH) Ch. 4 "Types of Approaches"
- Jeppesen Instrument Commercial (JIC) 3-62 "Approach Clearances", 7-64 "Visual and Contact Approaches"

LESSON 6: FLIGHT
3.0 HOURS SOLO X/C
2.0 HOURS NIGHT
0.3 HOURS PRE/POST

LESSON OBJECTIVE

The instructor should develop a cross country flight scenario that will allow the student to further his/her ADM skills by handling situations as they would occur on a normal flight. Use of a control-towered airport is recommended. Additionally, this lesson should be conducted under IFR to practice IFR cross country procedures learned in the Instrument course.

**Note: Instrument approaches are encouraged to be flown during Solo lessons; however, they can only be logged in actual conditions.*

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

GROUND TRAINING: Review

Preflight Information Briefing

- ☐ IFR cross country planning
- ☐ Briefing and filing of flight plan
- ☐ Weather briefing given to CFI
  - 1800WXBRIEF or similar source
- ☐ Relate to risk management for the flight

FLIGHT TRAINING: Review

Takeoffs, Landings, and Go-Arounds

- ☐ Normal/crosswind takeoff and climb
- ☐ Normal/crosswind approach and landing
- ☐ OPTIONAL: Go-around

Instrument Procedures

- ☐ Air traffic control clearance
- ☐ Clearance copying and read back
- ☐ Departure procedures
- ☐ Use of radar
- ☐ Voice communications
- ☐ Enroute procedures and clearances

Instrument Approach Procedures*

- ☐ OPTIONAL: Non-precision approach
- ☐ OPTIONAL: Precision approach to DA
- ☐ OPTIONAL: Additional approach
- ☐ OPTIONAL: Holding procedures

Approach Completion

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

Post Flight Procedures

- ☐ Parking and securing
- ☐ Post flight inspections

COMPLETION STANDARDS

The student should demonstrate increased proficiency and confidence in the use of IFR navigation and procedures in day/night conditions. He/she should be able to plan the flight accurately making use of all applicable FAA Publications and weather products.

REQUIRED READING/STUDY

- JIC Ch. 1 Section B "Advanced Human Factors Concepts"

LESSON 7: FLIGHT
3.0 HOURS SOLO X/C
0.3 HOURS PRE/POST

LESSON OBJECTIVE

The instructor should develop a cross country flight scenario that will allow the student to further his/her ADM skills by handling situations as they would occur on a normal flight. Use of a control-towered airport is recommended. Additionally, this lesson should be conducted under IFR to practice IFR cross country procedures learned in the Instrument course.

**Note: Instrument approaches are encouraged to be flown during Solo lessons; however, they can only be logged in actual conditions.*

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

GROUND TRAINING: Review

Preflight Information Briefing

- ☐ IFR cross country planning
- ☐ Briefing and filing of flight plan
- ☐ Weather briefing given to CFI
  - 1800WXBRIEF or similar source
- ☐ Relate to risk management for the flight

FLIGHT TRAINING: Review

Takeoffs, Landings, and Go-Arounds

- ☐ Normal/crosswind takeoff and climb
- ☐ Normal/crosswind approach and landing
- ☐ OPTIONAL: Go-around

Instrument Procedures

- ☐ Air traffic control clearance
- ☐ Clearance copying and read back
- ☐ Departure procedures
- ☐ Use of radar
- ☐ Voice communications
- ☐ Enroute procedures and clearances

Instrument Approach Procedures*

- ☐ OPTIONAL: Non-precision approach
- ☐ OPTIONAL: Precision approach to DA
- ☐ OPTIONAL: Additional approach
- ☐ OPTIONAL: Holding procedures

Approach Completion

- ☐ OPTIONAL: Missed approach procedures
- ☐ OPTIONAL: Circle to land
- ☐ OPTIONAL: Straight in to land

Post Flight Procedures

- ☐ Parking and securing
- ☐ Post flight inspections

COMPLETION STANDARDS

The student should demonstrate increased proficiency and confidence in the use of IFR navigation and procedures in day/night conditions. He/she should be able to plan the flight accurately making use of all applicable FAA Publications and weather products.

REQUIRED READING/STUDY

- Instrument ACS Appendix: 6 "Aeronautical Decision Making, Risk Management, CRM and SRM"

LESSON 8: FLIGHT
3.0 HOURS SOLO X/C
0.3 HOURS PRE/POST

LESSON OBJECTIVE

The instructor should develop a cross country flight scenario that will allow the student to further his/her ADM skills by handling situations as they would occur on a normal flight. Use of a control-towered airport is recommended. Additionally, this lesson should be conducted under IFR to practice IFR cross country procedures learned in the Instrument course.

**Note: Instrument approaches are encouraged to be flown during Solo lessons; however, they can only be logged in actual conditions.*

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

GROUND TRAINING: Review

Preflight Information Briefing

- ☐ IFR cross country planning
- ☐ Briefing and filing of flight plan
- ☐ Weather briefing given to CFI
  - 1800WXBRIEF or similar source
- ☐ Relate to risk management for the flight

FLIGHT TRAINING: Review

Takeoffs, Landings, and Go-Arounds

- ☐ Normal/crosswind takeoff and climb
- ☐ Normal/crosswind approach and landing
- ☐ OPTIONAL: Go-around

Instrument Procedures

- ☐ Air traffic control clearance
- ☐ Clearance copying and read back
- ☐ Departure procedures
- ☐ Use of radar
- ☐ Voice communications
- ☐ Enroute procedures and clearances

Instrument Approach Procedures*

- ☐ OPTIONAL: Non-precision approach
- ☐ OPTIONAL: Precision approach to DA
- ☐ OPTIONAL: Additional approach
- ☐ OPTIONAL: Holding procedures

Approach Completion

- ☐ OPTIONAL: Missed approach procedures
- ☐ OPTIONAL: Circle to land
- ☐ OPTIONAL: Straight in to land

Post Flight Procedures

- ☐ Parking and securing
- ☐ Post flight inspections

COMPLETION STANDARDS

The student should demonstrate increased proficiency and confidence in the use of IFR navigation and procedures in day/night conditions. He/she should be able to plan the flight accurately making use of all applicable FAA Publications and weather products.

REQUIRED READING/STUDY

- PHAK Chapter 17 "Aeronautical Decision Making"

LESSON 9: FLIGHT
4.0 HOURS DUAL X/C
3.3 HOURS INSTRUMENT
0.5 HOURS PRE/POST

LESSON OBJECTIVE

The instructor should develop a cross country flight scenario that will allow the student to further his/her ADM skills by handling situations as they would occur on a normal flight. Use of several control-towered airports in a busy environment is recommended to improve ATC communications. Alternatively, a flight to an airport with an ASR approach will give the student more exposure to other IFR operations. This lesson should be conducted under IFR to practice IFR cross country procedures learned in the Instrument course.

Suggested: Fly the city loop – KMKT KFCM KMIC KANE KRST(ASR) KMKT

Suggested: KMKT KFSD(ASR) KSTC KMKT

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 Information Briefing

- ☐ IFR cross country planning
- ☐ Alternate airports
- ☐ Briefing and filing of flight plan
- ☐ Weather briefing given to CFI
  - 1800WXBRIEF or similar source
- ☐ Relate to risk management for the flight

Preflight Procedures

- ☐ Use of checklist
- ☐ Preflight inspection
- ☐ Cockpit organization
- ☐ Passenger briefing
- ☐ Taxi briefing
- ☐ Review hot spots & runway incursions avoidance
- ☐ Positive change of controls
- ☐ Run up procedures

FLIGHT TRAINING: Review

Takeoffs, Landings, and Go-Arounds

- ☐ Normal/crosswind takeoff and climb
- ☐ Normal/crosswind approach and landing
- ☐ Optional: Go-around

Instrument Procedures

- ☐ Air traffic control clearance
- ☐ Clearance copying and read back
- ☐ Departure procedures
- ☐ Use of radar
- ☐ Voice communications
- ☐ Enroute procedures and clearances

Instrument Approach Procedures

- ☐ Non-precision approach
- ☐ Precision approach to DA
- ☐ OPTIONAL: ASR approach
- ☐ OPTIONAL: Visual descent/approach
- ☐ Additional precision or non-precision
- ☐ Holding procedures

Approach Completion

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

Post Flight Procedures

- ☐ Parking and securing
- ☐ Post flight inspections

COMPLETION STANDARDS

The student should be able to plan the flight accurately making use of all applicable FAA Publications and weather analysis. He/she should demonstrate the ability to use standard ATC terminology, and he/she should perform this flight to instrument ACS standards.

REQUIRED READING/STUDY

- ASEL PTS/ACS Area of Operation I. Task F. "Performance and Limitations"

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

LESSON OBJECTIVE
This lesson will be a review of instrument procedures, and it will introduce an engine failure in IMC.

Note: Frequent repositioning of the flight simulator may be required to accomplish the desired training.

SIMULATOR TRAINING: Review

Taxi Procedures

- ☐ Low visibility taxi at a complex airport
  - *Suggested: KMSP, KORD, KMIC, etc.*

Takeoffs, Landings, and Go-Arounds

- ☐ Crosswind takeoff and climb
- ☐ Crosswind approach and landing

Departure Procedures

- ☐ Clearance copying and readback
- ☐ Low visibility take off
- ☐ Climb gradient
  - Calculate the aircraft's ability to meet any required gradient
- ☐ Published departure procedure
  - *Suggested: KPHF HENRY THREE*
  - *Suggested: KBUF BUFFALO FIVE*

Enroute Procedures

- ☐ Use of radar
- ☐ Voice communications
- ☐ Situational awareness
- ☐ ADM
- ☐ SPRM

Emergency Operations

- ☐ Vacuum or PFD failure
- ☐ Pitot static system failure
- ☐ Lost communications procedures

Arrival Procedures

- ☐ Published arrival procedure
  - *Suggested: ENCEE ONE arrival into KFCM or KANE*

Instrument Approach Procedures

- ☐ Non-precision approach
- ☐ Precision approach to DA
- ☐ Additional precision or non-precision
- ☐ Holding procedures

Approach Completion

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

SIMULATOR TRAINING

Emergency Operations

- ☐ Engine failure in IMC

COMPLETION STANDARDS
The student should demonstrate an advanced knowledge of more complex instrument departure and arrival procedures. The student should also demonstrate additional proficiency operating under IFR conditions with various simulated emergencies.

REQUIRED READING/STUDY

- ASEL PTS/ACS Area of Operation II. Task F. "Runway Incursion Avoidance"

LESSON 11: FLIGHT
3.0 HOURS SOLO X/C
0.3 HOURS PRE/POST

LESSON OBJECTIVE

The instructor should develop a cross country flight scenario that will allow the student to further his/her ADM skills by handling situations as they would occur on a normal flight. Use of a control-towered airport is recommended. Additionally, this lesson should be conducted under IFR to practice IFR cross country procedures learned in the Instrument course.

**Note: Instrument approaches are encouraged to be flown during Solo lessons; however, they can only be logged in actual conditions.*

**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 Information Briefing

- ☐ IFR cross country planning
- ☐ Briefing and filing of flight plan
- ☐ Weather briefing given to CFI
  - 1800WXBRIEF or similar source
- ☐ Relate to risk management for the flight

FLIGHT TRAINING: Review

Takeoffs, Landings, and Go-Arounds

- ☐ Normal/crosswind takeoff and climb
- ☐ Normal/crosswind approach and landing
- ☐ OPTIONAL: Go-around

Instrument Procedures

- ☐ Air traffic control clearance
- ☐ Clearance copying and read back
- ☐ Departure procedures
- ☐ Use of radar
- ☐ Voice communications
- ☐ Enroute procedures and clearances

Instrument Approach Procedures*

- ☐ OPTIONAL: Non-precision approach
- ☐ OPTIONAL: Precision approach to DA
- ☐ OPTIONAL: Additional approach
- ☐ OPTIONAL: Holding procedures

Approach Completion

- ☐ OPTIONAL: Missed approach procedures
- ☐ OPTIONAL: Circle to land
- ☐ OPTIONAL: Straight in to land

Post Flight Procedures

- ☐ Parking and securing
- ☐ Post flight inspections

COMPLETION STANDARDS

The student should demonstrate increased proficiency and confidence in the use of IFR navigation and procedures in day/night conditions. He/she should be able to plan the flight accurately making use of all applicable FAA Publications and weather products.

REQUIRED READING/STUDY

- ASEL PTS/ACS Area of Operation II. Tasks A, B, C, D, and G.

LESSON 12: FLIGHT
3.0 HOURS DUAL X/C
2.0 HOURS INSTRUMENT
0.5 HOURS PRE/POST

LESSON OBJECTIVE

The instructor should develop a cross country flight scenario with one leg at least 100NM and two other legs at least 50NM each that will allow the student to further his/her ADM skills by handling situations as they would occur on a normal flight. Use of a control-towered airport is recommended. Additionally, this lesson should be conducted under IFR to practice IFR cross country procedures learned in the Instrument course.

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 Information Briefing

- ☐ IFR cross country planning
- ☐ Alternate airports
- ☐ Briefing and filing of flight plan
- ☐ Weather briefing given to CFI
  - 1800WXBRIEF or similar source
- ☐ Relate to risk management for the flight

Preflight Procedures

- ☐ Use of checklist
- ☐ Preflight inspection
- ☐ Cockpit organization
- ☐ Passenger briefing
- ☐ Taxi briefing
- ☐ Review hot spots and runway incursions avoidance
- ☐ Positive change of controls
- ☐ Run up procedures

FLIGHT TRAINING: Review

Takeoffs, Landings, and Go-Arounds

- ☐ Normal/crosswind takeoff and climb
- ☐ Normal/crosswind approach and landing
- ☐ OPTIONAL: Go-around

Instrument Procedures

- ☐ Air traffic control clearance
- ☐ Clearance copying and read back
- ☐ Departure procedures
- ☐ Use of radar
- ☐ Voice communications
- ☐ Enroute procedures and clearances

Instrument Approach Procedures

- ☐ Non-precision approach
- ☐ Precision approach to DA
- ☐ OPTIONAL: Visual descent/approach
- ☐ OPTIONAL: ASR approach
- ☐ Additional precision or non-precision
- ☐ Holding procedures

Approach Completion

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

Post Flight Procedures

- ☐ Parking and securing
- ☐ Post flight inspections

COMPLETION STANDARDS

The student should be able to plan the flight accurately making use of all applicable FAA Publications and weather analysis. He/she should demonstrate the ability to use standard ATC terminology, and he/she should perform this flight to instrument ACS standards.

REQUIRED READING/STUDY

- ASEL PTS/ACS Area of Operation III. "Airport Operations"

LESSON 13: FLIGHT
3.0 HOURS SOLO X/C
0.3 HOURS PRE/POST

LESSON OBJECTIVE

The instructor should develop a cross country flight scenario that will allow the student to further his/her ADM skills by handling situations as they would occur on a normal flight. Use of a control-towered airport is recommended. Additionally, this lesson should be conducted under IFR to practice IFR cross country procedures learned in the Instrument course.

**Note: Instrument approaches are encouraged to be flown during Solo lessons; however, they can only be logged in actual conditions.*

**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 Information Briefing

- ☐ IFR cross country planning
- ☐ Briefing and filing of flight plan
- ☐ Weather briefing given to CFI
  - 1800WXBRIEF or similar source
- ☐ Relate to risk management for the flight

FLIGHT TRAINING: Review

Takeoffs, Landings, and Go-Arounds

- ☐ Normal/crosswind takeoff and climb
- ☐ Normal/crosswind approach and landing
- ☐ OPTIONAL: Go-around

Instrument Procedures

- ☐ Air traffic control clearance
- ☐ Clearance copying and read back
- ☐ Departure procedures
- ☐ Use of radar
- ☐ Voice communications
- ☐ Enroute procedures and clearances

Instrument Approach Procedures*

- ☐ OPTIONAL: Non-precision approach
- ☐ OPTIONAL: Precision approach to DA
- ☐ OPTIONAL: Additional approach
- ☐ OPTIONAL: Holding procedures

Approach Completion

- ☐ OPTIONAL: Missed approach procedures
- ☐ OPTIONAL: Circle to land
- ☐ OPTIONAL: Straight in to land

Post Flight Procedures

- ☐ Parking and securing
- ☐ Post flight inspections

COMPLETION STANDARDS

The student should demonstrate increased proficiency and confidence in the use of IFR navigation and procedures in day/night conditions. He/she should be able to plan the flight accurately making use of all applicable FAA Publications and weather products.

REQUIRED READING/STUDY

- PHAK Chapter 16 "Navigation"

LESSON 14: FLIGHT
4.0 HOURS DUAL X/C
3.0 HOURS INSTRUMENT
0.5 HOURS PRE/POST

LESSON OBJECTIVE

The instructor should develop a cross country flight scenario that will allow the student to further his/her ADM skills by handling situations as they would occur on a normal flight. Use of several control-towered airports in a busy environment is recommended to improve ATC communications. Alternatively, a flight to an airport with an ASR approach will give the student more exposure to other IFR operations. This lesson should be conducted under IFR to practice IFR cross country procedures learned in the Instrument course.

Suggested: Fly the city loop – KMKT KFCM KMIC KANE KSTP KLVN KMKT

Suggested: KRST(ASR) or KFSD(ASR)

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 Information Briefing

- ☐ IFR cross country planning
- ☐ Alternate airports
- ☐ Briefing and filing of flight plan
- ☐ Weather briefing given to CFI
  - 1800WXBRIEF or similar source
- ☐ Relate to risk management for the flight

Preflight Procedures

- ☐ Use of checklist
- ☐ Preflight inspection
- ☐ Cockpit organization
- ☐ Passenger briefing
- ☐ Taxi briefing
- ☐ Review hot spots and runway incursions avoidance
- ☐ Positive change of controls
- ☐ Run up procedures

FLIGHT TRAINING: Review

Takeoffs, Landings, and Go-Arounds

- ☐ Normal/crosswind takeoff and climb
- ☐ Normal/crosswind approach and landing
- ☐ OPTIONAL: Go-around

Instrument Procedures

- ☐ Air traffic control clearance
- ☐ Clearance copying and read back
- ☐ Departure procedures
- ☐ Use of radar
- ☐ Voice communications
- ☐ Enroute procedures and clearances

Instrument Approach Procedures

- ☐ Non-precision approach
- ☐ Precision approach to DA
- ☐ OPTIONAL: ASR approach
- ☐ OPTIONAL: Visual approach
- ☐ Additional precision or non-precision
- ☐ Holding procedures

Approach Completion

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

Post Flight Procedures

- ☐ Parking and securing
- ☐ Post flight inspections

COMPLETION STANDARDS

The student should be able to plan the flight accurately making use of all applicable FAA Publications and weather analysis. He/she should demonstrate the ability to use standard ATC terminology, and he/she should perform this flight to instrument ACS standards.

REQUIRED READING/STUDY

- PHAK Chapter 14 "Airport Operations"

LESSON 15: FLIGHT
3.0 HOURS SOLO X/C
0.3 HOURS PRE/POST

LESSON OBJECTIVE

The instructor should develop a cross country flight scenario that will allow the student to further his/her ADM skills by handling situations as they would occur on a normal flight. Use of a control-towered airport is recommended. Additionally, this lesson should be conducted under IFR to practice IFR cross country procedures learned in the Instrument course.

**Note: Instrument approaches are encouraged to be flown during Solo lessons; however, they can only be logged in actual conditions.*

**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 Information Briefing

- ☐ IFR cross country planning
- ☐ Briefing and filing of flight plan
- ☐ Weather briefing given to CFI
  - 1800WXBRIEF or similar source
- ☐ Relate to risk management for the flight

FLIGHT TRAINING: Review

Takeoffs, Landings, and Go-Arounds

- ☐ Normal/crosswind takeoff and climb
- ☐ Normal/crosswind approach and landing
- ☐ OPTIONAL: Go-around

Instrument Procedures

- ☐ Air traffic control clearance
- ☐ Clearance copying and read back
- ☐ Departure procedures
- ☐ Use of radar
- ☐ Voice communications
- ☐ Enroute procedures and clearances

Instrument Approach Procedures*

- ☐ OPTIONAL: Non-precision approach
- ☐ OPTIONAL: Precision approach to DA
- ☐ OPTIONAL: Additional approach
- ☐ OPTIONAL: Holding procedures

Approach Completion

- ☐ OPTIONAL: Missed approach procedures
- ☐ OPTIONAL: Circle to land
- ☐ OPTIONAL: Straight in to land

Post Flight Procedures

- ☐ Parking and securing
- ☐ Post flight inspections

COMPLETION STANDARDS

The student should demonstrate increased proficiency and confidence in the use of IFR navigation and procedures in day/night conditions. He/she should be able to plan the flight accurately making use of all applicable FAA Publications and weather products.

REQUIRED READING/STUDY

- PHAK Chapter 13 "Aviation Weather Services"

LESSON 16: FLIGHT
3.0 HOURS SOLO X/C
0.3 HOURS PRE/POST

LESSON OBJECTIVE

The instructor should develop a cross country flight scenario that will allow the student to further his/her ADM skills by handling situations as they would occur on a normal flight. Use of a control-towered airport is recommended. Additionally, this lesson should be conducted under IFR to practice IFR cross country procedures learned in the Instrument course.

**Note: Instrument approaches are encouraged to be flown during Solo lessons; however, they can only be logged in actual conditions.*

**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 Information Briefing

- ☐ IFR cross country planning
- ☐ Briefing and filing of flight plan
- ☐ Weather briefing given to CFI
  - 1800WXBRIEF or similar source
- ☐ Relate to risk management for the flight

FLIGHT TRAINING: Review

Takeoffs, Landings, and Go-Arounds

- ☐ Normal/crosswind takeoff and climb
- ☐ Normal/crosswind approach and landing
- ☐ OPTIONAL: Go-around

Instrument Procedures

- ☐ Air traffic control clearance
- ☐ Clearance copying and read back
- ☐ Departure procedures
- ☐ Use of radar
- ☐ Voice communications
- ☐ Enroute procedures and clearances

Instrument Approach Procedures*

- ☐ OPTIONAL: Non-precision approach
- ☐ OPTIONAL: Precision approach to DA
- ☐ OPTIONAL: Additional approach
- ☐ OPTIONAL: Holding procedures

Approach Completion

- ☐ OPTIONAL: Missed approach procedures
- ☐ OPTIONAL: Circle to land
- ☐ OPTIONAL: Straight in to land

Post Flight Procedures

- ☐ Parking and securing
- ☐ Post flight inspections

COMPLETION STANDARDS

The student should demonstrate increased proficiency and confidence in the use of IFR navigation and procedures in day/night conditions. He/she should be able to plan the flight accurately making use of all applicable FAA Publications and weather products.

REQUIRED READING/STUDY

- PHAK Chapter 12 "Weather Theory"

LESSON 17: FLIGHT
4.0 HOURS SOLO X/C
0.3 HOURS PRE/POST

LESSON OBJECTIVE

The instructor should develop a cross country flight scenario with one leg at least 250NM and at least 3 points of landing that will allow the student to further his/her ADM skills by handling situations as they would occur on a normal flight. Use of a control-towered airport is recommended. Additionally, this lesson should be conducted under IFR to practice IFR cross country procedures learned in the Instrument course.

**Note: Instrument approaches are encouraged to be flown during Solo lessons; however, they can only be logged in actual conditions.*

**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 Information Briefing

- ☐ IFR cross country planning
- ☐ Briefing and filing of flight plan
- ☐ Weather briefing given to CFI
  - 1800WXBRIEF or similar source
- ☐ Relate to risk management for the flight

FLIGHT TRAINING: Review

Takeoffs, Landings, and Go-Arounds

- ☐ Normal/crosswind takeoff and climb
- ☐ Normal/crosswind approach and landing
- ☐ OPTIONAL: Go-around

Instrument Procedures

- ☐ Air traffic control clearance
- ☐ Clearance copying and read back
- ☐ Departure procedures
- ☐ Use of radar
- ☐ Voice communications
- ☐ Enroute procedures and clearances

Instrument Approach Procedures*

- ☐ OPTIONAL: Non-precision approach
- ☐ OPTIONAL: Precision approach to DA
- ☐ OPTIONAL: Additional approach
- ☐ OPTIONAL: Holding procedures

Approach Completion

- ☐ OPTIONAL: Missed approach procedures
- ☐ OPTIONAL: Circle to land
- ☐ OPTIONAL: Straight in to land

Post Flight Procedures

- ☐ Parking and securing
- ☐ Post flight inspections

COMPLETION STANDARDS

The student should demonstrate increased proficiency and confidence in the use of IFR navigation and procedures in day/night conditions. He/she should be able to plan the flight accurately making use of all applicable FAA Publications and weather products.

REQUIRED READING/STUDY

- JIC Chapter 9 "Meteorology"

LESSON 18: FLIGHT
2.0 HOURS SOLO X/C
0.3 HOURS PRE/POST

LESSON OBJECTIVE

The instructor should develop a cross country flight scenario that will allow the student to further his/her ADM skills by handling situations as they would occur on a normal flight. This lesson will review VFR cross country procedures from the Private Pilot course. The student should employ all available navigation resources, to include VFR flight following; however, for training he/she should concentrate on pilotage and dead reckoning navigation.

GROUND TRAINING: Review

Preflight Information Briefing

- ☐ VFR cross country planning
- ☐ Briefing and filing of flight plan
- ☐ Weather briefing given to CFI
  - 1800WXBRIEF or similar source
- ☐ Relate to risk management for the flight

FLIGHT TRAINING: Review

Preflight Procedures

- ☐ Use of checklist
- ☐ Preflight inspection
- ☐ Cockpit organization
- ☐ Passenger and taxi briefings
- ☐ Review hot spots and runway incursions avoidance
- ☐ Run up procedures

Airport Operations

- ☐ Radio communications
- ☐ Traffic pattern

Takeoffs, Landings, and Go-Arounds

- ☐ Normal/crosswind takeoff and climb
- ☐ Normal/crosswind approach and landing
- ☐ OPTIONAL: Go-around

Navigation

- ☐ Pilotage and dead reckoning
- ☐ Ground speed verification against planning
- ☐ Use of navigation systems and radar services
- ☐ Radio-communications
- ☐ OPTIONAL: Taxi to FBO at control tower
- ☐ OPTIONAL: Marshaled to parking
- ☐ Situational awareness
- ☐ ADM
- ☐ SPRM

Post Flight Procedures

- ☐ Parking and securing
- ☐ Post flight inspections

COMPLETION STANDARDS

The student should demonstrate increased proficiency and confidence in the use of VFR navigation and procedures. He/she should be able to plan the flight accurately making use of all applicable FAA Publications and weather products.

REQUIRED READING/STUDY

- JIC Chapter 10 “IFR Flight Considerations”

LESSON 19: FLIGHT
3.0 HOURS DUAL X/C
0.5 HOURS PRE/POST

LESSON OBJECTIVE

The instructor should develop a VFR cross country flight scenario with one leg at least 100NM and at least 3 points of landing that will allow the student to further his/her ADM skills by handling situations as they would occur on a normal flight. This lesson will review VFR cross country procedures from the Private Pilot course. The student should employ all available navigation resources, to include VFR flight following; however, for training he/she should concentrate on pilotage and dead reckoning navigation.

GROUND TRAINING: Review

Preflight Information Briefing

- ☐ VFR cross country planning
- ☐ Briefing and filing of flight plan
- ☐ Weather briefing given to CFI
  - 1800WXBRIEF or similar source
- ☐ Relate to risk management for the flight

FLIGHT TRAINING: Review

Preflight Procedures

- ☐ Use of checklist
- ☐ Preflight inspection
- ☐ Cockpit organization
- ☐ Passenger and taxi briefings
- ☐ Review hot spots and runway incursions avoidance
- ☐ Run up procedures

Airport Operations

- ☐ Radio communications
- ☐ Traffic pattern

Takeoffs, Landings, and Go-Arounds

- ☐ Normal/crosswind takeoff and climb
- ☐ Normal/crosswind approach and landing
- ☐ OPTIONAL: Go-around

Navigation

- ☐ Pilotage and dead reckoning
- ☐ Ground speed verification against planning
- ☐ Use of navigation systems and radar services
- ☐ Radio-communications
- ☐ OPTIONAL: Taxi to FBO at control tower
- ☐ OPTIONAL: Marshalled
- ☐ Situational awareness
- ☐ ADM
- ☐ SPRM

Post Flight Procedures

- ☐ Parking and securing
- ☐ Post flight inspections

COMPLETION STANDARDS

The student should demonstrate increased proficiency and confidence in the use of VFR navigation and procedures. He/she should be able to plan the flight accurately making use of all applicable FAA Publications and weather products.

REQUIRED READING/STUDY

- JIC Chapter 13 “Commercial Decision Making”

LESSON 20: PRE/POST GROUND 1.0 HOURS

LESSON OBJECTIVE
This lesson is used to prepare the student for the Stage One check, and to ensure the student's training records are in order.

GROUND TRAINING: Review
Preflight Preparation
- ☐ Pilot certificates and documents
- ☐ Currency
  - Passenger, IFR, flight review
- ☐ I'M SAFE
  - Use this checklist for passengers also
- ☐ Aeromedical factors

Aircraft Airworthiness
- ☐ Certificates and documents
- ☐ Required maintenance inspections
- ☐ Required equipment (91.205, KOE)
- ☐ 91.213
- ☐ Review of aircraft maintenance logs

Preflight Planning
- ☐ Risk management
- ☐ Flight log
- ☐ Low enroute symbols
- ☐ National airspace system
- ☐ Fuel planning
- ☐ Weight and balance calculations
- ☐ Weather brief
  - 1800WXBRIEF or a similar source will cover all necessary weather reports.

GROUND TRAINING
Records Audit (Student must be present)
- ☐ Complete the *Commercial 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 Commercial Pilot Stage One auditing checklist.*"

COMPLETION STANDARDS
The student should demonstrate sound knowledge of IFR and VFR flight planning procedures in preparation for the Stage One check. Additionally, this lesson is not complete until the record audit is accomplished and all errors are corrected.

REQUIRED READING/STUDY
- Review of all previous ground lessons

LESSON 21: STAGE ONE CHECK
3.0 HOURS DUAL
1.5 INSTRUMENT
1.0 HOURS PRE/POST

LESSON OBJECTIVE

The Chief/Assistant Chief Instructor or an approved Stage Check Pilot will evaluate the student's knowledge and proficiency in the items listed below to determine if he/she is able to operate the aircraft safely in an IFR/VFR cross country environment, and to determine if he/she is ready to begin Stage Two. The check pilot should create a plan of action that includes a diversion scenario. At least one leg of the flight should be IFR and another VFR.

GROUND TRAINING: Review

Preflight Preparation

- ☐ Pilot certificates and documents
- ☐ Currency
  - Passenger, IFR, flight review
- ☐ I'M SAFE
  - Use this checklist for passengers also
- ☐ Aeromedical factors

Aircraft Airworthiness

- ☐ Certificates and documents
- ☐ Required maintenance inspections
- ☐ Required equipment (91.205, KOE)
- ☐ 91.213
- ☐ Review of aircraft maintenance logs

Preflight Planning

- ☐ Risk management
- ☐ Flight log
- ☐ Low enroute symbols
- ☐ National airspace system
- ☐ Fuel planning
- ☐ Weight and balance calculations
- ☐ Weather brief
  - 1800WXBRIEF or a similar source will cover all necessary weather reports.

FLIGHT TRAINING: Review

Preflight Preparation

- ☐ Aircraft preflight
- ☐ Cockpit organization
- ☐ Checklist usage
- ☐ Passenger and taxi brief
- ☐ Positive exchange of flight controls
- ☐ Runway incursion avoidance
- ☐ Run up procedures

Takeoffs, Landings, and Go-Arounds

- ☐ Normal and/or crosswind takeoff and climb
- ☐ Normal and/or crosswind approach and landing

Cross Country Procedures

- ☐ Air traffic control clearance
- ☐ Clearance copying and read back
- ☐ Departure procedures
- ☐ Use of radar
- ☐ Voice communications
- ☐ Enroute procedures and clearances
- ☐ Situational awareness
- ☐ Pilotage and dead reckoning
- ☐ ADM
- ☐ SPRM

Emergency Procedures

- ☐ Emergency Equipment and Survival Gear
- ☐ Partial panel (Vacuum or EFIS failure)
- ☐ Diversion

Holding

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

Instrument Approach Procedures

- ☐ Non-precision or visual approach
- ☐ Precision approach

Approach Completion

- ☐ Missed approach procedure
- ☐ Landing from an approach
- ☐ OPTIONAL: Circle to land
- ☐ OPTIONAL: Straight in to land

COMPLETION STANDARDS

The student should perform all tasks in this lesson to Instrument and Private Pilot ACS standards.

COMMERCIAL PILOT FLIGHT TRAINING

STAGE TWO (18.5 HOURS)

LESSONS 22-36

STAGE TWO OBJECTIVES: In this stage, the student will be introduced to the commercial flight maneuvers in a single-engine airplane.

STAGE TWO COMPLETION STANDARDS: At the completion of this stage, the student will perform all the single-engine airplane commercial maneuvers and procedures at a proficiency level that meets or exceeds the criteria set forth in the current FAA Commercial Pilot Airplane Single-Engine Land Test Standards.

LESSON 22: GROUND
1.0 HOURS PRE/POST

LESSON OBJECTIVE

This lesson reviews traffic pattern operations and aircraft limitations. It also introduces the student to single engine commercial maneuvers, including flying techniques and current FAA commercial test standards.

GROUND TRAINING: Review

Airport Operations

- ☐ Traffic pattern entry
- ☐ Judging distance for downwind
- ☐ Judging when to turn base
- ☐ Stabilized descent
- ☐ Visual scanning and collision avoidance
- ☐ Radio communications
- ☐ Runway incursion avoidance
- ☐ Risk management

Aircraft

- ☐ Operating limitations
- ☐ Normal vs. utility category
- ☐ V-Speeds

GROUND TRAINING

Commercial Maneuvers

- ☐ Slow flight
- ☐ Power on stall
- ☐ Power off stall
- ☐ Accelerated stall
- ☐ Stabilator trim stall
- ☐ Cross control stall
- ☐ Steep turns
- ☐ Spin awareness and recovery
- ☐ Short field takeoff and landing
- ☐ Soft field takeoff and landing
- ☐ Power off 180º

COMPLETION STANDARDS

The Student should have a basic understanding of the Commercial Maneuvers on this lesson, they will be able to apply aircraft limitations to the maneuvers being performed.

REQUIRED READING/STUDY

- AFH Chapter 4 “Maintaining Aircraft Control: Upset Prevention and Recovery Training
- AFH Chapter 8 “Power off Accuracy Approach and Landing”
- AFH Chapter 9 “Steep Turns”

LESSON 23: FLIGHT
1.5 HOURS DUAL
0.5 HOURS PRE/POST

LESSON OBJECTIVE
The student will focus on practicing maneuvers to current Private Pilot standards. If conditions allow crosswind landings should be practiced. The number of landings performed is at the CFI's discretion as long as all required tasks are satisfactory.

GROUND TRAINING: Review

Preflight Preparation

- ☐ Preflight procedures
- ☐ Safety-related operations and procedures
- ☐ Practice area selection
- ☐ Risk management

FLIGHT TRAINING: Review

Takeoffs, Landings, and Go-Arounds

- ☐ OPTIONAL: Normal and/or crosswind takeoff and landing
- ☐ Soft field takeoff and landing
- ☐ Short field takeoff and landing
- ☐ Go-around/rejected landing
    - When to execute
    - Memory items (5 C's)

Slow Flight and Stalls

- ☐ Maneuvering during slow flight
- ☐ Power-off stall
- ☐ Power-on stall
- ☐ Spin awareness and recovery (do not spin)

Airport Operations

- ☐ Traffic pattern entry
- ☐ Judging distance for downwind
- ☐ Judging when to turn base
- ☐ Stabilized descent
- ☐ Visual scanning and collision avoidance
- ☐ Radio communications
- ☐ Runway incursion avoidance

COMPLETION STANDARDS
This lesson is complete when the student can perform all landings and maneuvers to Private Pilot ACS standards.

REQUIRED READING/STUDY

- AFH Chapter 4 "Maintaining Aircraft Control: Upset Prevention and Recovery Training"

LESSON 24: FLIGHT
1.5 HOURS DUAL
0.5 HOURS PRE/POST

LESSON OBJECTIVE

This lesson will introduce the student to the commercial maneuvers discussed in Ground Lesson 22. The instructor should continue to seek opportunities to practice crosswind landings. The number of landings performed is at the CFI's discretion as long as all required tasks are satisfactory.

GROUND TRAINING: Review

Preflight Preparation

- ☐ Preflight procedures
- ☐ Safety-related operations and procedures
- ☐ Practice area selection
- ☐ Risk management

FLIGHT TRAINING: Review

Takeoffs, Landings, and Go-Arounds

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

Slow Flight and Stalls

- ☐ Maneuvering during slow flight
- ☐ Power-off stall
- ☐ Power-on stall
- ☐ Spin awareness and recovery (do not spin)

Airport Operations

- ☐ Traffic pattern
- ☐ Stabilized descent
- ☐ Visual scanning and collision avoidance
- ☐ Radio communications
- ☐ Runway incursion avoidance

FLIGHT TRAINING

Landings

- ☐ Power off 180 Landing

Stalls

- ☐ Stabilator trim stall
- ☐ Secondary stall
- ☐ Accelerated stall
- ☐ Cross control stall

Performance Maneuver

- ☐ Steep turns (50º Bank)

COMPLETION STANDARDS

While performing commercial maneuvers the student should demonstrate adherence to proper procedures, operating techniques, coordination, and smoothness as he/she progresses towards achieving FAA commercial standards. The rest of the flight will be performed to current Private Pilot ACS.

REQUIRED READING/STUDY

- AFH Chapter 8 "Power off Accuracy Approach and Landing"
- AFH Chapter 9 "Steep Turns"

LESSON 25: PRE/POST GROUND 1.0 HOURS

LESSON OBJECTIVE
This lesson will continue to develop the student's knowledge of the commercial maneuvers learned thus far. The student will also be introduced to the remainder of the commercial maneuvers found in the current FAA test standards.

GROUND TRAINING: Review
Preflight Preparation
- ☐ Required pilot documents
- ☐ Risk management

Aircraft Limitations
- ☐ V-Speeds
- ☐ Section 2 of the POH
- ☐ 91.205
  - Read the regulation
- ☐ Altitude engine

GROUND TRAINING
Commercial Maneuvers
- ☐ Chandelle
- ☐ Steep spiral
- ☐ Lazy 8
- ☐ Eights-on-pylons

COMPLETION STANDARDS
This lesson is complete when the student has achieved a textbook understanding of the maneuvers introduced in this lesson.

REQUIRED READING/STUDY
- AFH Chapter 9 "Performance Maneuvers"
- Piper Warrior III Information Manual (POH)

LESSON 26: FLIGHT
1.5 HOURS DUAL
0.5 HOURS PRE/POST

LESSON OBJECTIVE

The student will review the commercial maneuvers learned thus far, and he/she will be introduced to the maneuvers discussed in lesson 25. Additionally, the student will continue to develop his/her skill at smoothly handling the aircraft. The number of landings performed is at the CFI's discretion as long as all required tasks are satisfactory.

GROUND TRAINING: Review

Preflight Preparation

- ☐ Preflight procedures
- ☐ Safety-related operations and procedures
- ☐ Practice area selection
- ☐ Risk management

FLIGHT TRAINING: Review

Takeoffs, Landings, and Go-Arounds

- ☐ OPTIONAL: Normal and/or crosswind takeoff and landing
- ☐ Soft field takeoff and landing
- ☐ Short field takeoff and landing
- ☐ Power off 180 landing
- ☐ OPTIONAL: Forward slip to landing
- ☐ OPTIONAL: Go-around/rejected landing

Stalls

- ☐ Stabilator trim stall
- ☐ Accelerated stall
- ☐ Secondary stall
- ☐ Cross control stall

Airport Operations

- ☐ Traffic pattern
- ☐ Stabilized descent
- ☐ Visual scanning and collision avoidance
- ☐ Radio communications
- ☐ Runway incursion avoidance

Performance Maneuver

- ☐ Steep turn (50º bank)

FLIGHT TRAINING

Performance Maneuvers

- ☐ Chandelle
- ☐ Steep spiral
- ☐ Lazy 8

Ground Reference Maneuver

- ☐ Eights-on-pylons

COMPLETION STANDARDS

While performing commercial maneuvers the student should demonstrate adherence to proper procedures, operating techniques, coordination, and smoothness as he/she progresses towards achieving FAA commercial standards. The rest of the flight will be performed to current Private Pilot ACS.

REQUIRED READING/STUDY

- Review of Ground Lesson 25

LESSON 27: FLIGHT
1.5 HOURS SOLO

LESSON OBJECTIVE
The student will practice the commercial maneuvers previously learned to gain added proficiency.

GROUND TRAINING: Review
Preflight Preparation
- ☐ Safety-related operations and procedures
- ☐ Preflight of the aircraft

FLIGHT TRAINING: Review
Takeoffs, Landings, and Go-Arounds
- ☐ Short field takeoff and landing
- ☐ Soft field takeoff and landing
- ☐ Forward slip to landing
- ☐ Power off 180º
- ☐ OPTIONAL: Go-around/rejected landing

Airport Operations
- ☐ Traffic patterns
- ☐ Visual scanning and collision avoidance
- ☐ Radio communications

Slow Flight and Stalls
- ☐ Maneuvering during slow flight
- ☐ Power-off stall
- ☐ Power-on stall

Performance Maneuvers
- ☐ Steep turn (50º bank)
- ☐ Chandelle
- ☐ Lazy 8

COMPLETION STANDARDS
Power Off 180° approaches and landings should be conducted safely, touching down within 200 feet of the desired point of landing. Airspeed during the maneuver should be within +5 and -0 knots, and bank angles limited to 30 degrees or less while in the pattern. Short Field landings should touch down within 100 feet of the desired point. All landings should follow a stabilized final approach. Steep turn altitude and airspeed allowances are ±100 ft. ± 10 knots. Slow flight altitude should remain within ±50 ft. on entry and exit. All maneuvers should be executed correctly according to FAA commercial standards.

REQUIRED READING/STUDY
- ASEL PTS/ACS Area of Operation IV “Takeoffs, Landings, and Go-Arounds”

LESSON 28: FLIGHT
1.5 HOURS DUAL
0.5 HOURS PRE/POST

LESSON OBJECTIVE

This lesson introduces emergency procedures and continues to review the commercial maneuvers. Landings should be conducted in crosswinds when conditions allow. The number of landings performed is at the CFI's discretion as long as all required tasks are satisfactory.

GROUND TRAINING: Review

Preflight Preparation

- ☐ Preflight procedures
- ☐ Safety-related operations and procedures
- ☐ Practice area selection
- ☐ Risk management

FLIGHT TRAINING: Review

Takeoffs, Landings, and Go-Arounds

- ☐ OPTIONAL: Normal and/or crosswind takeoff and landing
- ☐ Soft field takeoff and landing
- ☐ Short field takeoff and landing
- ☐ Power off 180 landing
- ☐ Forward slip to landing
- ☐ OPTIONAL: Go-around/rejected landing

Airport Operations

- ☐ Traffic pattern
- ☐ Stabilized descent
- ☐ Visual scanning and collision avoidance
- ☐ Radio communications
- ☐ Runway incursion avoidance

Slow Flight and Stalls

- ☐ Maneuvering during slow flight
- ☐ Power-off stall
- ☐ Power-on stall

Performance Maneuver

- ☐ Steep turn (50º bank)
- ☐ Chandelle
- ☐ Lazy 8

FLIGHT TRAINING

Emergency Procedures

- ☐ Engine fire during start
- ☐ Engine fire in flight
- ☐ Emergency descent
- ☐ Low oil pressure
  - Divert to nearest airport
- ☐ Simulated off airport landing
  - Do not go below 500'agl

COMPLETION STANDARDS

Power Off 180° approaches and landings should be conducted safely, touching down within 200 feet of the desired point of landing. Airspeed during the maneuver should be within +5 and -0 knots, and bank angles limited to 30 degrees or less while in the pattern. Short Field landings should touch down within 100 feet of the desired point. All landings should follow a stabilized final approach. Steep turn altitude and airspeed allowances are ±100 ft. ± 10 knots. Slow flight altitude should remain within ±50 ft. on entry and exit. All maneuvers should be executed correctly according to FAA commercial standards.

REQUIRED READING/STUDY

- ASEL PTS/ACS Area of Operation V "Steep Turns"

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

LESSON OBJECTIVE
The student will review the commercial maneuvers while continuing to develop his/her skill at smoothly handling the aircraft. Landings should be conducted in crosswinds when conditions allow. The number of landings performed is at the CFI's discretion as long as all required tasks are satisfactory.

GROUND TRAINING: Review

Preflight Preparation
- ☐ Preflight procedures
- ☐ Safety-related operations and procedures
- ☐ Practice area selection
- ☐ Risk management

FLIGHT TRAINING: Review

Takeoffs, Landings, and Go-Arounds
- ☐ OPTIONAL: Normal and/or crosswind takeoff and landing
- ☐ Soft field takeoff and landing
- ☐ Short field takeoff and landing
- ☐ Power off 180 landing
- ☐ OPTIONAL: Forward slip to landing
- ☐ OPTIONAL: Go-around/rejected landing

Airport Operations
- ☐ Traffic pattern
- ☐ Stabilized descent
- ☐ Visual scanning and collision avoidance
- ☐ Radio communications
- ☐ Runway incursion avoidance

Slow Flight and Stalls
- ☐ Maneuvering during slow flight
- ☐ Power-off stall with or without bank
- ☐ Power-on stall with or without bank
- ☐ Accelerated stall

Performance Maneuvers
- ☐ Steep turn (50º bank)
- ☐ Chandelle
- ☐ Steep spiral
- ☐ Lazy 8

Ground Reference Maneuver
- ☐ Eights-on-pylons

COMPLETION STANDARDS
Power Off 180° approaches and landings should be conducted safely, touching down within 200 feet of the desired point of landing. Airspeed during the maneuver should be within +5 and -0 knots, and bank angles limited to 30 degrees or less while in the pattern. Short Field landings should touch down within 100 feet of the desired point. All landings should follow a stabilized final approach. Steep turn altitude and airspeed allowances are ±100 ft. ± 10 knots. Slow flight altitude should remain within ±50 ft. on entry and exit. All maneuvers should be executed correctly according to FAA commercial standards.

REQUIRED READING/STUDY
- ASEL PTS/ACS Area of Operation V "Performance Maneuvers"

LESSON 30: FLIGHT
1.5 HOURS SOLO

LESSON OBJECTIVE
The student will practice the commercial maneuvers previously learned to gain added proficiency.

GROUND TRAINING: Review

Preflight Preparation

- ☐ Safety-related operations and procedures
- ☐ Preflight of the aircraft

FLIGHT TRAINING: Review

Takeoffs, Landings, and Go-Arounds

- ☐ Short field takeoff and landing
- ☐ Soft field takeoff and landing
- ☐ Forward slip to landing
- ☐ Power off 180º
- ☐ OPTIONAL: Go-around/rejected landing

Airport Operations

- ☐ Traffic patterns
- ☐ Visual scanning and collision avoidance
- ☐ Radio communications

Slow Flight and Stalls

- ☐ Maneuvering during slow flight
- ☐ Power-off stall
- ☐ Power-on stall

Performance Maneuvers

- ☐ Steep turn (50º bank)
- ☐ Chandelle
- ☐ Steep spiral
- ☐ Lazy 8

Ground Reference Maneuver

- ☐ Eights-on-pylons

COMPLETION STANDARDS
Power Off 180° approaches and landings should be conducted safely, touching down within 200 feet of the desired point of landing. Airspeed during the maneuver should be within +5 and -0 knots, and bank angles limited to 30 degrees or less while in the pattern. Short Field landings should touch down within 100 feet of the desired point. All landings should follow a stabilized final approach. Steep turn altitude and airspeed allowances are ±100 ft. ± 10 knots. Slow flight altitude should remain within ±50 ft. on entry and exit. All maneuvers should be executed correctly according to FAA commercial standards.

REQUIRED READING/STUDY

- ASEL PTS/ACS Area of Operation VI “Ground Reference Maneuvers”

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

LESSON OBJECTIVE

This pattern-only lesson will focus on landings. A different airport should be used so the student can practice judging pattern distances to unfamiliar runways. Landings should be conducted in crosswinds when conditions allow. The number of landings performed is at the CFI's discretion as long as all required tasks are satisfactory.

GROUND TRAINING: Review

Preflight Preparation

- ☐ Safety-related operations and procedures
- ☐ Preflight of the aircraft

FLIGHT TRAINING: Review

Takeoffs, Landings, and Go-Arounds

- ☐ OPTIONAL: Normal and/or crosswind takeoff and landing
- ☐ Soft field takeoff and landing
- ☐ Short field takeoff and landing
- ☐ Power off 180 landing
- ☐ Forward slip to landing
- ☐ Go-around/rejected landing

Airport Operations

- ☐ Traffic pattern
- ☐ Stabilized descent
- ☐ Visual scanning and collision avoidance
- ☐ Radio communications
- ☐ Runway incursion avoidance

COMPLETION STANDARDS

Power Off 180° approaches and landings should be conducted safely, touching down within 200 feet of the desired point of landing. Airspeed during the maneuver should be within +5 and -0 knots, and bank angles limited to 30 degrees or less while in the pattern. Short Field landings should touch down within 100 feet of the desired point. All landings should follow a stabilized final approach. All maneuvers should be executed correctly according to FAA commercial standards.

REQUIRED READING/STUDY

- ASEL PTS/ACS Area of Operation III. "Airport Operations"

LESSON 32: FLIGHT
1.5 HOURS SOLO

LESSON OBJECTIVE
This lesson will focus on commercial level takeoffs and landings. It should be conducted at another airport.

GROUND TRAINING: Review
Preflight Preparation
- ☐ Safety-related operations and procedures
- ☐ Preflight of the aircraft

FLIGHT TRAINING: Review
Takeoffs, Landings, and Go-Arounds
- ☐ OPTIONAL: Normal and/or crosswind takeoff and landing
- ☐ Short field takeoff and landing
- ☐ Soft field takeoff and landing
- ☐ Forward slip to landing
- ☐ Power off 180º
- ☐ Go-around/rejected landing

Airport Operations
- ☐ Traffic patterns
- ☐ Visual scanning and collision avoidance
- ☐ Radio communications

COMPLETION STANDARDS
Power Off 180° approaches and landings should be conducted safely, touching down within 200 feet of the desired point of landing. Airspeed during the maneuver should be within +5 and -0 knots, and bank angles limited to 30 degrees or less while in the pattern. Short Field landings should touch down within 100 feet of the desired point. All landings should follow a stabilized final approach. All maneuvers should be executed correctly according to FAA commercial standards.

REQUIRED READING/STUDY
- ASEL PTS/ACS Area of Operation XI “Post Flight Procedures”

LESSON 33: FLIGHT
1.5 HOURS DUAL
0.5 HOURS PRE/POST

LESSON OBJECTIVE

The student will review the commercial maneuvers while continuing to develop his/her skill at smoothly handling the aircraft. Landings should be conducted in crosswinds when conditions allow. The number of landings performed is at the CFI's discretion as long as all required tasks are satisfactory.

GROUND TRAINING: Review

Preflight Preparation

- ☐ Preflight procedures
- ☐ Safety-related operations and procedures
- ☐ Practice area selection
- ☐ Risk management

FLIGHT TRAINING: Review

Takeoffs, Landings, and Go-Arounds

- ☐ OPTIONAL: Normal and/or crosswind takeoff and landing
- ☐ Soft field takeoff and landing
- ☐ Short field takeoff and landing
- ☐ Power off 180 landing
- ☐ OPTIONAL: Forward slip to landing
- ☐ OPTIONAL: Go-around/rejected landing

Airport Operations

- ☐ Traffic pattern
- ☐ Stabilized descent
- ☐ Visual scanning and collision avoidance
- ☐ Radio communications
- ☐ Runway incursion avoidance

Slow Flight and Stalls

- ☐ Maneuvering during slow flight
- ☐ Power-off stall
- ☐ Power-on stall
- ☐ Accelerated stall

Performance Maneuver

- ☐ Steep turn (50º bank)
- ☐ Chandelle
- ☐ Lazy 8
- ☐ Steep spiral

Ground Reference Maneuver

- ☐ Eights on pylons

Emergency Procedures

- ☐ Engine fire during start
- ☐ Engine fire in flight
- ☐ Emergency descent
- ☐ Low oil pressure
  - Divert to nearest airport
- ☐ Simulated off airport landing
  - Do not go below 500'agl

COMPLETION STANDARDS

All maneuvers on this lesson should be performed to current FAA commercial test standards.

REQUIRED READING/STUDY

- ASEL PTS/ACS Area of Operation VIII "Slow Flight and Stalls"

LESSON 34: FLIGHT
1.5 HOURS DUAL
0.5 HOURS PRE/POST

LESSON OBJECTIVE

The student will review the commercial maneuvers while continuing to develop his/her skill at smoothly handling the aircraft. Landings should be conducted in crosswinds when conditions allow. The number of landings performed is at the CFI's discretion as long as all required tasks are satisfactory.

GROUND TRAINING: Review

Preflight Preparation

- ☐ Preflight procedures
- ☐ Safety-related operations and procedures
- ☐ Practice area selection
- ☐ Risk management

FLIGHT TRAINING: Review

Takeoffs, Landings, and Go-Arounds

- ☐ OPTIONAL: Normal and/or crosswind takeoff and landing
- ☐ Soft field takeoff and landing
- ☐ Short field takeoff and landing
- ☐ Power off 180 landing
- ☐ OPTIONAL: Forward slip to landing
- ☐ OPTIONAL: Go-around/rejected landing

Slow Flight and Stalls

- ☐ Maneuvering during slow flight
- ☐ Power-off stall
- ☐ Power-on stall
- ☐ Accelerated stall

Airport Operations

- ☐ Traffic pattern
- ☐ Stabilized descent
- ☐ Visual scanning and collision avoidance
- ☐ Radio communications
- ☐ Runway incursion avoidance

Performance Maneuver

- ☐ Steep turn (50º bank)
- ☐ Chandelle
- ☐ Lazy 8
- ☐ Steep spiral

Ground Reference Maneuver

- ☐ Eights on pylons

Emergency Procedures

- ☐ Engine fire during start
- ☐ Engine fire in flight
- ☐ Emergency descent
- ☐ Low oil pressure
  - Divert to nearest airport
- ☐ Simulated off airport landing
  - Do not go below 500'agl

COMPLETION STANDARDS

By the end of this lesson the student should be able to perform all specified maneuvers within current FAA standards for the Commercial Airplane, Single Engine Land practical exam, and he/she should be prepared for the flight portion of the Stage Two check.

REQUIRED READING/STUDY

- ASEL PTS/ACS Area of Operation IX "Emergency Operations"

LESSON 35: PRE/POST GROUND 2.0 HOURS

LESSON OBJECTIVE
This ground lesson is used to prepare the student for the Stage Two check, and to ensure the student's training records are in order.

GROUND TRAINING: Review

Preflight Preparation

- ☐ Pilot certificate and documents
- ☐ Currency
- ☐ I'M SAFE

Airworthiness Requirements

- ☐ Airworthiness and registration certificates
- ☐ Operating limitations, placards, instrument markings, and POH/AFM
- ☐ Wt.& Balance data and equipment list
- ☐ 91.205: Required equipment
- ☐ 91.213: INOP equipment
- ☐ Requirements and procedures for obtaining a special flight permit
- ☐ Airworthiness directives
- ☐ Maintenance/inspection requirements
  - Review maintenance logs
- ☐ Appropriate record keeping

Operation of Systems

- ☐ Primary flight controls and trim
- ☐ Power plant and propeller
- ☐ Landing gear
- ☐ Fuel, oil, and hydraulic
- ☐ Electrical
- ☐ Avionics
- ☐ Pitot-static, vacuum/pressure, and associated flight instruments

Performance and Limitations

- ☐ Demonstrate ability to calculate aircraft performance in various phases of flight
- ☐ Effects of density altitude on performance
- ☐ V-Speeds
- ☐ Weight and Balance calculation

GROUND TRAINING

Records Audit (Student must be present)

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

COMPLETION STANDARDS
The student should demonstrate a deeper understanding of all items covered on this lesson concurrent with FAA standards for the Commercial Airplane, Single Engine Land practical exam. This lesson is not complete until the record audit is accomplished and all errors are corrected.

REQUIRED READING/STUDY

- ASEL PTS/ACS Area of Operation X "High Altitude Operations"
- Previous Ground Lessons in this Stage.

LESSON 36: STAGE 2 CHECK
2.0 HOURS DUAL
1.0 HOURS PRE/POST

LESSON OBJECTIVE

The Chief/Assistant Chief Instructor or an approved Stage Check Pilot will evaluate the student's knowledge and proficiency in the procedures and maneuvers listed below.

GROUND TRAINING: Review

Preflight Preparation

- ☐ PAVE
- ☐ Pilot certificate and documents
- ☐ Currency
- ☐ I'M SAFE

Airworthiness Requirements

- ☐ Airworthiness and registration certificates
- ☐ Operating limitations, placards, instrument markings, and POH/AFM
- ☐ Wt. & Balance data and equipment list
- ☐ 91.205: Required equipment
- ☐ 91.213: INOP equipment
- ☐ Requirements and procedures for obtaining a special flight permit
- ☐ Airworthiness directives
- ☐ Maintenance/inspection requirements
  - Review maintenance logs
- ☐ Appropriate record keeping

Operation of Systems

- ☐ Primary flight controls and trim.
- ☐ Power plant and propeller.
- ☐ Landing gear.
- ☐ Fuel, oil, and hydraulic.
- ☐ Electrical.
- ☐ Avionics.
- ☐ Pitot-static, vacuum/pressure, and associated flight instruments.

Performance and Limitations

- ☐ Demonstrate ability to calculate Aircraft Performance in Various Phases of flight.
- ☐ Effects of density altitude on performance.
- ☐ V-Speeds
- ☐ Weight and Balance calculation

FLIGHT TRAINING: Review

Preflight Procedures

- ☐ Preflight inspection
- ☐ Cockpit management
- ☐ Engine starting
- ☐ Taxiing
- ☐ Before takeoff check

Takeoffs, Landings, and Go-Arounds

- ☐ Normal/crosswind takeoff and landing
- ☐ Soft-field takeoff
- ☐ Soft-field approach and landing
- ☐ Short-field takeoff and climb
- ☐ Short-field approach and landing
- ☐ Power-off 180° accuracy approach and landing
- ☐ Go-around/rejected landing

Airport Operations

- ☐ Radio communications and ATC light signals
- ☐ Traffic patterns
- ☐ Runway incursion avoidance

Performance Maneuvers

- ☐ Steep turn
- ☐ Steep spiral
- ☐ Chandelle
- ☐ Lazy 8

Ground Reference Maneuver

- ☐ Eights on pylon

Slow Flight and Stalls

- ☐ Maneuvering during slow flight
- ☐ Power-off stall
- ☐ Power-on stall
- ☐ Accelerated stall
- ☐ Spin awareness (do not spin)

Emergency Operations

- ☐ Emergency descent
- ☐ Emergency approach and landing (simulated)
- ☐ Systems and equipment malfunctions
- ☐ Emergency equipment and survival gear

Post Flight Procedures

- ☐ After landing, parking, and securing

COMPLETION STANDARDS

This lesson is complete when the student meets current FAA standards for the Commercial Airplane Single Engine Land practical exam.

COMMERCIAL PILOT FLIGHT TRAINING

STAGE THREE (47.3 HOURS)

LESSONS 37- 66

STAGE THREE OBJECTIVES: In this stage the student will gain the knowledge and skills necessary to operate the multiengine airplane in both VFR and IFR conditions at a level that meets or exceeds the proficiency requirements set forth by the current FAA Commercial Pilot Airplane Multiengine Land test standards.

STAGE THREE COMPLETION STANDARDS: The applicant must successfully complete each of the lessons in Stage III, including the end of course stage check. At the completion of the stage the applicant will be able to demonstrate each of the listed maneuvers and procedures at a proficiency level that meets those criteria outlined in the current FAA Commercial Pilot Airplane Multiengine Land test standards.

LESSON 37: PRE/POST GROUND 2.0 HOURS

LESSON OBJECTIVE

This ground lesson will introduce the student to multiengine airplane systems and limitations. The student will look at performance charts related to a multiengine aircraft, and he/she will be introduced to normal procedures in the Piper Seminole (PA-44).

GROUND TRAINING

Complex Aircraft

- ☐ Normally aspirated vs. turbo or super charger engine
- ☐ Manifold pressure
- ☐ Constant speed propeller
  - Purpose
  - Basic operation
- ☐ Retractable landing gear
  - Purpose
  - Basic operation
  - Precautions

Seminole Systems

- ☐ Primary flight controls and trim
- ☐ G1000/G500 avionics
- ☐ Autopilot/Flight Director
- ☐ Electrical system
- ☐ Engines and propeller system
- ☐ Fuel system
- ☐ Hydraulic system
- ☐ Landing gear system
- ☐ Environmental system
- ☐ Stall warning system

Performance Calculations

- ☐ Takeoff and landing distance charts
- ☐ Accelerate stop distance
- ☐ Accelerate go distance
- ☐ Climb performance with both engines operating (service ceiling)
- ☐ Climb performance with one engine operating (single engine service ceiling)
- ☐ Effects of density altitude on performance.
- ☐ Fuel and power settings table
  - Emphasize the burn rate (gph) needs to be doubled
- ☐ Cruise performance
- ☐ Weight and balance calculations

Seminole Limitations

- ☐ V-Speeds
  - Introduce new list of speeds.
  - Brief V_{mc} (full description on lesson 39)
- ☐ Weights
  - Empty Weight
  - Zero Fuel Weight
  - Maximum Ramp Weight
  - Maximum Takeoff Weight
  - Maximum Landing Weight
- ☐ Useable fuel
- ☐ Load factor limits
- ☐ Chapter 2 of the POH

Airworthiness Requirements

- ☐ Airworthiness and registration certificates
- ☐ Maintenance/inspection requirements.
  - Progressive maintenance
- ☐ Minimum Equipment List (MEL)

PA-44 Preflight

- ☐ Conduct a thorough preflight inspection
  - Use an airplane if available (and if time)
  - Use the preflight Power Point if no airplane/time available
  - Follow along with the checklist

COMPLETION STANDARDS

The student will begin to develop an understanding of complex and multiengine aircraft systems.

REQUIRED READING/STUDY

- AFH Chapter 11 “Transition to Complex Airplanes”

LESSON 38: SIMULATOR
1.5 HOURS DUAL
1.5 HOURS INSTRUMENT
0.5 HOURS PRE/POST

LESSON OBJECTIVE

This lesson will give the student an opportunity to perform basic flight maneuvers and general procedures as they relate to multiengine flying while in the simulator. The student should become familiar with all the verbal calls and memory checklists that are associated with complex aircraft.

SIMULATOR TRAINING

Multiengine/Complex Aircraft Operation

- ☐ Ground run (engine run-up; prop checks)
- ☐ Takeoff procedures
- ☐ Climb power settings
  - 25 X 25 (inches and rpm)
  - Move manifold pressure back before the props
- ☐ Climbing turns
- ☐ Climb and note manifold pressure drop
- ☐ Level off from climb, making proper power changes (e.g. 20 inches and 2300-2500 rpm)
- ☐ Straight and level flight
- ☐ Power settings for cruise at altitude
- ☐ Airspeed changes
- ☐ Establishing a climb from cruise
  - 25 X 25 (inches and rpm)
  - Move props before manifold pressure
- ☐ Descents from altitude with proper power and speed adjustments.
- ☐ Descending turns

Checklist Procedures

- ☐ Climb, cruise, in-range, before landing
- ☐ Configuring the aircraft for landing
  - BCCGUMPS
  - Props full forward below 100IAS
  - Flap settings
  - Gear down
- ☐ Landing gear down and locked verification
  - Crew call-outs
  - Multiple gear down checks (e.g. with every flap movement)

Area Maneuvers

- ☐ Power settings and configurations for each maneuver
- ☐ Slow flight
- ☐ Power on/off stalls
- ☐ Accelerated stalls
- ☐ Steep turns

Instrument Approach

- ☐ Precision or non-precision approach
- ☐ Checklist and configuration points along the approach
  - WIRE and In-Range checklists completed before the IAF
  - BCCGUMPS before the IAF and/or FAF
- ☐ Approach airspeeds and configurations
  - Straight-in to land
  - Circle-to-land

COMPLETION STANDARDS

The student should demonstrate the ability to manipulate the throttle and prop controls in the correct sequence. The student should also start to make the proper calls and perform the checklists required to safely fly a multiengine/complex aircraft.

REQUIRED READING/STUDY

- Review of Ground Lesson 37

LESSON 39: PRE/POST GROUND 2.0 HOURS

LESSON OBJECTIVE

This lesson will introduce the student to One Engine Inoperative (OEI) flight. The student will gain a basic understanding of V_{mc} and turning tendencies.

GROUND TRAINING: Review

Seminole Systems

- ☐ G1000/G500 avionics
  - G1000 flight director
  - G1000 autopilot
- ☐ Electrical system
- ☐ Engine and propeller systems

GROUND TRAINING

Multiengine Aerodynamics

- ☐ Centerline thrust
- ☐ Conventional twin
- ☐ Twin with counter rotating propellers
- ☐ Critical engine
- ☐ Sideslip and how to remedy
- ☐ Windmilling propeller
- ☐ Feathered propeller
- ☐ Zero thrust simulation; feathered propeller

Principles of Flight – OEI

- ☐ Meaning of the term Critical Engine
- ☐ V_{mc} Definition/Certification
- ☐ Effects of density altitude on V_{mc}
- ☐ Effects of weight and CG on V_{mc}
- ☐ Effects of bank angle on V_{mc}
- ☐ Relationship of V_{mc} to stall speed
- ☐ Reasons for loss of directional control
- ☐ Importance in maintaining proper pitch, bank, and coordination of controls
- ☐ Recovery procedures for loss of directional control
- ☐ Engine failure during takeoff
  - Planning ahead (i.e. briefing)
  - Decision-making
  - Emphasize controllability first, followed by climb-ability (performance)
- ☐ Performance loss with OEI
- ☐ Factors to consider for single-engine go around

OEI Turning Tendencies (PAST)

- ☐ P-factor
- ☐ Asymmetrical thrust
- ☐ Spiraling slipstream
- ☐ Torque effect

Risk Management

- ☐ 4 Fundamentals of risk (PAVE)
- ☐ Analyzing risk for each flight
- ☐ Changing conditions makes risk a moving target

COMPLETION STANDARDS

The student should demonstrate basic knowledge of multiengine aircraft aerodynamics and the factors that influence V_{mc}. The student will also continue to develop his/her knowledge of G1000/G500 avionics.

REQUIRED READING/STUDY

- AFH Chapter 12 “Transition to Multiengine Airplanes”

LESSON 40: FLIGHT
1.5 HOURS DUAL
0.5 HOURS PRE/POST

LESSON OBJECTIVE

This lesson will introduce the student to the Piper Seminole. The student will perform an in-depth preflight inspection and basic flight maneuvers in the aircraft.

GROUND TRAINING

Pa-44 Preflight Inspection

- ☐ Preflight orientation and preparation
- ☐ Preflight procedures
- ☐ Walk-around and detailed inspection

FLIGHT TRAINING

Preflight Procedures

- ☐ Aircraft servicing
- ☐ Cockpit management
- ☐ Equipment checks
- ☐ Engine starting and warm up
- ☐ Taxiing and taxi procedures
- ☐ Ground run
  - Exercise props
  - Governor check
- ☐ Before takeoff checks
- ☐ Pre-takeoff briefing

Safety Related Operations and Procedures

- ☐ Use of the checklist
- ☐ Crew resource management
- ☐ Positive exchange of the flight controls
- ☐ Wake turbulence avoidance
- ☐ Low level wind shear
- ☐ Visual scanning and collision avoidance
- ☐ Runway incursion avoidance

Takeoffs, Landings, and Go-Arounds

- ☐ Normal/Crosswind takeoff and climb
- ☐ Normal/Crosswind approach and landing
- ☐ Go-Around/rejected landing

Basic and Performance Maneuvers

- ☐ Straight-and-level flight
- ☐ Turns at different bank angles
- ☐ Climbs and descents
- ☐ Climbing and descending turns
- ☐ Steep turns

Slow Flight and Stalls

- ☐ Maneuvering during slow flight
- ☐ Power-off stall (level and turning)
- ☐ Power-on stall (level and turning)
- ☐ Accelerated stalls
- ☐ Spin awareness (do not spin)

Airport Operations

- ☐ Traffic pattern
- ☐ Pattern entry
- ☐ Determining distance for downwind
- ☐ Execution of memory checklist items (BCCGUMPS)
- ☐ Gear-down checks
  - Crew coordination
  - When to perform (e.g. with every new flap setting)
- ☐ Clearing for traffic
- ☐ Radio communications

Post Flight Procedures

- ☐ After landing
- ☐ Parking and securing the aircraft

COMPLETION STANDARDS

With little CFI assistance the student should be able to perform a thorough preflight inspection of the aircraft. During flight the student should demonstrate a solid grasp of Piper Seminole operating characteristics, including pitch and power settings, propeller control, and landing gear procedures.

REQUIRED READING/STUDY

- FAA Commercial Pilot – Airplane Multi Engine Land Practical Test Standards/Airmen Certification Standards (AMEL PTS/ACS) Area of Operation II “Preflight Procedures”

LESSON 41: FLIGHT
1.5 HOURS DUAL
0.5 HOURS PRE/POST

LESSON OBJECTIVE

This pattern-only lesson will allow time for the student to practice takeoffs and landings. This lesson should be done at another airport. The number of landings performed is at the CFI's discretion as long as all required tasks are satisfactory.

GROUND TRAINING: Review

Pa-44 Preflight Inspection

- ☐ Preflight orientation and preparation
- ☐ Full walk-around and detailed look at the aircraft

GROUND TRAINING

Short Field Takeoff and Landing

- ☐ Short field takeoff and max performance climb
- ☐ Short field approach and landing

FLIGHT TRAINING: Review

Safety Related Operations and Procedures

- ☐ Use of the checklist
- ☐ Safety-related operations and procedures
- ☐ Traffic pattern
- ☐ BCCGUMPS from memory
- ☐ Verbal calls at designated points
- ☐ Stabilized final approach
- ☐ Crew resource management
- ☐ Positive exchange of the flight controls
- ☐ Wake turbulence avoidance
- ☐ Visual scanning and collision avoidance
- ☐ Runway incursion avoidance

Takeoffs, Landings, and Go-Arounds

- ☐ Normal/crosswind takeoff and climb
- ☐ Normal/crosswind approach and landing
- ☐ Go-around

Post Flight Procedures

- ☐ After landing
- ☐ Parking and securing the aircraft

FLIGHT TRAINING

Short Field Takeoff and Landing

- ☐ Short field takeoff and max performance climb
- ☐ Short field approach and landing

COMPLETION STANDARDS

This lesson is complete when the student can safely perform normal, crosswind, and short field takeoffs and landings. During short field landings the student should be able to touch down within 200' of his/her designated point on the runway.

REQUIRED READING/STUDY

- AFH Chapter 12 "Normal Approach and Landing, Crosswind Approach and Landing, Short-Field Takeoff and Climb, Short-Field Approach and Landing, Go-Around, Rejected Takeoff"

LESSON 42: PRE/POST GROUND 2.0 HOURS

LESSON OBJECTIVE

This lesson will introduce the student to various multiengine emergencies. The student will also be introduced to commercial privileges, and he/she will learn how to apply the privileges to different scenarios.

GROUND TRAINING

Drag Demonstration (V_{yse})

- ☐ Purpose
- ☐ Review the procedure
- ☐ Induced drag effect slower than V_{yse} airspeed
- ☐ Parasitic drag effect faster than V_{yse} airspeed
- ☐ Gear down at V_{yse}
- ☐ Flaps down at V_{yse}
- ☐ Windmilling propeller at V_{yse}
- ☐ Apply observed performance values to real-world scenarios
  - Descent rate with gear down and windmilling prop
  - Attempting to continue takeoff w/ gear down & windmilling prop

Aeronautical Decision Making

- ☐ Both engines operating enroute and landing
- ☐ Single engine operation enroute and landing
- ☐ Engine failure on takeoff roll
- ☐ Engine failure on liftoff with gear down
- ☐ Engine failure on after takeoff with gear up
- ☐ Single-engine go around
- ☐ Takeoff briefing for multiengine aircraft

Risk Management

- ☐ Discuss flight scenarios involving single engine operations
- ☐ Takeoff briefing complacency
  - Repeating the same thing until it becomes a memorized chant
  - Discuss how to do a thoughtful briefing tailored to the situation
  - Practice the OEI memory items while briefing so they are fresh on the pilot's mind

Multiengine Operations (OEI Procedures)

- ☐ Aborted takeoff procedures
  - Engine failure on takeoff roll
  - Memory items
- ☐ Engine failure after takeoff
  - Minimum altitude to simulate
  - Memory items
  - Establishing zero sideslip
- ☐ Maneuvering with OEI
- ☐ Single engine go around
- ☐ Committed to land altitude
- ☐ Engine failure in flight above V_{mc}
- ☐ Procedures to follow in the aircraft for simulated engine shutdown/failure
  - Minimum altitudes (AGL)
  - Minimum temp. per the FOM
  - Establishing zero thrust (simulated feather)
- ☐ Engine fire in flight
  - Memory items
  - Checklist
- ☐ Emergency descent
  - Memory items
  - Landing gear speeds
  - Turning to the nearest airport
- ☐ Engine failure in IMC

Commercial Privileges and Limitations

- ☐ Common carriage
- ☐ Private carriage
- ☐ Holding out
- ☐ Part 119

COMPLETION STANDARDS

The student will be able to verbalize the memory items required in the emergency scenarios discussed on this lesson. The student will also gain an understanding of the amount and types of drag added during single engine flight in different aircraft configurations. Additionally, the student should know the privileges and limitations associated with a commercial pilot certificate.

REQUIRED READING/STUDY

- Piper Seminole Information Manual: Chair Fly Memory Items

LESSON 43: SIMULATOR
1.5 HOURS DUAL
0.2 HOURS PRE/POST

LESSON OBJECTIVE
This lesson allows the student to practice the emergency procedures learned in lesson 42.

SIMULATOR TRAINING

Multiengine Operations (OEI Procedures)

- ☐ Engine failure on takeoff roll before V_{mc} (<50% of V_{mc})
- ☐ Engine failure after takeoff (gear down)
- ☐ Engine failure after takeoff (gear up)
- ☐ Maneuvering with OEI
- ☐ Committed to land altitude/configuration (single engine)
- ☐ Single-engine go around
- ☐ V_{mc} demonstration
- ☐ Drag demo
- ☐ Full shutdown, feather, and restart
- ☐ Applying risk management tools to different flight scenarios

Memory Items

- ☐ Engine failure before rotation
- ☐ Engine failure after takeoff (gear down)
- ☐ Engine failure after takeoff (gear up)
- ☐ Single engine go around
- ☐ Engine fire in flight
- ☐ V_{mc} roll and recovery
- ☐ Emergency descent
- ☐ Spin recovery

Instrument Procedures

- ☐ Instrument approach
- ☐ OEI flight by reference to instruments
- ☐ OEI instrument approach

COMPLETION STANDARDS
The student should be able to perform a takeoff briefing and follow it accordingly, and he/she should be able to perform all emergency memory items efficiently and accurately.

REQUIRED READING/STUDY

- JIC Chapter 12 “Advanced Aerodynamics”

LESSON 44: FLIGHT
1.8 HOURS DUAL
0.2 HOURS PRE/POST

LESSON OBJECTIVE

This lesson will review all maneuvers previously learned. This lesson will also introduce the emergency procedures in the aircraft and, time permitting, an instrument approach.

GROUND TRAINING: Review

Preflight Procedures

- ☐ Preflight orientation and preparation
- ☐ Full walk around and detailed look at the aircraft

FLIGHT TRAINING: Review

Safety Related Operations and Procedures

- ☐ Use of the checklist
- ☐ Crew resource management
- ☐ Positive exchange of the flight controls
- ☐ Stall/Spin awareness
- ☐ Visual scanning and collision avoidance
- ☐ Runway incursion avoidance

Takeoffs, Landings, and Go-Arounds

- ☐ Short field takeoff and maximum performance climb
- ☐ Short field approach and landing
- ☐ OPTIONAL: Go-around/rejected landing

Commercial Maneuvers

- ☐ Steep turn
- ☐ Slow flight
- ☐ Power off stall (with or without bank)
- ☐ Power on stall (with or without bank)

Post Flight Procedures

- ☐ After landing
- ☐ Parking and securing the aircraft

FLIGHT TRAINING

Multiengine Operations (OEI)

- ☐ Engine failure (simulated) during takeoff prior to 50% of V_{mc}
- ☐ Engine failure (simulated) after liftoff and in the traffic pattern (> 500’ AGL)
- ☐ Maneuvering with OEI (simulated)
- ☐ OEI (simulated) pattern and landing
- ☐ Full engine shutdown and air-start
- ☐ V_{mc} demo
- ☐ Drag demo
- ☐ Emergency descent

Instrument Procedures

- ☐ OPTIONAL: Instrument Approach
- ☐ OPTIONAL: Straight in landing/missed
- ☐ OPTIONAL: Circle to land/missed

COMPLETION STANDARDS

The student should demonstrate proper control of the aircraft and sound ADM during all emergency maneuvers. During short field landings the student should be able to touch down within 200’ of his/her designated point on the runway. Aircraft control for all maneuvers should meet or exceed Private Pilot ACS standards as the student works towards FAA commercial test standards.

REQUIRED READING/STUDY

- JIC Chapter 12 “Predicting Performance”

LESSON 45: PRE/POST GROUND 2.0 HOURS

LESSON OBJECTIVE

This lesson will prepare the student for cross country flights performed at a commercial pilot's level. The instructor should create a scenario to challenge the student's planning and risk management skills (e.g. 3 paying passengers with luggage; long distances requiring fuel stops.)

GROUND TRAINING: Review

Commercial Privileges

- ☐ Common carriage
- ☐ Private carriage
- ☐ Holding out
- ☐ Part 119

Aircraft Performance

- ☐ Aircraft performance data
- ☐ Fuel consumption/fuel burn
- ☐ Power settings
- ☐ Takeoff distance
- ☐ Weight and balance (CG considerations)
- ☐ Density altitude
- ☐ Climb gradient

GROUND TRAINING

Preflight Information Brief

- ☐ 1800WXBRIEF or similar tool
  - Filing a flight plan
  - METAR, AWOS, ATIS
  - TAF, FA, Prog Charts, etc.
  - AIRMETs, SIGMETs
- ☐ NOTAMs/TFRs

Controlled Flight into Terrain (CFIT)

- ☐ VFR night operations
- ☐ VFR low visibility
- ☐ VFR into IMC
- ☐ IFR operations

Aeromedical Factors

- ☐ Hypoxia
- ☐ Hyperventilation
- ☐ Middle ear and sinus problems
- ☐ Spatial disorientation
- ☐ Motion sickness
- ☐ Carbon monoxide poisoning
- ☐ Stress and fatigue
- ☐ Dehydration.

VFR and IFR Cross Country Flight Planning

- ☐ NEXRAD in-cockpit weather/time lags and other risk factors
- ☐ XM/ADS-B (IN) weather
- ☐ Enroute weather updates
- ☐ National Airspace System
- ☐ Use of Electronic Flight Bags
  - Modern flight planning tools
  - Use of electronic charts
  - Back up planning (charts; battery; etc.)
- ☐ Types and sources of briefings available
- ☐ Chart Supplement (a.k.a. A/FD)
- ☐ Diversion ADM
- ☐ Pilotage and dead reckoning for VFR
- ☐ Correcting and recording groundspeed, fuel burn, and heading calculations
- ☐ Types of flight plans
- ☐ IFR to airports without published instrument approaches
- ☐ Alternate airports, VFR and IFR
- ☐ Altitude selection
- ☐ Oxygen requirements
- ☐ Types of O2 masks
  - Continuous flow
  - Diluter demand
  - Pressure
- ☐ Aircraft pressurization

COMPLETION STANDARDS

The student should be able to present a completed flight plan to the instructor demonstrating his/her knowledge of the national airspace system, aircraft performance, and risk management, especially as it relates to CFIT and aeromedical factors.

REQUIRED READING/STUDY

- AMEL PTS/ACS Area of Operation I "Preflight Preparation"

LESSON 46: FLIGHT
2.0 HOURS DUAL X/C DAY
0.5 HOURS PRE/POST

LESSON OBJECTIVE

The student will gain experience operating a complex multiengine aircraft in the National Airspace System by conducting a **DAY** cross country flight. Total flight time ***must*** be at least 2.0 hours, and the furthest point ***must*** be more than 100NM from the original point of departure in order to comply with 14 CFR 141 Appendix D*. Use of a tower controlled airport is recommended.

**Note: 14 CFR 141 App. D para. 4(b)(2)(iii); "One 2-hour cross country flight in daytime conditions in a multiengine airplane that consists of a total straight-line distance of more than 100NM from the original point of departure."*

GROUND TRAINING: Review

Preflight Information Briefing

- ☐ Cross country flight planning
- ☐ Weather/NOTAM/TFR briefing
  - 1800WXBRIEF or similar source
- ☐ Risk management: PAVE

FLIGHT TRAINING: Review

Takeoffs, Landings, and Go-Arounds

- ☐ Normal/Crosswind takeoff and climb
- ☐ Normal/Crosswind approach and landing
- ☐ Short Field takeoff and maximum performance climb
- ☐ Short Field approach and landing

Airport Operations

- ☐ Traffic pattern entry
- ☐ Traffic patterns
- ☐ Radio communications
- ☐ OPTIONAL: ATC light gun signals
- ☐ Airport signs and markings
- ☐ Runway incursion avoidance

Multiengine Operations - OEI

- ☐ OPTIONAL: Engine failure (simulated) during takeoff prior to 50% of V_{mc}
- ☐ OPTIONAL: Engine failure (simulated) after liftoff and in the traffic pattern (> 500' AGL)
- ☐ OPTIONAL: Maneuvering with inoperative engine (simulated)
- ☐ OPTIONAL: Single engine (simulated) landing
- ☐ OPTIONAL: Single engine (simulated) go-around

FLIGHT TRAINING

Navigation in a Multiengine Aircraft

- ☐ Cross-country flight planning
- ☐ **Furthest point >100NM from point of origin***
- ☐ Pilotage
- ☐ Dead reckoning
- ☐ Correct and record groundspeed, fuel burn, and heading calculations
- ☐ Use of navigation systems and radar services
- ☐ Diversion
- ☐ Lost procedures
- ☐ Situational awareness
- ☐ ADM
- ☐ SPRM
- ☐ Flight plan log

COMPLETION STANDARDS

This lesson is complete when the student has performed the required cross country and satisfied the requirements of 14 CFR 141 Appendix D, paragraph 4(b)(2)(iii)*. The student should demonstrate sound navigation skills using pilotage and dead reckoning, being able to verify the airplane's position within 2NM of the planned route, and being able to arrive at checkpoints within 3 minutes of planned or revised ETAs. The student should be able to control the aircraft and conduct the flight during normal operations to at least Private Pilot ACS standards as he/she works towards FAA commercial test standards.

REQUIRED READING/STUDY

- AMEL PTS/ACS Area of Operation VI "Navigation"

LESSON 47: FLIGHT
2.0 HOURS DUAL XC
2.0 HOURS NIGHT
0.5 HOURS PRE/POST

LESSON OBJECTIVE

The student will gain additional experience operating a complex multiengine aircraft in the National Airspace System by conducting a **NIGHT** cross country flight. Total flight time ***must*** be at least 2.0 hours, and the furthest point ***must*** be more than 100NM from the original point of departure in order to comply with 14 CFR 141 Appendix D*. Use of a tower controlled airport is recommended.

**Note: 14 CFR 141 App. D para. 4(b)(2)(iv); "One 2-hour cross country flight in nighttime conditions in a multiengine airplane that consists of a total straight-line distance of more than 100NM from the original point of departure."*

GROUND TRAINING: Review

Preflight Information Briefing

- ☐ Cross Country flight planning
- ☐ Weather/NOTAM/TFR briefing
  - 1800WXBRIEF or similar source
- ☐ Risk management: PAVE

GROUND TRAINING

Night Operations

- ☐ Nighttime illusions
- ☐ Eye adaptation
- ☐ Aircraft lighting
- ☐ Airport lighting

FLIGHT TRAINING: Review

Takeoffs, Landings, and Go-Arounds

- ☐ Normal/Crosswind takeoff and climb
- ☐ Normal/Crosswind approach and landing
- ☐ OPTIONAL: Go-Around

Airport Operations

- ☐ Traffic patterns
- ☐ Radio communications
- ☐ OPTIONAL: ATC light gun signals
- ☐ Airport signs, markings, and lighting
- ☐ Runway Incursions

Multiengine Operations - OEI

- ☐ OPTIONAL: Engine failure (simulated) during takeoff prior to 50% of V_{mc}
- ☐ OPTIONAL: Engine failure (simulated) after liftoff and in the traffic pattern (> 500' AGL)
- ☐ OPTIONAL: Maneuvering with OEI (simulated)
- ☐ OPTIONAL: Single engine (simulated) landing

FLIGHT TRAINING

Navigation in a Multiengine Aircraft at Night

- ☐ Cross-country flight planning
- ☐ **Furthest point >100NM from point of origin***
- ☐ Pilotage (nighttime)
- ☐ Dead Reckoning (nighttime)
- ☐ Correct and record groundspeed, fuel burn, and heading calculations
- ☐ Use of navigation systems and radar services
- ☐ Diversion
- ☐ Lost procedures
- ☐ Situational awareness
- ☐ ADM
- ☐ SPRM
- ☐ Flight plan log

COMPLETION STANDARDS

This lesson is complete when the student has performed the required cross country and satisfied the requirements of 14 CFR 141 Appendix D, paragraph 4(b)(2)(iv)*. The student should demonstrate sound navigation skills using pilotage and dead reckoning at night, being able to verify the airplane's position within 2NM of the planned route, and being able to arrive at checkpoints within 3 minutes of planned or revised ETAs. The student should be able to control the aircraft and conduct the flight during normal operations to at least Private Pilot ACS standards as he/she works towards FAA commercial test standards.

REQUIRED READING/STUDY

- AMEL PTS/ACS Area of Operation X "Multi Engine Operations"

LESSON 48: SIMULATOR
1.5 HOURS DUAL
1.5 HOURS INSTRUMENT
0.5 HOURS PRE/POST

LESSON OBJECTIVE

This lesson will allow the student to continue to develop his/her IFR cross country and ADM skills. The instructor should provide a scenario that allows all elements of this lesson to be completed.

GROUND TRAINING: Review

Preflight Preparation

- ☐ Weather information
- ☐ Cross-country flight planning
- ☐ National Airspace System
- ☐ Performance and limitations
- ☐ Aeromedical factors

SIMULATOR TRAINING: Review

Cross Country Procedures

- ☐ ATC clearances
- ☐ Use of radar
- ☐ Voice communications
- ☐ Airway navigation
- ☐ Direct-to navigation
- ☐ Holding
  - As instructed by ATC
  - Published

Emergency Operations

- ☐ Electrical failure
- ☐ Lost communications/radio failure
- ☐ Other system failure (e.g. low or trapped fuel)
- ☐ Rough engine
- ☐ Engine failure

Instrument Approach Procedures

- ☐ Non-precision approach
- ☐ Precision approach to DA
- ☐ Additional precision or non-precision
- ☐ OEI Instrument approach

Approach Completion

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

SIMULATOR TRAINING

Instrument Departure and Arrival Procedures

- ☐ Clearance copying and readback (CRAFT)
- ☐ Low visibility taxi (1/8-mile visibility)
- ☐ Instrument takeoff (1/8-mile visibility)
- ☐ Climb gradient
  - Published requirements
  - Calculating the aircraft's ability to meet a required gradient
- ☐ Departure clearances
- ☐ Departures Procedure (DP)
- ☐ Standard Terminal Arrival Route (STAR)

COMPLETION STANDARDS

The student should demonstrate sound ADM and judgment throughout the flight, including the proper use of normal and emergency checklists. The student's instrument procedures should be to FAA Instrument ACS standards.

REQUIRED READING/STUDY

- AMEL PTS/ACS Area of Operation III "Airport and Seaplane Base Operations"

LESSON 49: PRE/POST GROUND 2.0 HOURS

LESSON OBJECTIVE
This lesson will review the systems on the Piper Seminole and technologically advanced aircraft, with an emphasis on G1000 operations.

GROUND TRAINING: Review

G1000

- ☐ Garmin advanced avionics training course
- ☐ AHRS, ADC, DAU
- ☐ Backup components
- ☐ Backup power sources
- ☐ Troubleshooting errors (use the required G1000 Cockpit Ref. Guide (CRG))
- ☐ Primary Flight Display (PFD)
  - Display options
  - Inlet screens (e.g. map; nearest)
- ☐ Multi-Function Display (MFD)
  - Database currencies
  - Page/sub-page groups (big knob/little knob)
- ☐ Backup/reversionary mode (i.e. the PFD is primary)
- ☐ Comm/nav panel
- ☐ Building a GPS flight plan
  - Direct-to
  - Airway navigation
  - Entering an IAP
- ☐ Jeppesen-View approach plates
- ☐ Obtaining weather data through XM, ADS-B (IN), or another source

Aircraft Systems

- ☐ General information and limitations
- ☐ Primary flight controls and trim
- ☐ Fuel system
- ☐ Environmental system
- ☐ Stall warning system
- ☐ Electrical system
- ☐ Engines
- ☐ Propeller system and feathering accumulator
- ☐ Hydraulic system

Autopilot Operations

- ☐ Programming the autopilot
  - Flight director use
  - Lateral modes
  - Pitch modes
  - Disengagement
- ☐ Autopilot limitations
  - POH supplement
  - Single engine use
- ☐ Coupled approaches
- ☐ Risk management associated with the autopilot and navigation systems
  - Use the autopilot to reduce workload
  - Complacency
  - Garbage in = garbage out
- ☐ Single engine approaches and autopilot use
- ☐ Circling approach and autopilot use

COMPLETION STANDARDS
The student should be able to name and describe the components of a technologically advanced aircraft and explain basic troubleshooting steps. Additionally, the student should be able to describe thoroughly each primary system of the aircraft, including operating procedures and limitations.

REQUIRED READING/STUDY

- JIC Chapter 2 “Integrated Displays”
- G1000 Pilot’s Training Guide

LESSON 50: FLIGHT
1.5 HOURS DUAL
1.3 HOURS INSTRUMENT
0.5 HOURS PRE/POST

LESSON OBJECTIVE

This lesson focuses on strengthening the student's IFR skills in a complex multiengine aircraft. The instructor should give the student an IFR cross country scenario to plan and then introduce a diversion scenario in flight.

GROUND TRAINING: Review

Preflight Procedures

- ☐ Preflight orientation and preparation
- ☐ Full walk-around/detailed a/c inspection
- ☐ Safety-related operations and procedures

FLIGHT TRAINING: Review

Safety Related Operations and Procedures

- ☐ Use of the checklist
- ☐ CRM/SPRM
- ☐ Positive exchange of flight controls
- ☐ Stall/spin awareness
- ☐ Visual scanning and collision avoidance
- ☐ Runway incursion avoidance

Instrument Departure and Arrival Procedures

- ☐ Clearance copying and readback
- ☐ Complying with a departure clearance
- ☐ Approach setup and arrival

Cross Country Procedures

- ☐ Cross country flight plan (grade for accuracy and thoroughness)
- ☐ Program for GPS navigation with VOR/LOC backup
- ☐ Airway navigation
- ☐ Direct-to navigation
- ☐ Radio communications
- ☐ Situational awareness
- ☐ ADM
- ☐ Holding Procedures
  - ATC directed
  - Published

Emergency Operations

- ☐ System failure scenario
- ☐ Diversion scenario
- ☐ Engine failure (simulated)

Instrument Procedures

- ☐ Non-precision approach
- ☐ Precision approach to DA
- ☐ OPTIONAL: additional approach
- ☐ One of the above: OEI approach

Approach Completion

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

Post Flight

- ☐ Closing of flight plan
- ☐ After landing
- ☐ Parking and securing the aircraft

COMPLETION STANDARDS

The student should have all emergency memory items memorized, and he/she should be able to control the aircraft efficiently and accurately during emergency operations. Additionally, the student should be able to control the aircraft and conduct the flight during normal operations to at least Private Pilot and Instrument ACS standards as he/she works towards FAA commercial test standards.

REQUIRED READING/STUDY

- JIC Chapter 7 "Approach Procedures"

LESSON 51: SIMULATOR
1.5 HOURS DUAL
1.5 HOURS INSTRUMENT
0.5 HOURS PRE/POST

LESSON OBJECTIVE

This lesson will allow the student to continue to develop his/her IFR cross country and ADM skills. The instructor should provide a scenario that incorporates flight into severe weather. He/she should sit outside the simulator and act as ATC for this lesson. The number of approaches are at the CFI's discretion; however, at least one single engine approach (precision or non-precision) is required.

GROUND TRAINING: Review

Preflight Preparation

- ☐ Weather information
- ☐ Cross-country flight planning
- ☐ National airspace system
- ☐ Performance and limitations
- ☐ Aeromedical factors

SIMULATOR TRAINING: Review

Instrument Departure and Arrival Procedures

- ☐ Clearance copying and readback (CRAFT)
- ☐ Low visibility taxi (1/8-mile visibility)
- ☐ Instrument takeoff (1/8-mile visibility)
- ☐ Climb gradient
  - Published requirements
  - Calculating the aircraft's ability to meet a required gradient
- ☐ Departure clearances
- ☐ Departures Procedure (DP)
- ☐ Standard Terminal Arrival Route (STAR)

Cross Country Procedures

- ☐ Air traffic control clearance
- ☐ Clearance copying and read back
- ☐ Use of radar
- ☐ Radio-communications
- ☐ Enroute procedures and clearances
- ☐ Diversion
- ☐ Holding procedures

Hazardous Weather

- ☐ AIRMETS/SIGMETS
- ☐ Apply ADM/SPRM to cope with hazardous weather scenarios
  - Severe icing
  - Turbulence
  - Thunderstorms
- ☐ ATC assistance (e.g. radar vectors around heavy precipitation)

Emergency Operations

- ☐ Electrical failure scenario
- ☐ Other system failure scenario
- ☐ Engine problem scenario (e.g. rough engine; low oil pressure)
- ☐ Engine failure
- ☐ Single engine approach

Instrument Approach Procedures

- ☐ OEI approach
- ☐ OPTIONAL: Non-precision approach
- ☐ OPTIONAL: Precision approach
- ☐ OPTIONAL: Additional approach

Approach Completion

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

COMPLETION STANDARDS

The student should demonstrate the ability to deal with problems in a single pilot environment, and he/she should apply proper instrument procedures throughout the flight.

REQUIRED READING/STUDY

- Federal Aviation Regulations (FAR) Part 119 "Certification: Air Carriers and Commercial Operators"

LESSON 52: SIMULATOR
1.5 HOURS DUAL
1.5 HOURS INSTRUMENT
0.5 HOURS PRE/POST

LESSON OBJECTIVE

This lesson is similar to the previous lesson, allowing the student to continue developing his/her IFR cross country and ADM skills. The instructor should provide a scenario that forces an emergency diversion. He/she should sit outside the simulator and act as ATC for this lesson. The number of approaches are at the CFI's discretion; however, at least one single engine approach (precision or non-precision) is required.

GROUND TRAINING: Review

Preflight Preparation

- ☐ Weather information
- ☐ Cross-country flight planning
- ☐ National airspace system
- ☐ Performance and limitations
- ☐ Aeromedical factors

SIMULATOR TRAINING: Review

Instrument Departure and Arrival Procedures

- ☐ Clearance copying and readback (CRAFT)
- ☐ Low visibility taxi (1/8-mile visibility)
- ☐ Instrument takeoff (1/8-mile visibility)
- ☐ Climb gradient
  - Published requirements
  - Calculating the aircraft's ability to meet a required gradient
- ☐ Departure clearances
- ☐ Departures Procedure (DP)
- ☐ Standard Terminal Arrival Route (STAR)

Cross Country Procedures

- ☐ Air traffic control clearance
- ☐ Clearance copying and read back
- ☐ Use of radar
- ☐ Radio-communications
- ☐ Enroute procedures and clearances
- ☐ Diversion
- ☐ Holding procedures

Emergency Operations

- ☐ Electrical failure scenario
- ☐ Other system failure scenario
- ☐ Low fuel/high headwind
- ☐ Icing conditions at night
- ☐ Engine problem scenario (e.g. rough engine; low oil pressure)
- ☐ Engine failure
- ☐ Single engine approach

Instrument Approach Procedures

- ☐ OEI approach
- ☐ OPTIONAL: Non-precision approach
- ☐ OPTIONAL: Precision approach
- ☐ OPTIONAL: Additional approach

Approach Completion

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

COMPLETION STANDARDS

The student should demonstrate the ability to deal with problems in a single pilot environment, and he/she should apply proper instrument procedures throughout the flight.

REQUIRED READING/STUDY

- Aeronautical Information Manual (AIM) Chapter 5 "Pilot/Controller Roles and Responsibilities"

LESSON 53: FLIGHT
4.0 HOURS DUAL X/C
2.0 HOURS INSTRUMENT
0.5 HOURS PRE/POST

LESSON OBJECTIVE

This lesson will continue developing the student's risk management and flight planning skills. The instructor should create an IFR cross country scenario that challenges the student to use ATC as much as possible. Each leg should come to a full stop so the student can file the next leg. At least one leg should be 50NM away from the departure airport. This lesson may be combined with lesson 54.

GROUND TRAINING: Review

Preflight Information Briefing

- ☐ Cross country flight planning
- ☐ Weather/NOTAM/TFR briefing
  - 1800wxbrief or similar source
- ☐ Risk management: PAVE
- ☐ Aircraft performance, limitations, & systems related to IFR cross-country

FLIGHT TRAINING: Review

Takeoffs, Landings, and Go-Arounds

- ☐ Normal/crosswind takeoff and climb
- ☐ Normal/crosswind approach and landing
- ☐ Short field takeoff and climb
- ☐ Short field approach and landing
- ☐ Go-around

Cross Country Procedures

- ☐ Air traffic control clearance
- ☐ Clearance copying and readback
- ☐ Enroute procedures and clearances
- ☐ Calculating ETEs and ETAs
- ☐ Use of navigation systems and radar services
  - Airway navigation
  - Direct-to navigation
- ☐ Autopilot/flight director usage
- ☐ Holding procedures

Airport Operations

- ☐ Radio communications
- ☐ OPTIONAL: ATC light gun signals
- ☐ Airport signs and markings
- ☐ Avoiding runway incursions

Multiengine Operations - OEI

- ☐ OPTIONAL: Engine failure in flight (simulated) by reference to instruments
- ☐ OPTIONAL: Maneuvering with OEI (simulated) by reference to instruments
- ☐ OPTIONAL: Engine failure (simulated) during takeoff prior to 50% of V_{mc}
- ☐ OPTIONAL: Engine failure (simulated) after liftoff and in the traffic pattern (>500' AGL)

Other Emergency Operations

- ☐ Loss of communications
- ☐ System malfunctions
- ☐ ADM and SPRM
- ☐ Simulated landing gear emergency

Instrument Approach Procedures

- ☐ Non-precision approach
- ☐ Precision approach to DA
- ☐ Additional precision or non-precision
- ☐ OPTIONAL: One of the above: partial panel approach
- ☐ OPTIONAL: OEI approach by reference to instruments
- ☐ OPTIONAL: DME arc
- ☐ OPTIONAL: Procedure turn
- ☐ OPTIONAL: RNAV Terminal Arrival Area (TAA) NoPT
- ☐ OPTIONAL: Vectors to final
- ☐ OPTIONAL: Visual approach

Approach Completion

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

COMPLETION STANDARDS

The student should be able to control the aircraft and conduct the flight while exercising sound ADM and SPRM skills to at least Private Pilot and Instrument ACS standards as he/she works towards FAA commercial test standards. He/she should execute all checklists—normal and emergency; printed and memory—in a timely and appropriate manner with little or no prompting from the CFI.

REQUIRED READING/STUDY

- AIM Chapter 8 "Medical Facts for Pilots"

LESSON 54: FLIGHT
4.0 HOURS DUAL XC
2.0 HOURS INSTRUMENT
0.5 HOURS PRE/POST

LESSON OBJECTIVE

This lesson will continue developing the student's risk management and flight planning skills. The instructor should create an IFR cross country scenario that challenges the student to use ATC as much as possible. Each leg should come to a full stop so the student can file the next leg. At least one leg should be 50NM away from the departure airport. This lesson may be combined with lesson 53.

GROUND TRAINING: Review

Preflight Information Briefing

- ☐ Cross country flight planning
- ☐ Weather/NOTAM/TFR briefing
  - 1800wxbrief or similar source
- ☐ Risk management: PAVE
- ☐ Aircraft performance, limitations, & systems related to IFR cross-country

FLIGHT TRAINING: Review

Takeoffs, Landings, and Go-Arounds

- ☐ Normal/crosswind takeoff and climb
- ☐ Normal/crosswind approach and landing
- ☐ Short field takeoff and climb
- ☐ Short field approach and landing
- ☐ Go-around

Cross Country Procedures

- ☐ Air traffic control clearance
- ☐ Clearance copying and readback
- ☐ Enroute procedures and clearances
- ☐ Calculating ETEs and ETAs
- ☐ Use of navigation systems and radar services
  - Airway navigation
  - Direct-to navigation
- ☐ Autopilot/flight director usage
- ☐ Holding procedures

Airport Operations

- ☐ Radio communications
- ☐ OPTIONAL: ATC light gun signals
- ☐ Airport signs and markings
- ☐ Avoiding runway incursions

Multiengine Operations - OEI

- ☐ OPTIONAL: Engine failure in flight (simulated) by reference to instruments
- ☐ OPTIONAL: Maneuvering with OEI (simulated) by reference to instruments
- ☐ OPTIONAL: Engine failure (simulated) during takeoff prior to 50% of V_{mc}
- ☐ OPTIONAL: Engine failure (simulated) after liftoff and in the traffic pattern (>500' AGL)

Other Emergency Operations

- ☐ Loss of communications
- ☐ System malfunctions
- ☐ ADM and SPRM
- ☐ Simulated landing gear emergency

Instrument Approach Procedures

- ☐ Non-precision approach
- ☐ Precision approach to DA
- ☐ Additional precision or non-precision
- ☐ OPTIONAL: One of the above: partial panel approach
- ☐ OPTIONAL: OEI approach by reference to instruments
- ☐ OPTIONAL: DME arc
- ☐ OPTIONAL: Procedure turn
- ☐ OPTIONAL: RNAV Terminal Arrival Area (TAA) NoPT
- ☐ OPTIONAL: Vectors to final
- ☐ OPTIONAL: Visual approach

Approach Completion

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

COMPLETION STANDARDS

The student should be able to control the aircraft and conduct the flight while exercising sound ADM and SPRM skills to at least Private Pilot and Instrument ACS standards as he/she works towards FAA commercial test standards. He/she should execute all checklists—normal and emergency; printed and memory—in a timely and appropriate manner with little or no prompting from the CFI.

REQUIRED READING/STUDY

- AMEL PTS/ACS Area of Operation IX "High Altitude Operations"

LESSON 55: FLIGHT
5.0 HOURS SOLO X/C
0.5 HOURS PRE/POST

LESSON OBJECTIVE

The next three lessons (55, 56, and 57) are designed to meet 14 CFR 141 Solo requirements*. They may be combined into one or more cross country flight(s) and flown in any order. This lesson includes the requirement to fly cross country with one segment consisting of a straight-line distance of at least 250NM and with landings at three points. The instructor should create a scenario for the student to fly as if Solo. The instructor will accompany the student merely as an observer/safety pilot (i.e. "supervised solo")**.

**Note: 14 CFR 141 Appendix D paragraph 5 requires 10 hours of Solo ("supervised solo"); one Solo cross country with landings at a minimum of three points and one segment consisting of a straight-line of at least 250NM; 5 hours in night VFR conditions with 10 takeoffs and landings—each landing using a traffic pattern—with an operating control tower.*

***Note: The following statement must be placed in the student's logbook, "Student performing duties of PIC under the supervision of an authorized instructor."*

GROUND TRAINING: Review

Preflight Information Briefing

- ☐ Cross country flight planning (***must include one segment at least 250NM, and 3 points of landing.***)
- ☐ Weather/NOTAM/TFR briefing
  - 1800WXBRIEF or similar source
- ☐ Risk management: PAVE

FLIGHT TRAINING: Review

Takeoffs, Landings, and Go-Arounds

- ☐ Normal/crosswind takeoff and climb
- ☐ Normal/crosswind approach and landing
- ☐ Landings at three different points
- ☐ OPTIONAL: Short field takeoff and climb
- ☐ OPTIONAL: Short field approach and landing

Airport Operations

- ☐ Traffic patterns
- ☐ Radio communications
- ☐ Airport signs and markings
- ☐ Runway incursion avoidance

Navigation in A Multiengine Aircraft

- ☐ Pilotage
- ☐ Dead reckoning
- ☐ Correct and record groundspeed, fuel burn, and heading calculations
- ☐ Use of navigation systems and radar services
- ☐ Situational awareness
- ☐ ADM
- ☐ SPRM
- ☐ Autopilot/flight director
- ☐ OPTIONAL: Diversion

COMPLETION STANDARDS

This lesson is complete when the student has met 14 CFR 141 Appendix D paragraph 5(b)(2) requirements* (one segment at least 250NM; landings at three different points.) While navigating, the student should able to verify the airplane's position within 2NM of the planned route, and be able to arrive at checkpoints within 3 minutes of planned or revised ETAs. The flight should be performed with no CFI assistance to at least Private Pilot ACS standards as the student works towards FAA commercial test standards.

REQUIRED READING/STUDY

- AFH Chapter 17 "Emergency Procedures"

LESSON 56: FLIGHT
2.5 HOURS SOLO X/C
2.5 HOURS NIGHT
0.5 HOURS PRE/POST

LESSON OBJECTIVE

The next two lessons (56 and 57) are designed to meet 14 CFR 141 Solo night requirements*. (Lesson 55 may also be used towards this requirement if nighttime was logged.) Lessons 55-57 may be combined into one or more cross country flight(s) and flown in any order. The instructor should create a VFR scenario to an ***operating*** control tower for the student to fly as if Solo. An instructor pilot will accompany the student merely as an observer/safety pilot (i.e. "supervised solo").**

Note: 14 CFR 141 Appendix D paragraph 5 requires 10 hours of Solo ("supervised solo"); one Solo cross country with landings at a minimum of three points and one segment consisting of a straight-line of at least 250NM; 5 hours in **night VFR conditions with 10 takeoffs and landings—each landing using a traffic pattern—with an operating control tower.*

***Note: The following statement must be placed in the student's logbook, "Student performing duties of PIC under the supervision of an authorized instructor."*

GROUND TRAINING: Review

Preflight Information Briefing

- ☐ Cross country flight planning (***should include an operating control tower.)***
- ☐ Weather/NOTAM/TFR briefing
  - 1800WXBRIEF or similar source
- ☐ Risk management: PAVE

FLIGHT TRAINING: Review

Takeoffs, Landings, and Go-Arounds

- ☐ Normal/crosswind takeoff and climb
- ☐ Normal/crosswind approach and landing
- ☐ Night patterns and landings at a tower-controlled airport
- ☐ OPTIONAL: Short field takeoff and climb
- ☐ OPTIONAL: Short field approach and landing
- ☐ OPTIONAL: Go around

Airport Operations

- ☐ Traffic patterns
- ☐ Radio communications
- ☐ Airport signs, markings, and lighting
- ☐ Runway incursion avoidance

Night Operation

- ☐ Night preparation and preflight
  - Eye adaptation
  - Aircraft lighting

Navigation in A Multiengine Aircraft

- ☐ Pilotage
- ☐ Dead reckoning
- ☐ Correct and record groundspeed, fuel burn, and heading calculations
- ☐ Use of navigation systems and radar services
- ☐ Situational awareness
- ☐ ADM
- ☐ SPRM
- ☐ Autopilot/flight director
- ☐ OPTIONAL: Diversion

COMPLETION STANDARDS

While navigating, the student should able to verify the airplane's position within 2NM of the planned route, and be able to arrive at checkpoints within 3 minutes of planned or revised ETAs. The flight should be performed with no CFI assistance to at least Private Pilot ACS standards as the student works towards FAA commercial test standards.

REQUIRED READING/STUDY

- AFH Chapter 10 "Night Operations"

LESSON 57: FLIGHT
2.5 HOURS SOLO X/C
2.5 HOURS NIGHT
0.5 HOURS PRE/POST

LESSON OBJECTIVE

This and the previous lesson (56) are designed to meet 14 CFR 141 Solo night requirements*. (Lesson 55 may also be used towards this requirement if nighttime was logged.) Lessons 55-57 may be combined into one or more cross country flight(s) and flown in any order. The instructor should create a VFR scenario to an ***operating*** control tower for the student to fly as if Solo. An instructor pilot will accompany the student merely as an observer/safety pilot (i.e. "supervised solo").**

Note: 14 CFR 141 Appendix D paragraph 5 requires 10 hours of Solo ("supervised solo"); one Solo cross country with landings at a minimum of three points and one segment consisting of a straight-line of at least 250NM; 5 hours in **night VFR conditions with 10 takeoffs and landings—each landing using a traffic pattern—with an operating control tower.*

***Note: The following statement must be placed in the student's logbook, "Student performing duties of PIC under the supervision of an authorized instructor."*

GROUND TRAINING: Review

Preflight Information Briefing

- ☐ Cross country flight planning (***should include an operating control tower.)***
- ☐ Weather/NOTAM/TFR briefing
  - 1800WXBRIEF or similar source
- ☐ Risk management: PAVE

FLIGHT TRAINING: Review

Takeoffs, Landings, and Go-Arounds

- ☐ Normal/crosswind takeoff and climb
- ☐ Normal/crosswind approach and landing
- ☐ Night patterns and landings at a tower-controlled airport (***10 required by the end of this lesson.***)
- ☐ OPTIONAL: Short field takeoff and climb
- ☐ OPTIONAL: Short field landing
- ☐ OPTIONAL: Go around

Airport Operations

- ☐ Traffic patterns
- ☐ Radio communications
- ☐ Airport signs, markings, and lighting
- ☐ Runway incursion avoidance

Night Operation

- ☐ Night preparation and preflight
  - Eye adaptation
  - Aircraft lighting

Navigation in A Multiengine Aircraft

- ☐ Pilotage
- ☐ Dead reckoning
- ☐ Correct and record groundspeed, fuel burn, and heading calculations
- ☐ Use of navigation systems and radar services
- ☐ Situational awareness
- ☐ ADM
- ☐ SPRM
- ☐ Autopilot/flight director
- ☐ OPTIONAL: Diversion

COMPLETION STANDARDS

This lesson is complete when the student has performed all the Solo night requirements found in 14 CFR Part 141 Appendix D paragraph 5* (i.e. 10 hours total with 5 hours at night; 10 night takeoffs/patterns/landings with an operating control tower.) While navigating, the student should able to verify the airplane's position within 2NM of the planned route, and be able to arrive at checkpoints within 3 minutes of planned or revised ETAs. The flight should be performed with no CFI assistance to at least Private Pilot ACS standards as the student works towards FAA commercial test standards.

REQUIRED READING/STUDY

- Advisory Circular (AC) 00-6B Chapter 19 "Thunderstorms"

LESSON 58: PRE/POST GROUND 2.0 HOURS

LESSON OBJECTIVE

This lesson emphasizes weather theory and all the ground training covered previously in preparation for the student's Multiengine Commercial Checkride.

GROUND TRAINING: Review

Seminole Systems

- ☐ G1000/G500 avionics
- ☐ Electrical system
- ☐ Fuel system
- ☐ Engine(s)
- ☐ Propeller system and feathering accumulator
- ☐ Hydraulic/Landing gear system
- ☐ Environmental system
- ☐ Stall warning system

Multiengine Aerodynamics

- ☐ Centerline thrust
- ☐ Conventional twin
- ☐ Counter rotating propellers
- ☐ Critical engine
- ☐ Sideslip and how to remedy
- ☐ Windmilling propeller
- ☐ Feathering propeller
- ☐ Zero thrust; simulation feathered propeller

Principles of Flight – OEI

- ☐ Meaning of the term Critical Engine
- ☐ Effects of density altitude on V_{mc}
- ☐ Effects of weight and CG on V_{mc}
- ☐ Effects of bank angle on V_{mc}
- ☐ Relationship of V_{mc} to stall speed
- ☐ Reasons for loss of directional control
- ☐ Importance in maintaining proper pitch, bank and coordination of controls
- ☐ Recovery procedures for loss of directional control
- ☐ Performance loss with OEI
- ☐ Factors to consider for OEI go around

OEI Turning Tendencies (PAST)

- ☐ P-Factor
- ☐ Asymmetrical thrust
- ☐ Spiraling slipstream
- ☐ Torque effect

Emergency Immediate Memory Items

- ☐ Engine failure on takeoff roll
- ☐ Engine failure after lift off
- ☐ Engine fire
- ☐ Emergency descent
- ☐ Landing gear emergencies

High Altitude Operations

- ☐ Supplemental oxygen
  - Requirements
  - 3 types of masks
- ☐ Pressurization systems

Preflight

- ☐ 91.205
  - Flight with inoperative equipment
  - Progressive maintenance
  - Maintenance logbook review
- ☐ 91.103 requirements
- ☐ Weather theory
  - High/low pressure
  - Frontal passage weather
  - Effects of temperature on weather
  - Causes/stages of T-storms
  - Where/when to expect ice
  - Where/when to expect fog
- ☐ Reading and interpreting WX reports
  - Prog charts
  - AIRMETS/SIGMETS
  - Area forecasts
  - METAR/TAF
  - Winds aloft

COMPLETION STANDARDS

The student will demonstrate a thorough understanding of the aircraft's systems, multiengine aerodynamics, OEI principles of flight, immediate action checklists, high altitude operations, and preflight requirements, including weather theory.

REQUIRED READING/STUDY

- Commercial Pilot Closed Book Final Test
- Review of notes from previous ground lessons

LESSON 59: FLIGHT
1.5 HOURS DUAL
0.5 HOURS PRE/POST

LESSON OBJECTIVE
This lesson will review all commercial flight maneuvers in preparation for the end of course stage check.

GROUND TRAINING: Review

Preflight Procedures
- ☐ Preflight orientation and preparation
- ☐ Full walk-around and detailed look at the aircraft
- ☐ Safety-related operations and procedures

FLIGHT TRAINING: Review

Takeoffs, Landings, and Go-Arounds
- ☐ Short field takeoff and maximum performance climb
- ☐ Traffic pattern
- ☐ Short field approach and landing
- ☐ Go-around/rejected landing
- ☐ OPTIONAL: Normal/crosswind takeoff and landing

Performance Maneuver
- ☐ Steep turns

Slow Flight and Stalls
- ☐ Maneuvering during slow flight
- ☐ Power-off stall (level or bank up to 20º)
- ☐ Power-on stall (level or bank up to 20º)
- ☐ Accelerated stall
- ☐ Spin awareness (do not spin)

Multiengine Operations - OEI
- ☐ Engine failure (simulated) during takeoff prior to 50% of V_{mc}
- ☐ Engine failure (simulated) after liftoff and in the traffic pattern (> 500')
- ☐ Maneuvering with OEI (simulated)
- ☐ Single engine (simulated) pattern and landing
- ☐ Full engine shutdown and air start
- ☐ V_{mc} demonstration
- ☐ OPTIONAL: Drag demonstration

Emergency Operations
- ☐ Engine fire or smoke in the cockpit
- ☐ Emergency descent
- ☐ Other system(s) and equipment malfunction(s)
- ☐ Emergency equipment and survival gear
- ☐ Emergency gear extension

Instrument Approach
- ☐ OEI precision or non-precision approach
- ☐ OPTIONAL: DME Arc
- ☐ OPTIONAL: Procedure turn
- ☐ OPTIONAL: RNAV TAA (NoPT)
- ☐ OPTIONAL: Vectors to final

Approach Completion
- ☐ OPTIONAL: Straight in to land
- ☐ OPTIONAL: Circle to land
- ☐ OPTIONAL: Missed approach procedure

Post Flight
- ☐ After landing
- ☐ Parking and securing the aircraft

COMPLETION STANDARDS
At the completion of this lesson the student should be able to fly all maneuvers to current FAA commercial test standards.

REQUIRED READING/STUDY
- AMEL PTS/ACS Area of Operation IV "Takeoffs, Landings, and Go-Arounds"

LESSON 60: FLIGHT
1.5 HOURS DUAL
0.5 HOURS PRE/POST

LESSON OBJECTIVE

This lesson should be planned as a cross country; however, the CFI should create a scenario requiring a diversion. This lesson will allow the student to practice VFR navigation and takeoffs and landings at another local airport.

GROUND TRAINING: Review

Preflight Procedures

- ☐ Cross-country flight planning
- ☐ Preflight orientation and preparation
- ☐ Full walk-around and detailed look at the aircraft
- ☐ Safety-related operations and procedures

FLIGHT TRAINING: Review

Takeoffs, Landings, and Go-Arounds

- ☐ Normal/crosswind takeoff and climbs
- ☐ Normal/crosswind approach and landing
- ☐ Short field takeoff and maximum performance climb
- ☐ Short field approach and landing
- ☐ OPTIONAL: Go-around/rejected landing

Cross Country Navigation

- ☐ Pilotage
- ☐ Dead reckoning
- ☐ Correct and record groundspeed, fuel burn, and heading calculations
- ☐ Use of navigation systems and radar services
- ☐ Autopilot/flight director
- ☐ Diversion
- ☐ Situational awareness
- ☐ Radio-communications
- ☐ ADM
- ☐ SPRM

Multiengine Operations - OEI

- ☐ Engine failure (simulated) during takeoff prior to 50% of V_{mc}
- ☐ Engine failure (simulated) after liftoff and in the traffic pattern (> 500')
- ☐ Maneuvering with OEI (simulated)
- ☐ Single engine (simulated) pattern and landing
- ☐ V_{mc} Demonstration
- ☐ OPTIONAL: Full engine shutdown and air start

Post Flight

- ☐ Closing of flight plan
- ☐ After landing
- ☐ Parking and securing the aircraft

COMPLETION STANDARDS

The student should be able to maintain course and situational awareness via pilotage and dead reckoning navigation. While navigating, the student should able to verify the airplane's position within 2NM of the planned route, and be able to arrive at checkpoints within 3 minutes of planned or revised ETAs. Throughout the flight the student should be able to perform all maneuvers to current FAA commercial test standards.

REQUIRED READING/STUDY

- AMEL PTS/ACS Area of Operation XI "Post Flight Procedures"

LESSON 61: SIMULATOR
1.5 HOURS DUAL
1.5 HOURS INSTRUMENT
0.5 HOURS PRE/POST

LESSON OBJECTIVE

This lesson is designed to challenge the student in a high stress IFR environment, and to elevate his/her confidence. The instructor should create a busy scenario with system malfunctions, requiring the student to use sound ADM and SPRM skills to bring about a safe conclusion. The instructor should sit outside the simulator and act as ATC for this lesson. At least one single engine approach (precision or non-precision) is required.

GROUND TRAINING: Review

Preflight Preparation

- ☐ Weather information
- ☐ Cross-country flight planning
- ☐ National Airspace System
- ☐ Performance and limitations
- ☐ Aeromedical factors

SIMULATOR TRAINING: Review

Instrument Departure and Arrival Procedures

- ☐ Clearance copying and readback (CRAFT)
- ☐ Low visibility taxi (1/8-mile visibility)
- ☐ Instrument takeoff (1/8-mile visibility)
- ☐ Climb gradient
  - Published requirements
  - Calculating the aircraft's ability to meet a required gradient
- ☐ Departure clearances
- ☐ Departures Procedure (DP)
- ☐ Standard Terminal Arrival Route (STAR)

Cross Country Procedures

- ☐ Air traffic control clearance/modified routing
  - Copy and readback
  - Compliance
- ☐ Use of radar
- ☐ Radio communications
- ☐ IFR Navigation
  - RNAV routes (T-routes)
  - Victor airways
  - Direct-to
- ☐ Holding

Emergency Operations

- ☐ Electrical failure
- ☐ Other system failure
- ☐ Low fuel/high headwind
- ☐ Icing conditions at night
- ☐ Engine problem followed by engine failure
- ☐ Diversion

Instrument Approach Procedures

- ☐ OEI approach
- ☐ OPTIONAL: Non-precision approach
- ☐ OPTIONAL: Precision approach
- ☐ OPTIONAL: Additional approach

Approach Completion

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

COMPLETION STANDARDS

The student should demonstrate sound situation awareness, ADM, SPRM, and checklist usage throughout the flight and while handling emergencies. All instrument procedures should be flown correctly.

REQUIRED READING/STUDY

- JIC Chapter 4 "Departure"
- JIC Chapter 6 "Arrival"

LESSON 62: FLIGHT
1.5 HOURS DUAL
1.3 HOURS INSTRUMENT
0.5 HOURS PRE/POST

LESSON OBJECTIVE
This lesson will review instrument procedures required to add instrument privileges to the commercial multiengine certificate.

GROUND TRAINING: Review
Preflight Procedures
- ☐ Preflight orientation and preparation
- ☐ Full walk-around and detailed look at the aircraft
- ☐ Safety-related operations and procedures

FLIGHT TRAINING: Review
Instrument Departure and Arrival Procedures
- ☐ Departure procedures and clearances
- ☐ Clearance copying and readback
- ☐ Holding
  - ATC directed
  - Published

Basic Instrument Maneuvers
- ☐ Straight and level flight
- ☐ Constant airspeed climbs
- ☐ Turns to headings
- ☐ Recovery from unusual attitudes

Emergency Operations
- ☐ Electrical failure
- ☐ Engine failure (simulated) in IMC
- ☐ EFIS or vacuum failure
- ☐ Partial panel aircraft control

Instrument Approach Procedures
- ☐ Non-precision approach
- ☐ Precision approach to DA
- ☐ Additional precision or non-precision
- ☐ One of the above OEI (simulated) approach
- ☐ One of the above partial panel
- ☐ OPTIONAL: DME arc
- ☐ OPTIONAL: Procedure turn
- ☐ OPTIONAL: RNAV TAA (NoPT)
- ☐ OPTIONAL: Vectors to final

Approach Completion
- ☐ Missed approach procedures
- ☐ OPTIONAL: Circle to land
- ☐ OPTIONAL: Straight in to land

COMPLETION STANDARDS
At the completion of this lesson the student will be able to perform all tasks within current FAA commercial test standards.

REQUIRED READING/STUDY
- AMEL PTS/ACS Area of Operation VIII “Emergency Operations”

LESSON 63: FLIGHT
1.5 HOURS DUAL
0.2 HOURS INSTRUMENT
0.5 HOURS PRE/POST

LESSON OBJECTIVE
This lesson will provide time for the student to review any items or maneuvers needing additional work. All maneuvers on this lesson are optional. Those performed will be graded.

GROUND TRAINING: Review

Preflight Procedures
- ☐ Preflight orientation and preparation
- ☐ Full walk-around and detailed look at the aircraft
- ☐ Safety-related operations and procedures

FLIGHT TRAINING: Review

Takeoffs, Landings, and Go-Arounds
- ☐ OPTIONAL: Normal and/or crosswind takeoff and climb
- ☐ OPTIONAL: Normal and/or crosswind approach and landing
- ☐ OPTIONAL: Short field takeoff and maximum performance climb
- ☐ OPTIONAL: Short field approach and landing
- ☐ OPTIONAL: Go-around/rejected landing
- ☐ OPTIONAL: Traffic patterns

Performance Maneuver
- ☐ OPTIONAL: Steep turn

Slow Flight and Stalls
- ☐ OPTIONAL: Maneuvering during slow flight
- ☐ OPTIONAL: Power-Off stall (Level or bank up to 20º)
- ☐ OPTIONAL: Power-On stall (Level or bank up to 20º)
- ☐ OPTIONAL: Accelerated stall
- ☐ OPTIONAL: Spin awareness (do not spin)

Emergency Operations
- ☐ OPTIONAL: Systems and equipment malfunctions
- ☐ OPTIONAL: Engine fire or cabin smoke
- ☐ OPTIONAL: Emergency descent
- ☐ OPTIONAL: Emergency equipment and survival gear
- ☐ OPTIONAL: Emergency gear extension

Multiengine Operations - OEI
- ☐ OPTIONAL: Engine failure (simulated) during takeoff prior to 50% of V_{mc}
- ☐ OPTIONAL: Engine failure (simulated) after liftoff and in the traffic pattern (> 500')
- ☐ OPTIONAL: Maneuvering with OEI (simulated)
- ☐ OPTIONAL: Single engine (simulated) pattern and landing
- ☐ OPTIONAL: Full engine shutdown and air start
- ☐ OPTIONAL: V_{mc} demonstration

Instrument Approaches
- ☐ OPTIONAL: Precision approach
- ☐ OPTIONAL: Non-precision approach
- ☐ OPTIONAL: OEI approach

Approach Completion
- ☐ OPTIONAL: Missed approach
- ☐ OPTIONAL: Straight in to land
- ☐ OPTIONAL: Circle to land

COMPLETION STANDARDS
The student should be able to perform all tasks on this lesson within current FAA commercial test standards.

REQUIRED READING/STUDY
- AMEL PTS/ACS Area of Operation VII "Slow Flight and Stalls"
- AMEL PTS/ACS Area of Operation V "Performance Maneuver"

LESSON 64: FLIGHT
2.0 HOURS DUAL
0.3 HOURS INSTRUMENT
0.5 HOURS PRE/POST

LESSON OBJECTIVE

This lesson will simulate the flight portion of the Stage Three check. It may be completed after lesson 65 (the oral portion of the simulated stage check.) This lesson should be conducted by someone other than the student's primary instructor. The instructor will create a VFR cross country scenario for the student to plan, and then he/she will introduce a diversion scenario to challenge the student's ADM and SPRM skills.

GROUND TRAINING: Review

Preflight Procedures

- ☐ Preflight inspection
- ☐ Cockpit management
- ☐ Engine starting
- ☐ Taxiing
- ☐ Before takeoff check

FLIGHT TRAINING: Review

Takeoffs, Landings, and Go-Arounds

- ☐ Normal/crosswind takeoff and climb
- ☐ Normal/crosswind approach and landing
- ☐ Short-field takeoff and maximum performance climb
- ☐ Short-field approach and landing
- ☐ Go-around/rejected landing

Airport Operations

- ☐ Radio communications
- ☐ Traffic patterns
- ☐ Airport markings and lighting
- ☐ Runway incursion avoidance

Navigation

- ☐ Pilotage
- ☐ Dead reckoning
- ☐ Correct and record groundspeed, fuel burn, and heading calculations
- ☐ Navigation systems and radar services
- ☐ Autopilot/flight director
- ☐ Lost procedures

Performance Maneuver

- ☐ Steep turns

Slow Flight and Stalls

- ☐ Maneuvering during slow flight
- ☐ Power-off stalls
- ☐ Power-on stalls
- ☐ Accelerated stalls
- ☐ Spin awareness (do not spin)

Emergency Operations

- ☐ Emergency equipment and survival gear
- ☐ Systems and equipment malfunctions
- ☐ Emergency descent
- ☐ Diversion
- ☐ OPTIONAL: Landing gear malfunction

Multiengine Operations - OEI

- ☐ Engine failure (simulated) during takeoff prior to 50% of V_{mc}
- ☐ Engine failure (simulated) after liftoff and in the traffic pattern (> 500')
- ☐ Single engine (simulated) pattern and landing
- ☐ Engine failure or fire (simulated) in flight above V_{mc}
- ☐ Maneuvering with OEI (simulated) by reference to instruments
- ☐ V_{mc} Demonstration
- ☐ Full engine shutdown and air start

Instrument Approach

- ☐ OEI (simulated) precision or non-precision approach

Approach Completion (choose one)

- ☐ OPTIONAL: Missed approach
- ☐ OPTIONAL: Straight in to land
- ☐ OPTIONAL: Circle to land

Postflight Procedures

- ☐ After landing, parking, and securing

COMPLETION STANDARDS

Throughout the flight the student should be able to perform all tasks on this lesson within current FAA commercial test standards.

REQUIRED READING/STUDY

- Review all Flight Procedures Previously Learned

LESSON 65: PRE/POST GROUND 3.0 HOURS

LESSON OBJECTIVE

This lesson may immediately precede lesson 64 (complete the audit afterwards.) It prepares the student for the oral portion of his/her Stage Three check and ensures the training records are certifiable for graduation. This lesson should be conducted by someone other than the student's primary instructor. The instructor will create a VFR cross country scenario that will challenge the student's knowledge of all operations.

GROUND TRAINING: Review

Pilot

- ☐ Certificates and documents
- ☐ Aeromedical factors
- ☐ Currency/proficiency
- ☐ Commercial pilot privileges and limitations

Aircraft

- ☐ Certificates and documents
- ☐ Maintenance requirements (review logbooks)
- ☐ 91.205, 91.213, MEL, KOE
- ☐ Seminole systems
  - Propeller system
  - Landing gear system
  - Fuel system
  - Electrical system
- ☐ Supplemental oxygen
  - When required
  - 3 types of masks
- ☐ Pressurization
- ☐ Performance and limitations
- ☐ Principles of Flight – OEI
  - Types of twins
  - Turning tendencies
  - Factors affecting V_{mc}
  - Effect of density altitude on V_{mc}

Environment

- ☐ Cross-country flight planning
- ☐ Risk management
- ☐ National Airspace System
- ☐ Runway incursion avoidance
- ☐ Weather information and theory
- ☐ CFIT

External Pressures

- ☐ Passengers, events, weather, etc.

GROUND TRAINING

Records Audit (Student must be present)

- ☐ Complete the *Commercial Pilot Stage Three 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 Commercial Pilot Stage Three auditing checklist."*

COMPLETION STANDARDS

The student must be able to demonstrate the knowledge required to pass the multiengine commercial pilot checkride. This lesson is not complete until the record audit is accomplished and all errors are corrected.

REQUIRED READING/STUDY

- Review all Previous Ground Lessons

LESSON 66: STAGE 3 CHECK
2.0 HOURS DUAL
0.3 HOURS INSTRUMENT
2.5 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 all items required for a Commercial Pilot, Multiengine Land certificate. The check pilot should prepare a plan of action that mimics a commercial pilot checkride, emphasizing knowledge areas that were missed on the FAA written test. Refer to the current FAA Commercial Pilot test standards.

GROUND TRAINING: Review

Preflight preparation (PAVE)

- ☐ Certificates and documents
- ☐ Aeromedical factors
- ☐ Airworthiness requirements
- ☐ Weather information and theory
- ☐ Cross-country flight planning
- ☐ National Airspace System
- ☐ Performance and limitations
- ☐ Operation of systems
- ☐ Principles of flight – engine inoperative
- ☐ Preflight briefing – apply risk management

High Altitude Operations

- ☐ Supplemental oxygen
- ☐ Pressurization

FLIGHT TRAINING: Review

Preflight procedures

- ☐ Preflight inspection
- ☐ Cockpit management
- ☐ Engine starting
- ☐ Taxiing
- ☐ Runway incursion avoidance
- ☐ Before takeoff check

Takeoffs, Landings, and Go-Arounds

- ☐ Normal/crosswind takeoff and climb
- ☐ Normal/crosswind approach and landing
- ☐ Short field takeoff/max perform climb
- ☐ Short field approach and landing
- ☐ Go-around/rejected landing

Airport operations

- ☐ Radio communications
- ☐ Traffic pattern
- ☐ Runway/taxiway signs and markings

Performance maneuvers

- ☐ Steep turn

Navigation

- ☐ Pilotage and DR
- ☐ Correct and record groundspeed, fuel burn, and heading calculations
- ☐ Navigation systems and radar services
- ☐ Lost procedures

Slow Flight and Stalls

- ☐ Maneuvering during slow flight
- ☐ Power off stall
- ☐ Power on stall
- ☐ Accelerated Stall
- ☐ Spin awareness (do not spin)

Emergency Operations

- ☐ Emergency equipment and survival gear
- ☐ Systems and equipment malfunctions
- ☐ Emergency descent
- ☐ Diversion

Multiengine Operations - OEI

- ☐ Engine failure (simulated) during takeoff prior to 50% of V_{mc}
- ☐ Engine failure (simulated) after liftoff and in the traffic pattern (> 500')
- ☐ Single engine (simulated) pattern and landing
- ☐ Engine failure or fire (simulated) in flight above V_{mc}
- ☐ Maneuvering with OEI (simulated) by reference to instruments
- ☐ V_{mc} demonstration
- ☐ Full engine shutdown and air start
- ☐ OEI (simulated) instrument approach

Postflight procedures

- ☐ After landing, parking, and securing

COMPLETION STANDARDS

The student must be able to perform all tasks on this lesson within current FAA commercial test standards, and he/she will be ready for the FAA Commercial Pilot AMEL checkride.

INTENTIONALLY
LEFT
BLANK

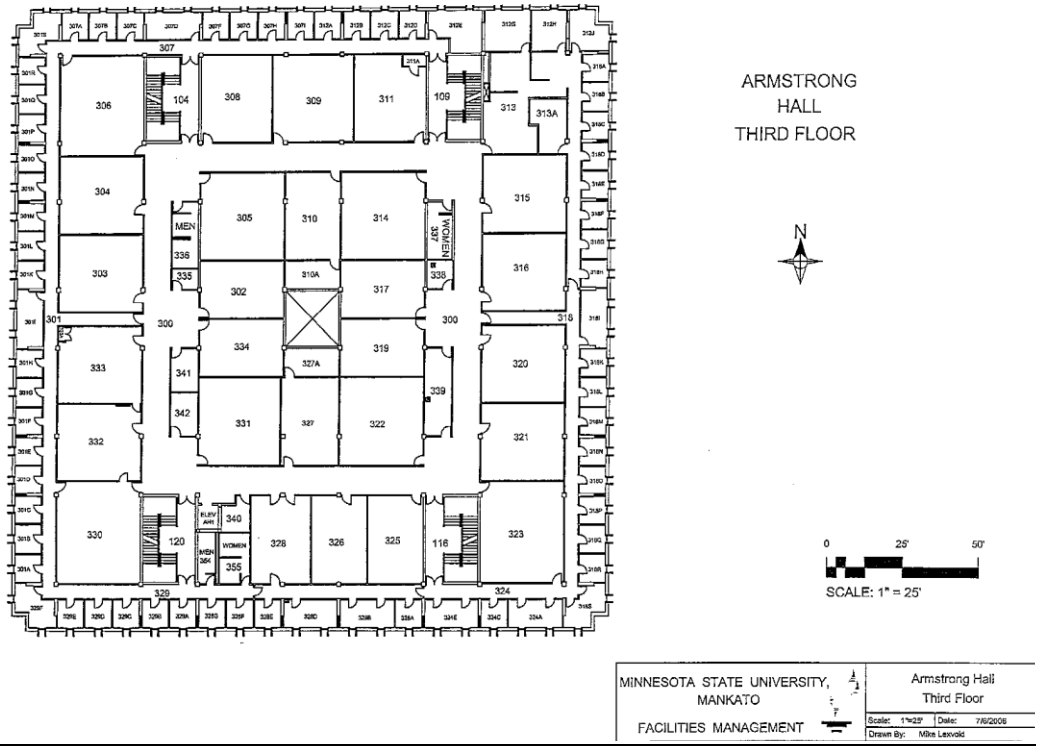
APPENDIX A
Ground Instruction Facilities

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.

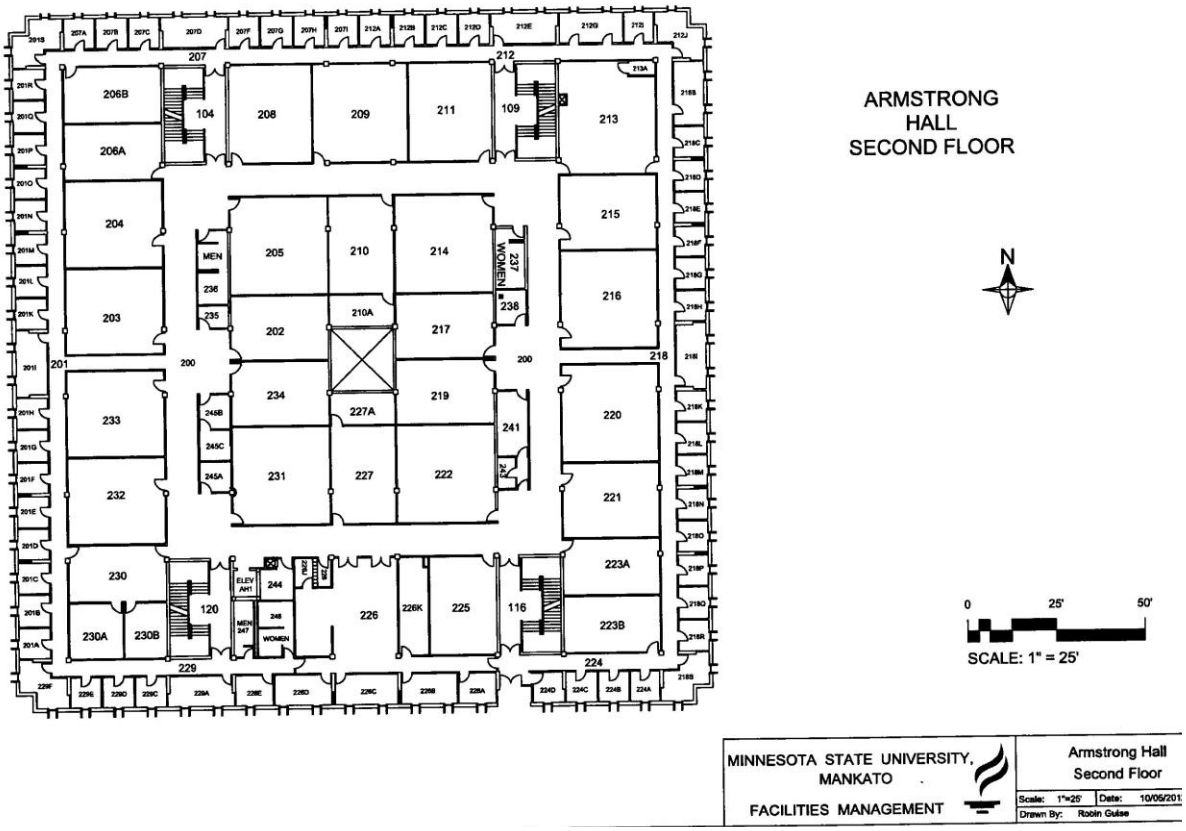
MNSU Armstrong Hall Room Capacity and Square Footage

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			

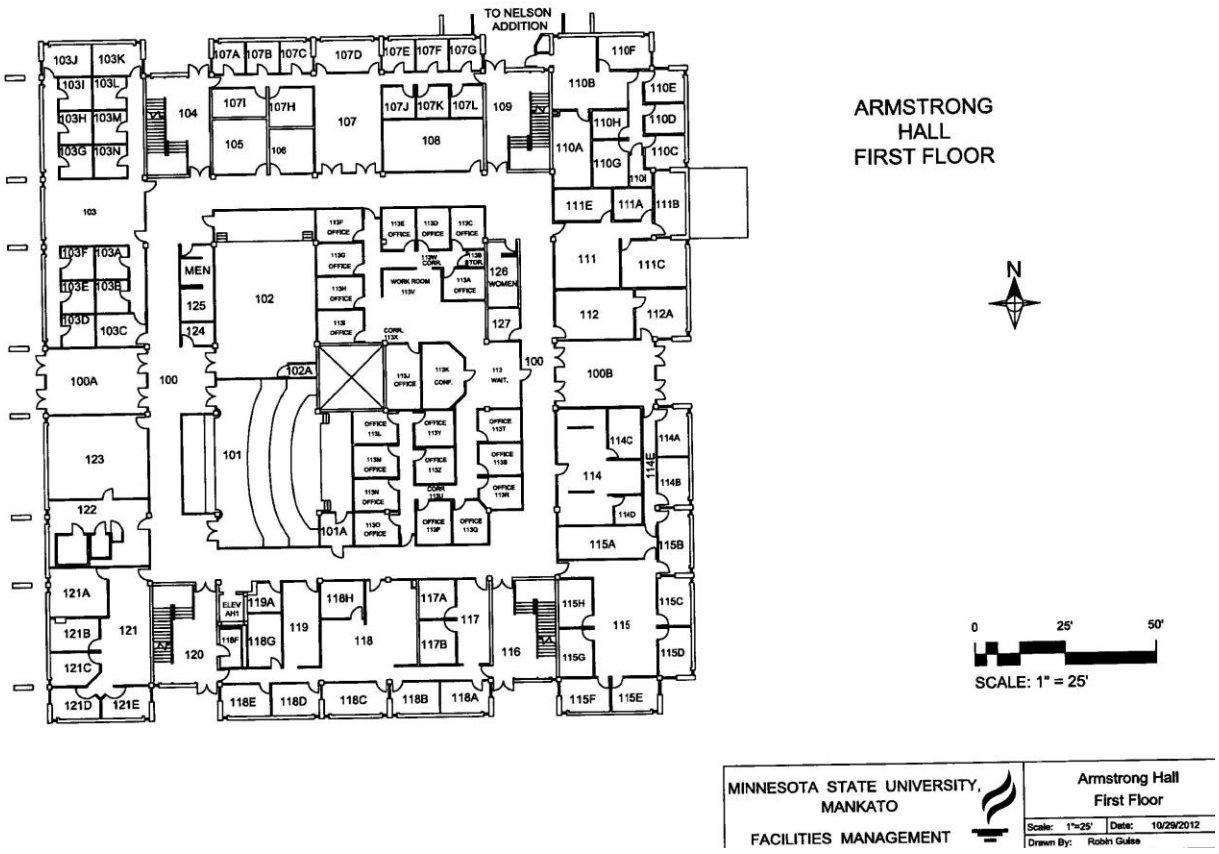
MNSU Armstrong Hall Room Third Floor



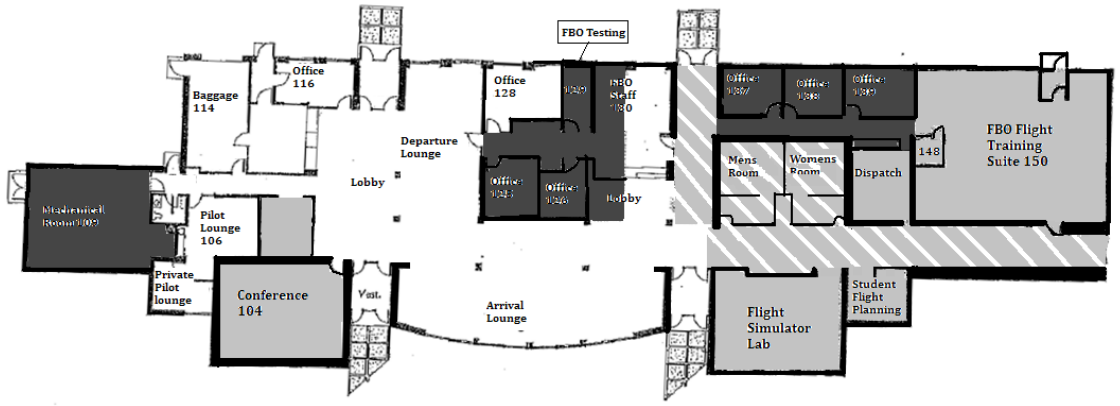
MNSU Armstrong Hall Room Second Floor



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

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 Makin

- 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
SVFR	Special Visual Flight Rules
T/O	Take Off
TAC	Terminal Area Chart
TACAN	Tactical Aircraft Control and Navigation
TAF	Terminal Area Forecast
TAS	True Airspeed
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
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