MRFTI, LLC

INSTRUMENT RATING
COURSE SYLLABUS (14 CFR PARTS 61 & 141)
CATEGORY: AIRPLANE

INTRODUCTION

The Instrument Rating Course is designed to coordinate the academic study assignments and flight training required by pilots operating in an increasingly complex aviation environment. New subject matter is introduced during the ground lessons and pre-flight orientations.

After completing the ground lesson, the student will apply these new principles in the Airplane during the subsequent flight lessons. Optimum effectiveness is realized when ground lessons are completed just prior to the respective flight lessons, as outlined in the syllabus. However, it is also acceptable to present lessons in a formal ground school before the student is introduced to airplane practice. If a considerable length of time has elapsed between the ground lesson and the associated flight, the instructor may wish to conduct a short review of essential material. One rule dictated by sound educational philosophy is that the flight lesson not be conducted until the related ground lesson has been completed.

In the flight syllabus, the content portion contains areas of operation which are italicized. Listed under the areas of operation are the tasks which should be emphasized for that flight. When no tasks are listed, the instructor should assign the tasks, as appropriate, for that area of operation. In particular for 14 CFR PART 61 students, additional lessons not outlined or a repeat of lessons covering areas of improvement should be utilized to reinforce proficiency and to meet the higher time requirements of 14 CFR PART 61.

COURSE IMPLEMENTATION

The Instrument Rating Syllabus is designed to fulfill the requirements of a Instrument Rating Course in accordance with 14 CFR PART 141, Appendix C. It is also utilized as a guideline for students pursuing a Private Pilot Certificate under 14 CFR PART 61. Adapting this syllabus to 14 CFR PART 61 training requires only a slight modification of individual flight lesson times to ensure that the applicant has the minimum 40 hours of instrument time. If you provide the 10 hours of dual cross-country recommended in this course, you must verify that the student has an additional 40 hours of cross-country PIC flight experience to meet the 14 CFR PART 61 50-hour requirement.

While the ground-training requirements under 14 CFR PART 141 require formal ground schooling, the requirements under 14 CFR PART 61 specify that an applicant for a knowledge test be required to have a logbook endorsement from an authorized instructor who conducted the training or reviewed the applicant's home study course. A home study course for the purposes of Part 61 is a course of study in the aeronautical knowledge areas specified in 14 CFR 61.65(b), and organized by a pilot school, publisher, flight or ground instructor, or by the student. The Jeppesen Instrument course easily satisfies this requirement. As a practical consideration, students seeking pilot certification under Part 61 should receive some formal ground training, either in the classroom or from an authorized flight or ground instructor.

COURSE OBJECTIVE

The student will obtain the knowledge, skill, and aeronautical experience necessary to meet the appropriate 14 CFR PART 61 or 14 CFR PART 141 requirements for an instrument airplane rating.

COURSE COMPLETION STANDARD

The student must compete all ground lessons and demonstrate through knowledge tests and show through appropriate records that he/she has the necessary knowledge to pass the FAA Instrument Airplane Knowledge Test. The student must complete all flight lessons demonstrate through flight tests and school records that the necessary aeronautical skill and experience requirements to obtain an instrument rating in the airplane category have been met.

COURSE MATERIALS

It is required that each student purchase a Jeppesen Instrument/Airplane Kit or provide their own copy of the included texts and tools. Besides note-taking supplies, the student should have the following materials:

1. *Jeppesen Guided Flight Discovery: Instrument/Commercial Manual*
2. *Jeppesen FAR/AIM*
3. *Jeppesen Instrument Airmen Knowledge Test Guide*
4. *Jeppesen Instrument Rating Practical Test Study Guide*
5. *Jeppesen Instrument Rating Practical Test Standards*
6. *Pilot Logbook [Not included in Jeppesen Instrument/Commercial Kit]*
7. *Plotter with IFR Chart scale [Not included in Jeppesen Instrument/Commercial Kit]*
8. *E6B Flight Computer [Not included in Jeppesen Instrument/Commercial Kit]*
9. *Timer (for Cross-Country Flights) [Not included in Jeppesen Instrument/Commercial Kit]*

USE OF OTHER TRAINING MATERIALS (14 CFR PART 61 ONLY)

For 14 CFR PART 61 students only, other brands of texts, study guides, practical test standards can be used. The instructor should be familiar with the layout of that particular brand's topics so that the student can be assigned the proper sections for each lesson's study and exercise assignments. Various handouts and video assignments are approved for all students.

USE OF A FLIGHT OR AVIATION TRAINING DEVICE (FTD/ATD) IN GROUND LESSONS

An ATD is an excellent classroom training tool that can assist an instructor in achieving specific instructional objectives. With an ATD, you can introduce many of the procedural aspects of flight in a ground-training phase. In addition to skill enhancement, the introduction of IFR procedures in the ATD has other advantages for both student and instructor. The advantages include fewer distractions, more versatility in lesson presentation, repositioning, freeze functions, emergency training, and the ability to control the environment of the training session and permit the student to concentrate on the areas that the instructor wants to emphasize. The use of an ATD is at the discretion of the school. Depending on the capabilities of the ATD, it is an appropriate teaching aid for the following ground lessons:

- Ground Lesson 3: Attitude Instrument Flying
- Ground Lesson 4: Instrument Navigation
- Ground Lesson 12: Holding
- Ground Lesson 16: VOR & NDB Approach
- Ground Lesson 17: ILS Approaches
- Ground Lesson 18: RNAV Approaches

USE OF A SIMULATOR, FTD, OR ATD IN FLIGHT LESSONS

Some flight training time required under 14 CFR PART 141, Appendix C, may be conducted in an approved simulator, flight training device (FTD), or aviation training device (ATD). The total time in all of these devices may not count toward more than 50 percent of the required flight training time. FTD and ATD time together may not count toward more than 40 percent of the required flight training time. ATD time may not count toward more than 10 percent of the required flight training time. The flight lessons that can be used for flight training time are as follows:

- Flight Lesson 2: Full Panel & IFR Systems
- Flight Lesson 4: Introduction to Partial Panel
- Flight Lesson 8: VOR Orientation
- Flight Lesson 10: NDB Orientation
- Flight Lesson 14: VOR/NDB Holding (Standard)
- Flight Lesson 18: VOR Approaches
- Flight Lesson 19: NDB Approaches
- Flight Lesson 20: ILS Approaches
- Flight Lesson 22: Review Holding and Approaches
- Flight Lessons 24: IFR Cross-Country Procedures

If you are not utilizing an airplane with a GPS on board, it is acceptable to utilize a PC simulator that recreates the interface of various GPS systems (for example, a Garmin G1000 simulator) to give your student some familiarity with these types of navigational systems. This training can be conducted during the post-flight briefing on the ground for any flight lesson that was intended to use a GPS system, although this is not a mandated requirement of this syllabus. Note that this ground simulator time cannot be logged as flight time in a logbook.

FLYING IN ACTUAL INSTRUMENT CONDITIONS AND UNDER INSTRUMENT RULES

Providing a student with real-world experience by allowing some flights to be conducted under actual IFR conditions and under Instrument Flight Rules is an excellent tool for building confidence and safety awareness. For flight lessons 17 and on, it is recommended to file an instrument flight plan for a local area practice flight, whether or not actual IFR conditions exist. The instructor should ensure that he or she is instrument current before doing so. Be advised that while flying under actual instrument conditions, the student cannot log time as pilot-in-command, so this must be considered when training under 14 CFR PART 61.

REQUIREMENTS FOR COURSE COMPLETION

All students must hold a current private pilot or commercial pilot certificate with an airplane rating to complete this course. For 14 CFR PART 141 students, they must meet the time requirements listed in the time table for dual and solo flight, and meet the aeronautical experience requirements under 14 CFR PART 141, Appendix C, to be eligible for course graduation. For 14 CFR PART 61 students, they must meet the current aeronautical experience requirements given under 14 CFR PART 61, Subpart B, to be eligible for course graduation. All students are still required to pass the checkride to earn instrument airplane privileges.

LESSON DESCRIPTIONS AND STAGES OF TRAINING

Each lesson is described in the syllabus, including objectives, standards, and units of accomplishment and learning. The stage objectives and standards for both ground and flight are described in the respective section of the syllabus.

TESTS AND CHECKS

The syllabus incorporates stage tests and end-of-course tests in accordance with 14 CFR FAR 141, Appendix C. The chief instructor is responsible for ensuring that each student accomplishes the required stage checks and end-of-course tests in accordance with the schools approved training course. However, the chief instructor may delegate authority for stage checks and end-of-course tests to the assistant chief or check instructor. The student also must complete stage exams, pilot briefings, and final examinations that are described within the syllabus. 14 CFR PART 61 students do not have to complete the stage 3 flight check, although it is highly recommended.

RECORDKEEPING

All record of training for this course are tracked in the Jeppesen *Instrument/Commercial Student Record* folder for that student. All information on the front should be completed and signed appropriately. Ground lesson topics are signed off as completed individually for each lesson. All flight training topics are graded individually for each flight the student conducts, both dual and solo. For dual flight lessons, the instructor should record a grade to each item covered and explain the reason for each grade. For solo flight, the student will self-evaluate in the same fashion. The results of all stage examinations and the *FAA Instrument Airplane Airmen Knowledge Test* should be recorded on the front of the *Instrument/Commercial Student Record* folder for that student.

CREDIT FOR PREVIOUS TRAINING

According to 14 CFR 141.77, when a student transfers from one FAA-approved school to another approved school, course credits obtained in the previous course of training may be credited for up to 50 percent of the curriculum requirements by the receiving school. However, the receiving school must determine the amount of credit to be allowed based upon a proficiency test or knowledge test, or both, conducted by the receiving school. A student who enrolls in a course of training may receive credit for 25 percent of the curriculum requirements for knowledge and experience gained in a non-FAA-approved flight school, and the credit must be based upon a proficiency test, a knowledge test, or both, and be conducted by the receiving school. The amount of credit for previous training allowed, whether received from an FAA-approved school or from another source, is determined by the receiving school. In addition, the previous provider of the training must certify the kind and amount of training given, and the result of each stage check and end-of-course test, if applicable.

TRAINING TIME TABLE

The following table outlines the total times for various types of flight and ground lessons, not including any time spent on pre/post-flight discussions or exam reviews (these times vary depending on the abilities and preparation of each student). These times meet 14 CFR PART 141, Appendix C, requirements. Note that students training under 14 CFR PART 61 must complete another 3.5 hours of total time to meet 14 CFR PART 61, Subpart B, requirements. These students should work with their instructor on what to cover to meet the time requirements or perform practice checkrides with your primary or designated check instructor to build time and prepare.

FLIGHT LESSONS				
	Dual			
Stage	Day Local	Day Cross Country	Actual or Simulated IFR/Hood	Simulator, FTD, or ATD
I	13.0	–	(13.0)	[4.0]
II	11.0	–	(11.0)	[5.0]
III	3.0	8.0	(11.0)	[1.0]
Totals	27.0	8.0	(35.0)	[10.0]

GROUND LESSONS			
Stage	Classroom	Exam	Simulator, FTD, or ATD
I	8.0	1.5	[2.0]
II	10.0	1.0	[3.0]
III	6.0	2.0	–
Totals	24.0	6.5	[5.0]

COURSE OUTLINE

This syllabus is presented first in both an overview and a lesson by lesson format. The combined flight and ground training includes the entire outline from Stage I through the completion of Stage III. The lesson sequence and content have been designed to provide the student with maximum academic and flight training prior to the introduction of new maneuvers or procedures. The sequence shown in the syllabus outline should not be altered when the coordinated program is utilized. If absolutely necessary, the placement of ground lesson assignments in the coordinated program may be changed to allow the student to progress more rapidly in his academic study than is outlined in the course. If this method is used, the student should not be allowed to progress into the ground lesson assignments of the next stage until he has completed the flights in the current stage of training. This is important, because the student's recall of academic knowledge decreases with an increase in time between subject introduction during ground training and its application in flight training. The SIM/FTD/ATD column indicates whether or not a ground lesson can incorporate a FTD/ATD or a flight lesson can replace actual flight time with the use of a simulator, FTD, or ATD.

Ground Lessons Stage I and Flight Lessons Stage I				
Lesson #	**Lesson Description**	**Ground Time**	**Flight Time**	**SIM/FTD/ATD**
GL 1	Training, Opportunities, & Human Factors	1.0 Classroom	–	–
GL 2	Flight Instrument Systems	1.0 Classroom	–	–
GL 3	Attitude Instrument Flying	1.0 Classroom		[1.0]
FL 1	Pre-flight Procedures & Full Panel	–	1.0 Dual Local (IR)	–
FL 2	Full Panel & IFR Systems	–	1.0 Dual Local (IR)	[1.0]
GL 4	Instrument Navigation	1.0 Classroom	–	[1.0]
FL 3	Review Full Panel	–	1.0 Dual Local (IR)	–
FL 4	Introduction to Partial Panel	–	1.0 Dual Local (IR)	[1.0]
GL 5	Instrument Rating Federal Aviation Regulations	1.0 Classroom	–	–
GL 6	Airports, Airspace, & Flight Information	1.0 Classroom	–	–
FL 5	Systems & Equipment Malfunctions	–	1.0 Dual Local (IR)	–
FL 6	Full & Partial Panel	–	1.0 Dual Local (IR)	–
GL 7	Air Traffic Control System	1.0 Classroom	–	–
FL 7	Review	–	1.0 Dual Local (IR)	–
GL 8	Air Traffic Control Clearances	1.0 Classroom	–	–
FL 8	VOR Orientation	–	1.0 Dual Local (IR)	[1.0]
GL 9	Stage I Exam	1.0 Exam	–	–
FL 9	VOR Navigation	–	1.0 Dual Local (IR)	–
FL 10	NDB Orientation	–	1.0 Dual Local (IR)	[1.0]
FL 11	Localizer Tracking	–	1.0 Dual Local (IR)	–
FL 12	VOR/NDB Tracking	–	1.0 Dual Local (IR)	–
FL 13	Stage I Flight Check	0.5 Exam (Oral)	1.0 Dual Local (IR)	–
	Section Totals	8.0 Classroom 1.5 Exam	13.0 Dual Local (IR)	[2.0] Ground [4.0] Flight

Ground Lessons Stage II and Flight Lessons Stage II				
Lesson #	**Lesson Description**	**Ground Time**	**Flight Time**	**SIM/FTD/ATD**
GL 10	Departure Charts & Procedures	1.0 Classroom	–	–
GL 11	Enroute Charts & Procedures	1.5 Classroom	–	–
GL 12	Holding	1.0 Classroom	–	[1.0]
FL 14	VOR/NDB Holding (Standard)	–	1.0 Dual Local (IR)	[1.0]
FL 15	VOR/NDB Holding (Nonstandard)	–	1.0 Dual Local (IR)	–
FL 16	Localizer/Intersection Holding	–	1.5 Dual Local (IR)	–
GL 13	Arrival Charts & Procedures	1.0 Classroom	–	–
GL 14	Approach Charts	1.5 Classroom	–	–
GL 15	Approach Procedures	1.0 Classroom	–	–
GL 16	VOR/NDB Approaches	1.0 Classroom	–	[1.0]
FL 17	VOR Approaches I	–	1.0 Dual Local (IR)	–
FL 18	VOR Approaches II	–	1.0 Dual Local (IR)	[1.0]
FL 19	NDB Approaches	–	1.0 Dual Local (IR)	[1.0]
GL 17	ILS Approaches	1.0 Classroom	–	[1.0]
FL 20	ILS Approaches	–	1.0 Dual Local (IR)	[1.0]
FL 21	Partial Panel Approaches	–	1.0 Dual Local (IR)	–
GL 18	RNAV Approaches	1.0 Classroom	–	–
FL 22	Review Holding & Approaches	–	1.0 Dual Local (IR)	[1.0]
GL 19	Stage II Exam	1.0 Exam	–	–
FL 23	Stage II Flight Check	0.5 Exam (Oral)	1.5 Dual Local (IR)	–
	Section Totals	10.0 Classroom 1.5 Exam	11.0 Dual Local (IR)	[3.0] Ground [5.0] Flight

Ground Lessons Stage III and Flight Lessons Stage III				
Lesson #	**Lesson Description**	**Ground Time**	**Flight Time**	**SIM/FTD/ATD**
GL 20	Weather Factors & Hazards	1.0 Classroom	–	–
GL 21	Printed Reports & Forecasts	1.0 Classroom	–	–
FL 24	IFR Cross-Country Procedures	–	1.0 Dual Cross-Country (IR)	[1.0]
GL 22	Graphic Weather Products	1.0 Classroom	–	–
FL 25	IFR Cross-Country	–	2.0 Dual Cross-Country (IR)	–
GL 23	Sources of Weather Information	1.0 Classroom	–	–
GL 24	IFR Emergencies	1.0 Classroom	–	–
GL 25	IFR Decision Making/Flight Planning	1.0 Classroom	–	–
FL 26	Long IFR Cross-Country	–	3.0 Dual Cross-Country (IR)	–
FL 27	IFR Cross-Country Review	–	2.0 Dual Cross-Country (IR)	–
GL 26	Stage III Exam	1.0 Exam	–	–
FL 28	Stage III Flight Check	0.5 Exam (Oral)	1.5 Dual Local (IR)	–
GL 27	End-of-Course Exam	1.0 Exam	–	–
FL 29	End-of-Course Flight Check	1.0 Exam (Oral)	1.5 Dual Local (IR)	–
	Section Totals	6.0 Classroom 3.5 Exam	3.0 Dual Local (IR) 8.0 Dual Cross-Country (IR)	[1.0] Flight

Course Totals	24.0 Classroom 6.5 Exam	27.0 Dual Local (IR) 8.0 Dual Cross-Country (IR)	[5.0] Ground [10.0] Flight

GROUND LESSONS

In accordance with 14 CFR PART 141, ground school training is an integral part of pilot certification courses. The ground training syllabus has been designed to meet this requirement and may be conducted concurrently with flight training. This is the most effective method for course utilization, because the academic knowledge is obtained immediately prior to its application during flight training. When the course is presented as a formal classroom program, lessons should be followed in numerical order as listed in the ground training segment of the syllabus. However, to provide a degree of flexibility for adapting to individual student needs and the training environment, the syllabus lessons may be altered with approval of the chief flight instructor. Any deviation should not disturb the course continuity or objective. Each lesson may be presented in one classroom session, or it may be divided into two sessions, as necessary.

USING THE GROUND LESSON

The ground lessons generally are divided into two sections: Lesson Introduction and Material Presentation/Class Discussion. During the introduction, the instructor should outline the subject material to be covered during the training session, the objective for learning that information, and the performance standards necessary for successful lesson completion.

Each ground lesson also includes a Study Assignment for the next lesson, with some of the lessons also including a Homework Assignment if necessary. Exercises are not required for 14 CFR PART 61 students, but are highly recommended. They are required for 14 CFR PART 141 students.

Upon the completion of each ground lesson topic, the appropriate lesson should be signed off in the *Instrument/Commercial Student Record* folder for that student.

KNOWLEDGE MANUAL & FAR/AIM

Prior to each ground lesson, the student should read and study the assigned textbook chapter and sections. The *Instrument/Commercial Manual* is comprehensive and well illustrated for easier study and understanding. It, along with other publications indicated by the Chief flight instructor, contains the information necessary to complete the academic stages of the Instrumenr Rating Syllabus. The *FAR/AIM* is used throughout the training as well, and should be read when assigned by the instructor.

MANUAL EXERCISES

The final step of each lesson is for the students to complete the appropriate questions in the manual (as homework or immediately) and discuss any incorrect responses with the instructor. This ensures student understanding of the subject material prior to beginning the next ground lesson. When the lesson is complete, the instructor assigns the next chapter for out-of-class reading. At the end of each ground training stage, the students are required to complete the stage exam successfully before entering the next stage.

STAGE GROUND EXAMS

At the end of each ground training stage, the students are required to complete the stage ground exam successfully before entering the next stage. The chief instructor should be aware of the results of each student. This gives the chief instructor the chance to check the effectiveness of the instructor(s).

END-OF-COURSE GROUND EXAM & FAA AIRMEN KNOWLEDGE TEST

When all of the appropriate ground lesson assignments are complete, the student will take the end-of-course ground exam and must obtain a minimum of 80% correct to avoid a retake requirement. The chief instructor should be aware of the results of each student. This gives the chief instructor the chance to check the effectiveness of the instructor(s). After a thorough review of the end-of-course exam material, the actual *FAA Instrument Airplane Airmen Knowledge Test* should be completed without delay.

GROUND STAGE I

During this stage, the student will learn about the principles of instrument flight, including the operation, use, and limitations of flight instruments and instrument navigation systems, and how the air traffic control system functions. Stage I also emphasizes advanced human factors and physiological factors directly related to instrument flight.

GROUND STAGE II

During this stage, the student will learn how to use instrument flight charts for IFR planning and flight. The student will also learn the procedures used to execute the various types of instrument approaches, as well as IFR departure, enroute, and arrival operations.

GROUND STAGE III

During this stage, the student will learn the procedures necessary for IFR cross-country operations. The student will also learn how to analyze weather data and make a Go/No-Go decision, as well as obtain an understanding of the physiological factors which can affect both pilot and passengers during instrument flight. Finally, the student will gain an insight into factors affecting single-pilot resource management.

GROUND LESSONS: STAGE I

GROUND LESSON 1: BUILDING PROFESSIONAL EXPERIENCE

- **Objective:** Review knowledge of private pilot privileges. Become familiar with advanced pilot training and opportunities. Gain an understanding of the advanced human factors concepts related to aviation.
- **References:**
  - → *Instrument/Commercial Manual* – Chapter 1: Building Professional Experience.
- **Content:**
  - → Course Overview
    - Course elements
    - Course materials
    - Exams and tests
    - Policies and procedures
    - Aviation Training Device (ATD Utilization)
    - Student/Instructor Expectations
    - Review Private Pilot Privileges and Limitations
  - → Instrument/Commercial Training and Opportunities
    - Instrument Flight
    - Instrument/Commercial Training
    - Commercial Pilot Privileges
    - Additional Certificates and Ratings
  - → Advanced Human Factors Concepts
    - Aeronautical Decision Making
    - Crew Resource Management
    - Single-Pilot Resource Management
    - The Decision-Making Process
    - Pilot-in-Command Responsibility
    - Communication
    - Workload Management
    - Situational Awareness
  - → Aviation Physiology
    - Spatial Disorientation
    - Vetibular Disorientation
    - Motion Sickness
    - Hypoxia
    - Prevention of Hypoxia
    - Decompression Sickness
    - Hyperventilation
    - Stress
    - Fatigue
    - Alcohol and Drugs
    - Fitness for Flight
- **Completion Standards.** The student will indicate, through oral quizzing, familiarity with instrument/commercial training, opportunities in aviation, human factors, and understanding of private pilot privileges. In addition, the instructor will make sure the student has a basic understanding of policies and procedures applicable to the school's pilot training program.
- **Study Assignment:** *Instrument/Commercial Manual* – Chapter 2, Section A: Flight Instrument Systems.

GROUND LESSON 2: FLIGHT INSTRUMENT SYSTEMS

- **Objective:** Gain a working knowledge of the function and use of the flight instrument components and systems. Become familiar with the limitatiosn and common errors of the flight instrument systems and components.
- **References:**
  - → *Instrument/Commercial Manual* – Chapter 2, Section A: Flight Instrument Systems.
- **Content:**
  - → Flight Instrument Systems
    - FAA Instrument Requirements
    - Pilot's Operating Handbook
  - → Gyroscopic Flight Instruments
    - System Operation
    - System Errors
    - Instrument Check
  - → Magnetic Compass
    - System Operation
    - System Errors
    - Instrument Check
  - → Pitot-Static Instruments
    - System Operation
    - System Errors
    - Instrument Check
    - V-Speeds and Color Codes
  - → Integrated Displays
    - Primary Flight Display (PFD)
    - Multifunction Display (MFD)
    - Malfunctiosn and Failures
- **Completion Standards:** Demonstrate understanding during oral quizzing by the instructor at completion of lesson.
- **Exercise Assignment:** Student completes Chapter 2 questions for Section A with a minimum passing score of 80%, and the instructor review incorrect responses to ensure complete understanding before the student progresses to Ground Lesson 3.
- **Study Assignment:** *Instrument/Commercial Manual* – Chapter 2, Section B: Attitude Instrument Flying.

GROUND LESSON 3: ATTITUDE INSTRUMENT FLYING [ATD OPTION]

- **Objective:** Review the basic principles of attitude instrument flying, including the fundamental procedures related to instrument cross-check, instrument interpretation, and aircraft control. Gain a working knowledge of the instrument cockpit check. Become familiar with instrument system failures and partial panel flight procedures.
- **References:**
  - → *Instrument/Commercial Manual* – Chapter 2, Section B: Attitude Instrument Flying.
- **Content:**
  - → Fundamental Skills
    - Instrument Cross-Check
    - Instrument Interpretation
    - Control and Performance Concept
    - Primary/Support Concept
    - Straight-and-Level Flight
    - Standard-Rate Turns
    - Steep Turns
    - Constant Airspeed Climbs
    - Constant Rate Climbs
    - Constant Airspeed Descents
    - Constant Rate Descents
    - Climbing and Descending Turns
    - Stalls
  - → Coping With Instrument Failure
    - Identifying an Instrument Failure
    - Attitude Indicator Failure
    - Heading Indicator Failure
    - Partial Panel Flying
    - Magnetic Compass Turns
    - Timed Turns
    - Pitot-Static Instrument Failures
  - → Unusual Attitude Recovery
    - Nose-High Attitude
    - Nose-Low Attitude
    - Partial Panel Unusual Attitude Recovery
  - → Introduction to the ATD (Option)
    - Orientation and Flight Familiarization
    - Overview of Physical and Virtual Controls
    - Aircraft Systems Related to IFR Operations
    - Instrument Cockpit Check
    - Full Panel Instrument Maneuvers
    - Partial Panel Instrument Considerations
- **Completion Standards:** Demonstrate understanding during oral quizzing by the instructor at completion of lesson.
- **Exercise Assignment:** Student completes Chapter 2 questions for Section B with a minimum passing score of 80%, and the instructor reviews incorrect responses to ensure complete understanding before progressing to Ground Lesson 4.
- **Study Assignment:** *Instrument/Commercial Manual* – Chapter 2, Section C: Instrument Navigation.

GROUND LESSON 4: INSTRUMENT NAVIGATION [ATD OPTION]

- **Objective:** Learn the function, use, and limitations of VOR, DME, and ADF radio equipment navigation aids (navaids). Understand the concept of area navigation (RNAV). Learn the function, use, and limitations of GPS navigation.
- **References:**
  - → *Instrument/Commercial Manual* – Chapter 2, Section C: Instrument Navigation.
- **Content:**
  - → VOR Navigation
    - Horizontal Situation Indicator
    - Intercepting & Tracking a Radial
    - Determining Your Progress
    - Time and Distance to a Station
    - Station Passage
    - VOR Limitations
    - Distance Measuring Equipment
    - DME Arcs
  - → ADF Navigation
    - Automatic Direction Finder
    - Radio Magnetic Indicator
    - Intercepting a Bearing
    - Tracking
  - → VOR and ADF Operational Considerations
    - Ground Facilities
    - VOR Checks
    - Identification
  - → Area Navigation (RNAV)
    - Flight Management Systems (FMS)
    - Inertial Navigation System (INS)
  - → GPS Navigation
    - Regulatory Requirements
    - Programming and Flying Routes
    - Course Deviation Indications
  - → ATD Option
    - VOR Orientation
    - Intercepting and Tracking a Radials, Bearings, and Courses
    - Intercepting and Tracking DME Arcs
    - NDB Orientation
    - GPS Programming
    - HSI and RMI Orientation
    - Integrated Display Orientation
- **Completion Standards:** Demonstrate understanding during oral quizzing by the instructor at completion of lesson.
- **Exercise Assignment:** Student completes Chapter 2 questions for Section C with a minimum passing score of 80%, and the instructor will review each incorrect response to ensure complete understanding before progressing to Ground Lesson 5.
- **Study Assignment:** *FAR/AIM* – Instrument FARs.

GROUND LESSON 5: INSTRUMENT FARs

- **Objective:** Become familiar with the Federal Aviation Regulations related to instrument flight. Understand the information from NTSB Part 830.
- **References:**
  - → *FAR/AIM* – Instrument FARs.
- **Content:**
  - → FAR Part 1
  - → FAR Part 61
  - → FAR Part 91
  - → NTSB Part 830
- **Completion Standards:** Demonstrate understanding during oral quizzing by the instructor at completion of lesson.
- **Exercise Assignment:** The student will complete the Instrument Rating (Airplane) Exercises in the *FAR/AIM* with a minimum passing score of 80%, and the instructor will review each incorrect response to ensure complete understanding before progressing to Ground Lesson 6.
- **Study Assignment:** *Instrument/Commercial Manual* – Chapter 3, Section A: Airports, Airspace, and Flight Information.

GROUND LESSON 6: AIRPORTS, AIRSPACE, AND FLIGHT INFORMATION

- **Objectives:** Study and become familiar with the airport environment, including collision avoidance and runway incursion avoidance. Gain specific knowledge of the National Airspace System. Gain a basic understanding of the sources of flight information, particularly the *Aeronautical Information Manual* and FAA Advisory Circulars dealing with IFR flight.
- **References:**
  - → *Instrument/Commercial Manual* – Chapter 3, Section A: Airports, Airspace, and Flight Information.
- Content:
  - → Airport Environment
    - Runway Markings
    - Taxiway Markings
    - Airport Signs
    - Runway Incursion Avoidance
    - Land and Hold Short Operations (LAHSO)
    - Approach Light System
    - Visual Glide Slope Indicators
    - Runway Lighting
    - Airport Beacons and Obstruction Lights
  - → Airspace
    - Controlled Airspace
    - Class A, B, C, D, and E Airspace
    - Special Use Airspace
    - Other Airspace Areas
    - ADIZ
  - → Flight Information
    - *Aeronautical Information Manual*
    - *Airport/Facility Directory*
    - Notices to Airman (NOTAMs)
    - *International Flight Information Manual*
    - Advisory Circulars
- **Completion Standards:** Demonstrate understanding during oral quizzing by the instructor at completion of lesson.
- **Exercise Assignment:** Student completes Chapter 3 questions for Section A with a minimum passing score of 80%, and the instructor reviews incorrect responses to ensure complete understanding before progressing to Ground Lesson 7.
- **Study Assignment:** *Instrument/Commercial Manual* – Chapter 3, Section B: Air Traffic Control System.

GROUND LESSON 7: AIR TRAFFIC CONTROL SYSTEM

- **Objectives:** Learn the types of services provided by the air traffic control system. Become familiar with the various enroute and terminal facilities and their use for flight under IFR.
- **References:**
  - → *Instrument/Commercial Manual – Chapter 3, Section B: Air Traffic Control System.*
- **Content:**
  - → Air Traffic Control System
    - Air Route Traffic Control Center
    - ARTCC Traffic Separation
    - Processing the IFR Flight Plan
    - Weather Information
    - Safety Alerts
    - Emergency Assistance
    - Terminal Facilities
    - ATIS
    - Clearance Delivery
    - Control Tower
    - Approach and Departure Control
    - Radar Service for VFR Aircraft
    - Flight Service Stations
- **Completion Standards:** Demonstrate understanding during oral quizzing by the instructor at completion of lesson.
- **Exercise Assignment:** Student completes Chapter 3 questions for Section B with a minimum passing score of 80%, and the instructor reviews incorrect responses to ensure complete understanding before progressing to Ground Lesson 8.
- **Study Assignment:** *Instrument/Commercial Manual* – Chapter 3, Section C: ATC Clearances.

GROUND LESSON 8: ATC CLEARANCES

- **Objectives:** Become familiar with ATC clearance procedures. Learn and gain experience using clearance shorthand.
- **References:**
  → *Instrument/Commercial Manual* – Chapter 3, Section C: ATC Clearances.
- **Content:**
  → ATC Clearances
    - Pilot Responsibilities
    - IFR Flight Plan and ATC Clearance
    - Elements of an IFR Clearance
    - Abbreviated IFR Departure Clearance
    - VFR on Top
    - Approach Clearances
    - VFR Restrictions to an IFR Clearance
    - Composite Flight Plan
    - Tower Enroute Control Clearance
    - Departure Restrictions
    - Clearance Readback
    - Clearance Shorthand
- **Completion Standards:** Demonstrate understanding during oral quizzing by the instructor at completion of lesson.
- **Exercise Assignment:** Student completes Chapter 3 questions for Section C with a minimum passing score of 80%, and the instructor reviews incorrect responses to ensure complete understanding before progressing to the Stage I Exam.
- **Study Assignment:** *Instrument/Commercial Manual* – Review Chapters 1, 2, and 3 and *FAR/AIM* – Review Instrument FARs in preparation for the Stage I Exam.

GROUND LESSON 9: STAGE I EXAM

- **Objectives:** Administer the Stage I Exam covering the first three chapters of the *Instrument/Commercial* textbook, the applicable FARs, and NTSB Part 830 rules
- **References:**
  - → *Instrument/Commercial Manual* – Chapters 1, 2, and 3.
  - → *FAR/AIM* - Instrument FARs.
- **Content:**
  - → Stage I Exam
    - Advanced Human Factors Concepts
    - Flight Instrument Systems
    - Attitude Instrument Flying
    - Instrument Navigation
    - Instrument FARs
    - Airports, Airspace, and Flight Information
    - Air Traffic Control System
    - ATC Clearances
- **Completion Standards:** The lesson and stage are complete when the student has completed the Stage I Exam with a minimum passing score of 80%, and the instructor has reviewed each incorrect response to ensure complete understanding before progressing to Stage II.
- **Study Assignment:** *Instrument/Commercial Manual* – Chapter 4, Departure.

GROUND LESSONS: STAGE II

GROUND LESSON 10: DEPARTURE

- **Objectives:** Learn the format and symbology used to present information on departure charts. Gain a working knowledge of departure procedures.
- **References:**
  - → *Instrument/Commercial Manual* – Chapter 4, Departure.
- **Content:**
  - → Departure Charts
    - Obtaining Charts
    - Departure Standards
    - Instrument Departure Procedures (DPs)
    - Obstacle Departure Procedures (ODPs)
    - Standard Instrument Departures (SIDs)
    - Pilot Nav SID
    - Vector SID
    - Chart Format and Symbology
  - → Departure Procedures
    - Takeoff Minimums
    - Departure Options
    - Graphic Departure Procedures
    - Textual Departure Procedures
    - Radar Departures
    - VFR Departures
    - Selecting a Departure Method
- **Completion Standards:** Demonstrate understanding during oral quizzing by the instructor at completion of lesson.
- **Exercise Assignment:** Student completes Chapter 4 questions for Sections A and B with a minimum passing score of 80%, and the instructor reviews incorrect responses to ensure complete understanding before progressing to Ground Lesson 11.
- **Study Assignment:** *Instrument/Commercial Manual* – Chapter 5, Section A: Enroute and Area Charts and Section B: Enroute Procedures.

GROUND LESSON 11: ENROUTE AND AREA CHARTS and ENROUTE PROCEDURES

- **Objectives:** Gain a working knowledge of enroute and area charts. Learn the symbology used to present information and the applicable procedures for IFR enroute operations.
- **References:** *Instrument/Commercial Manual* – Chapter 5, Section A: Enroute and Area Charts and Section B: Enroute Procedures.
- **Content:**
  - → Enroute and Area Charts
    - Enroute Charts
    - Front Panel
    - Navigation Aids
    - Victor Airways
    - Communication
    - Airports
    - Airspace
    - Area Charts
  - → Enroute Procedures
    - Enroute Radar Procedures
    - Communication
    - Reporting Procedures
    - Enroute Navigation Using GPS
    - Air Traffic Service Routes
    - Enroute RNP
    - Special Use Airspace
    - Temporary Flight Restrictions
    - IFR Cruising and Minimum Altitudes
    - Descending from the Enroute Segment
    - Reduced Vertical Separation Minimum
- **Completion Standards:** Demonstrate understanding during oral quizzing by the instructor at completion of lesson.
- **Exercise Assignment:** Student completes Chapter 5 questions for Sections A and B with a minimum passing score of 80%, and the instructor reviews incorrect responses to ensure complete understanding before progressing to Ground Lesson 12.
- **Study Assignment:** *Instrument/Commercial Manual* – Chapter 5, Section C: Holding Procedures.

GROUND LESSON 12: HOLDING PROCEDURES [ATD OPTION]

- **Objectives:** Gain a working knowledge of holding patterns including entry, timing, and communication.
- **References:**
  - → *Instrument/Commercial Manual* - Chapter 5, Section C — Holding Procedures.
- **Content:**
  - → Holding Procedures
    - Standard and Nonstandard Pattern
    - Outbound and Inbound Timing
    - Crosswind Correction
    - Maximum Holding Speed
    - Direct Entry
    - Teardrop Entry
    - Parallel Entry
    - Visualizing Entry Procedures
    - ATC Holding Instructions
    - ATD Option: Demonstrate Compliance with ATC Holding Instructions
    - Holding Entries
    - VOR, GPS, and NDB Holding
    - Standard and Nonstandard Holding
    - Wind Correction and Ground Track
- **Completion Standards:** Demonstrate understanding during oral quizzing by the instructor at completion of lesson.
- **Exercise Assignment:** Student completes Chapter 5 questions for Section C with a minimum passing score of 80%, and the instructor reviews incorrect responses to ensure complete understanding before progressing to Ground Lesson 13.
- **Study Assignment:** *Instrument/Commercial Manual* – Chapter 6, Arrival.

GROUND LESSON 13: ARRIVAL

- **Objectives:** Gain a working knowledge of arrival charts. Gain a working knowledge of arrival procedures and methods.
- **References:**
  - → *Instrument/Commercial Manual* – Chapter 6, Arrival.
- **Content:**
  - → Arrival Charts
    - Standard Terminal Arrival Route
    - Interpreting the STAR
    - Vertical Navigation Planning
  - → Arrival Procedures
    - Preparing for the Arrival
    - Reviewing the Approach
    - Altitude
    - Airspeed
- **Completion Standards:** Demonstrate understanding during oral quizzing by the instructor at completion of lesson.
- **Exercise Assignment:** Student completes Chapter 6 questions for Sections A and B with a minimum passing score of 80%, and the instructor reviews incorrect responses to ensure complete understanding before the student progresses to Ground Lesson 14.
- **Study Assignment:** *Instrument/Commercial Manual* – Chapter 7, Section A — Approach Charts.

GROUND LESSON 14: APPROACH CHARTS

- **Objectives:** The student will begin to learn how to interpret and use information published on instrument approach charts.
- **References:**
  - → *Instrument/Commercial Manual* – Chapter 7, Section A: Approach Charts.
- **Content:**
  - → Approach Segments
    - Initial Approach Segment
    - Intermediate Approach Segment
    - Final Approach Segment
    - Missed Approach Segment
  - → Chart Layout
    - Heading Section
    - Communications Section
    - Briefing Information
    - Minimum Safe Altitude
    - Plan View Feeder Routes
    - Profile View
    - Stepdown Fix and Visual Descent Point
    - Missed Approach Icons
    - Conversion/Time and Speed Table
    - Landing Minimums
    - Aircraft Approach Categories
    - Minimum Descent Requirements
    - Visibility Requirements
    - Inoperative Components
  - → Airport Chart
    - Heading and Communications Sections
    - Plan View and Additional Runway Information
    - Takeoff and Alternate Minimums
- **Completion Standards:** Demonstrate understanding during oral quizzing by the instructor at completion of lesson.
- **Exercise Assignment:** Student completes Chapter 7 questions for Section A with a minimum passing score of 80%, and the instructor reviews incorrect responses to ensure complete understanding before the student progresses to Ground Lesson 15.
- **Study Assignment:** *Instrument/Commercial Manual* – Chapter 7, Section B: Approach Procedures.

GROUND LESSON 15: APPROACH PROCEDURES

- **Objectives:** Learn the procedures used to transition from the enroute segment to the approach segment. Increase understanding and knowledge of approach procedures.
- **References:**
  - → *Instrument/Commercial Manual* – Chapter 7, Section B: Approach Procedures.
- **Content:**
  - → Approach Procedures
    - Preparing for the Approach
    - Approach Chart Review
    - Approach Clearance
    - Executing the Approach
    - Straight-In Approaches
    - Use of ATC Radar for Approaches
    - Approaches Which Require Course Reversal
    - Timed Approaches From a Holding Fix
    - Final Approach
    - Circling Approaches
    - Sidestep Maneuver
    - Missed Approach Procedures
    - Visual and Contact Approaches
- **Completion Standards:** Demonstrate understanding during oral quizzing by the instructor at completion of lesson.
- **Exercise Assignment:** Student completes Chapter 7 questions for Section B with a minimum passing score of 80%, and the instructor reviews incorrect responses to ensure complete understanding before the student progresses to Ground Lesson 16.
- **Study Assignment:** *Instrument/Commercial* – Chapter 8, Section A: VOR and NDB Approaches.

GROUND LESSON 16: VOR AND NDB APPROACHES [ATD OPTION]

- **Objectives:** Learn procedures and methods necessary to perform VOR and NDB approaches.
- **References:**
  - → *Instrument/Commercial* – Chapter 8, Section A: VOR and NDB Approaches.
- **Content:**
  - → VOR and NDB Approaches
    - VOR Approach Procedure
    - Off-Airport Facility
    - On-Airport Facility
    - VOR/DME Approach Procedure
    - Radar Vectors to the Approach
  - → ATD Option
    - VOR Approach Procedure
    - VOR Missed Approach Procedure
    - NDB Approach Procedure
    - NDB Missed Approach Procedure
- **Completion Standards:** Demonstrate understanding during oral quizzing by the instructor at completion of lesson.
- **Exercise Assignment:** Student completes Chapter 8 questions for Section A with a minimum passing score of 80%, and the instructor reviews incorrect responses to ensure complete understanding before the student progresses to Ground Lesson 17.
- **Study Assignment:** *Instrument/Commercial Manual* – Chapter 8, Section B: ILS Approaches.

GROUND LESSON 17: ILS APPROACHES [ATD OPTION]

- **Objectives:** Gain knowledge of ILS components and approach procedures.
- **References:**
  - → *Instrument/Commercial* – Chapter 8, Section B: ILS Approaches.
- **Content:**
  - → ILS Approaches
    - ILS Categories and Minimums
    - ILS Components
    - Inoperative Components
    - Flying the ILS
    - Straight-In (NoPT) ILS Approach
    - ILS Approach With a Course Reversal
    - ILS/DME Approach
    - Radar Vectors to ILS Final
    - ILS Approaches to Parallel Runways
    - Simultaneous Converging Instrument Approach
    - Localizer Approach
    - Localizer Back Course Approach
    - LDA, SDF, and MSL Approaches
  - → ATD Option
    - Localizer
    - Glideslope
    - ILS Marker Beacons
    - Compass Locators
    - Flying the ILS Approach
    - Nonradar ILS Procedures
    - Transition Via DME Arc
    - Localizer Approach and Back Course Approach
- **Completion Standards:** Demonstrate understanding during oral quizzing by the instructor at completion of lesson.
- **Exercise Assignment:** Student completes Chapter 8 questions for Section B with a minimum passing score of 80%, and the instructor reviews incorrect responses to ensure complete understanding before the student progresses to Ground Lesson 18.
- **Study Assignment:** *Instrument/Commercial Manual* – Chapter 8, Section C: RNAV Approaches.

GROUND LESSON 18: RNAV APPROACHES [ATD OPTION]

- **Objectives:** Become familiar with RBAV instrument approach systems and procedures.
- **References:**
  - → *Instrument/Commercial* – Chapter 8, Section C: RNAV Approaches.
- **Content:**
  - → RNAV Approaches
    - Approach Design
    - Terminal Arrival Area
    - Waypoints
    - Required Navigation Performance
    - GPS Approaches
    - LNAV/VNAV Approach Procedures
    - LPV Approach
    - GPS Equipment Requirements
    - Receiver Autonomous Integrity Monitoring (RAIM)
    - The Navigation Database
    - GPS Navigation Considerations
    - (RNAV) GPS Approach
    - Radar Vectors to a GPS Approach
- **Completion Standards:** Demonstrate understanding during oral quizzing by the instructor at completion of lesson.
- **Exercise Assignment:** Student completes Chapter 8 questions for Section C with a minimum passing score of 80% and the instructor reviews incorrect responses to ensure complete understanding before the student progresses to the Stage II Exam in Lesson 19.
- **Study Assignment:** *Instrument/Commercial Manual* – Review Chapters 4, 5, 6, 7, and 8 in preparation for the Stage II Exam.

GROUND LESSON 19: STAGE II EXAM

- **Objectives:** Administer the stage exam to evaluate the student's comprehension of enroute and terminal chart information, as well as the applicable procedures covered in chapters 4, 5, 6, 7, and 8.
- **References:**
  - → *Instrument/Commercial* – Chapters 4, 5, 6, 7, and 8.
- **Content:**
  - → Stage II Exam
    - Departure Charts and Procedures
    - Enroute Charts and Procedures
    - Holding Procedures
    - Arrival Charts and Procedures
    - Approach Charts and Procedures
    - VOR and NDB Instrument Approaches
    - ILS Approaches
    - RNAV Approaches
- **Completion Standards:** The lesson and stage are complete when the student has completed the Stage II Exam with a minimum passing score of 80%, and the instructor has reviewed each incorrect response to ensure complete understanding before the student progresses to Stage III.
- **Study Assignment:** *Instrument/Commercial Manual* – Chapter 9, Section A: Weather Factors and Section B: Weather Hazards.

GROUND LESSONS: STAGE III

GROUND LESSON 20: WEATHER FACTORS AND WEATHER HAZARDS

- **Objectives:** Become familiar with the factors affecting weather patterns and weather hazards related to flight operations.
- **References:**
  - → *Instrument/Commercial* – Chapter 9, Section A: Weather Factors and Section B: Weather Hazards.
- **Content:**
  - → Weather Factors
    - The Atmosphere
    - Atmospheric Circulation
    - Pressure and Wind Patterns
    - Moisture, Precipitation, and Stability
    - Types of Clouds
    - Airmass
    - Fronts
    - High Altitude Weather
  - → Weather Hazards
    - Thunderstorms
    - Thunderstorm Avoidance
    - Low Level Turbulence
    - Turbulence
    - Wake Turbulence
    - Clear Air Turbulence
    - Mountain Wave Turbulence
    - Reporting Turbulence
    - Wind Shear
    - Low Visibility
    - Volcanic Ash
    - Icing
    - Hydroplaning
    - Cold Weather Operations
- **Completion Standards:** Demonstrate understanding during oral quizzing by the instructor at completion of lesson.
- **Exercise Assignment:** Student completes Chapter 9 questions for Sections A and B with a minimum passing score of 80%, and the instructor reviews incorrect responses to ensure complete understanding before the student progresses to Ground Lesson 21.
- **Study Assignment:** *Instrument/Commercial Manual* – Chapter 9, Section C: Printed Reports and Forecasts.

GROUND LESSON 21: PRINTED REPORTS AND FORECASTS

- **Objectives:** Learn to retrieve and interpret printed weather reports and forecasts.
- **References:**
  - → *Instrument/Commercial Manual* – Chapter 9, Section C — Printed Reports and Forecasts.
  - → *GFD I/C Video* – Part III, Chapter 9, Section C.
- **Content:**
  - → Printed Reports and Forecasts
    - Aviation Routine Weather Report (METAR)
    - Radar Weather Reports
    - Pilot Weather Reports
    - Terminal Aerodrome Forecast
    - Aviation Area Forecast
    - Winds and Temperatures Aloft Forecast
    - Severe Weather Reports and Forecasts
- **Completion Standards:** Demonstrate understanding during oral quizzing by the instructor at completion of lesson.
- **Exercise Assignment:** Student completes Chapter 9 questions for Section C with a minimum passing score of 80%, and the instructor reviews incorrect responses to ensure complete understanding before the student progresses to Ground Lesson 22.
- **Study Assignment:** *Instrument/Commercial Manual* – Chapter 9, Section D: Graphic Weather Products.

GROUND LESSON 22: PRINTED REPORTS AND FORECASTS

- **Objectives:** Understand the information displayed on graphic weather products and how to use each product.
- **References:**
  - → *Instrument/Commercial Manual* – Chapter 9, Section D: Graphic Weather Products.
- **Content:**
  - → Graphic Reports
    - Surface Analysis Chart
    - Weather Depiction Chart
    - Radar Summary Chart
    - Satellite Weather Pictures
    - Composite Moisture Stability Chart
    - Constant Pressure Analysis Chart
  - → Graphic Forecasts
    - Low-Level Significant Weather Prog
    - High-Level Significant Weather Prog
    - Convective Outlook Chart
    - Forecast Winds and Temperatures Aloft Chart
    - National Convective Weather Forecast
    - Volcanic Ash Forecast Transport and Dispersion Chart
- **Completion Standards:** Demonstrate understanding during oral quizzing by the instructor at completion of lesson.
- **Exercise Assignment:** Student completes Chapter 9 questions for Section D with a minimum passing score of 80%, and the instructor reviews incorrect responses to ensure complete understanding before the student progresses to Ground Lesson 23.
- **Study Assignment:** *Instrument/Commercial Manual* – Chapter 9, Section E: Sources of Weather Information.

GROUND LESSON 23: SOURCES OF WEATHER INFORMATION

- **Objectives:** Learn how to access preflight and in-flight sources of weather information. Learn how to interpret and use weather information for planning and in-flight purposes.
- **References:**
  - → *Instrument/Commercial Manual* – Chapter 9, Section E: Sources of Weather Information.
- **Content:**
  - → Preflight Weather Sources
    - Flight Service Station
    - Preflight Weather Briefing
    - Telephone Information Briefing Service
    - Direct User Access Terminal System
    - Private Industry Sources
    - Internet Sources
  - → In-Flight Weather Sources
    - AIRMETs and SIGMETs
    - Convective SIGMETs
    - Enroute Flight Advisory Service
    - Flight Service
    - Center Weather Advisories
    - Hazardous In-Flight Weather Advisory Service
    - Weather Radar Services
    - Automated Surface Observing System (ASOS)
    - Automated Weather Observing System (AWOS)
  - → Airborne Weather Equipment
    - Weather Radar
    - Lightning Detection Systems
- **Completion Standards:** Demonstrate understanding during oral quizzing by the instructor at completion of lesson.
- **Exercise Assignment:** Student completes Chapter 9 questions for Section E with a minimum passing score of 80%, and the instructor reviews incorrect responses to ensure complete understanding before the student progresses to Ground Lesson 24.
- **Study Assignment:** *Instrument/Commercial Manual* – Chapter 10, Section A: IFR Emergencies.

GROUND LESSON 24: IFR EMERGENCIES

- **Objectives:** Learn to recognize emergency situations and perform the correct emergency procedures.
- **References:**
  - → *Instrument/Commercial Manual* – Chapter 10, Section A: IFR Emergencies.
- **Content:**
  - → IFR Emergencies
    - Declaring an Emergency
    - Minimum Fuel
    - Gyroscopic Instrument Failure
    - Communication Failure
    - Emergency Approach Procedures
    - Malfunction Reports
- **Completion Standards:** Demonstrate understanding during oral quizzing by the instructor at completion of lesson.
- **Exercise Assignment:** Student completes Chapter 10 questions for Section A with a minimum passing score of 80%, and the instructor reviews incorrect responses to ensure complete understanding before the student progresses to Ground Lesson 25.
- **Study Assignment:** *Instrument/Commercial Manual* – Chapter 10, Section B: IFR Decision Making and Section C: IFR Flight Planning.

GROUND LESSON 25: IFR DECISION MAKING AND FLIGHT PLANNING

- **Objectives:** Obtain the knowledge necessary to successfully plan an IFR flight and recognize the factors related to effective decision making.
- **References:**
  - → *Instrument/Commercial Manual* – Chapter 10, Section B: IFR Decision Making and Section C: IFR Flight Planning.
- **Content:**
  - → IFR Decision Making
    - Applying the Decision-Making Process
    - The IFR Accident
    - Poor Judgment Chain
    - Assessing Risk
    - Pilot-In-Command Responsibility
    - Hazardous Attitudes
    - Crew Relationships
    - Communication
    - Resource Use
    - Workload Management
    - Situational Awareness
    - Controlled Flight Into Terrain
  - → IFR Flight Planning
    - Flight Overview
    - Route Selection
    - Flight Information Publications
    - Weather Considerations
    - Altitude Selection
    - Completing the Navigation Log
    - Filing the Flight Plan
    - Closing the IFR Flight Plan
- **Completion Standards:** Demonstrate understanding during oral quizzing by the instructor at completion of lesson.
- **Exercise Assignment:** Student completes Chapter 10 questions for Sections B and C with a minimum passing score of 80%, and the instructor reviews incorrect responses to ensure complete understanding before the student progresses to Ground Lesson 26.
- **Study Assignment:** *Instrument/Commercial Manual* – Review Chapters 9 and 10 in preparation for the Stage III Exam.

GROUND LESSON 26: STAGE III EXAM

- **Objectives:** Administer the stage exam to evaluate the student's comprehension of the information in Chapters 9 and 10 covering weather factors, weather hazards, and sources of weather information, as well as decision making, IFR flight planning, and emergency procedures.
- **References:**
  → *Instrument/Commercial Manual* – Chapters 9 and 10.
- **Content:**
  → Stage III Exam
    - Meteorology
    - IFR Flight Considerations
- **Completion Standards:** The lesson and stage are complete when the student has completed the Stage III exam with a minimum passing score of 80%, and the instructor has reviewed each incorrect response to ensure complete understanding before the student progresses to the End-of-Course Exam.
- **Study Assignment:** *Instrument/Commercial Manual* – Review Chapters 1 through 10 and the *FAR/AIM* – Review Instrument FARs in preparation for the Instrument Rating End-of-Course Exam.

GROUND LESSON 27: END-OF-COURSE EXAM

- **Objectives:** Administer and evaluate the student's comprehension of academic material presented in Chapters 1 through 10 in preparation for the FAA Instrument Rating Airman Knowledge Test.
- **References:**
  - → *Instrument/Commercial Manual* – Chapters 1 through 10.
  - → *FAR/AIM* Instrument FARs.
- **Content:**
  - → Principles of Instrument Flight
  - → The Flight Environment
  - → Departure Charts and Procedures
  - → Enroute Charts and Procedures
  - → Arrival Charts and Procedures
  - → Approach Charts and Procedures
  - → Instrument Approaches
  - → Meteorology
  - → IFR Flight Considerations
- **Completion Standards:** The lesson and stage are complete when the student has completed the Instrument Rating End-of-Course Exam with a minimum of 80%, and the instructor has reviewed each incorrect response to ensure complete understanding before the student progresses to the FAA Instrument Rating Airman Knowledge Test.
- **Study Assignment:** Review the *Instrument/Commercial* textbook Chapters 1 – 10 in preparation for the FAA Instrument Rating Airman Knowledge Test.

FLIGHT LESSONS

The flight lessons in this course are divided into three stages, each providing an important segment of pilot training. Stage One will provide a strong foundation for flight under instrument rules. Stage Two introduces rules and procedures for conducting instrument navigation, approaches, and landings. Stage Three provides practice in procedural habits for safe instrument cross-country flights and develops the student's proficiency to pass the Instrument Rating Practical Test. Each stage builds on previous learning and, therefore, should be completed in sequence. However, to provide a degree of flexibility for adapting to individual student needs and the training environment, the syllabus lessons may be altered with approval of the chief flight instructor. Any deviation should not disturb the course continuity or objective.

PREFLIGHT ORIENTATION

Prior to each dual and solo flight, the instructor must provide the student with an overview of the subject matter to be covered during the lesson. Any maneuvers being introduced should be introduced on the ground prior to the beginning of the flight. It is important that the instructor define unfamiliar terms, explains the maneuvers and the objectives of each lesson, and also discuss human factors concepts related to each lesson. Each flight lesson contains information intended to provide a basis for the instructor's pre-flight overview.

AIRPLANE PRACTICE

Airplane practice must be conducted so that the student obtains the maximum benefit from each flight. Each dual flight should begin with a review of previously learned maneuvers and procedures before any new maneuvers are introduced.

POSTFLIGHT EVALUATION

After each flight, the student should be debriefed thoroughly. Noticeable advancement should be apparent and recommendations should be made for improvement where appropriate. This action is a valuable instructional technique because it increases retention and, to some degree, prepares the student for the next lesson. As a guide, approximately 10 to 30 minutes is recommended for pre-flight and post-flight briefings combined.

Upon the completion of each flight , the flight and maneuvers practices should be recorded and signed off in the *Instrument/Commercial Student Record* folder for that student.

STAGE FLIGHT CHECKS

At the end of each flight training stage, the students are required to complete a flight check successfully before entering the next stage. The chief instructor should conduct this check. However, the chief instructor may delegate authority for conducting stage flight checks to the assistant chief instructor or a designated check instructor. In any case, the chief instructor should be aware of the results of each student. This gives the chief instructor the chance to check the effectiveness of the instructor(s).

END-OF-COURSE CHECK & ORAL/PRACTICAL TEST

At the end of flight training, the students are required to complete a final flight check successfully before being authorized to take the Oral/Practical Test. The chief instructor should conduct this check. However, the chief instructor may delegate authority for conducting the flight checks to the assistant chief instructor or a designated check instructor. In any case, the chief instructor should be aware of the results of each student. This gives the chief instructor the chance to check the effectiveness of the instructor(s).

FLIGHT STAGE ONE

Stage I emphasizes basic IFR flight operations. The student will learn precise airplane attitude control by instrument reference and gain greater competence in the use of navigation systems. This stage is complete when the student can demonstrate precise airplane attitude control by full-panel and partial-panel instrument reference. In addition, the student will demonstrate accurate use of navigation systems by maintaining positional awareness at all times.

FLIGHT STAGE II

The objective of Stage II is to introduce and train the student in holding patterns and instrument approaches, including circling and missed approach procedures. The student will learn to correctly perform holding patterns and accurate instrument approaches using full-panel and partial-panel techniques. This stage is complete when the student can demonstrate accuracy and proficiency in holding patterns and all required instrument approach procedures.

FLIGHT STAGE III

The objective of Stage III is to introduce the student to IFR cross-country procedures and to increase the student's proficiency to the level required of an instrument rated pilot. This stage is complete when the student can demonstrate all IFR maneuvers and procedures at the proficiency level of an instrument rated pilot, as outlined in the current FAA instrument rating practical test standards.

FLIGHT LESSONS: STAGE I

FLIGHT LESSON 1:PRE-FLIGHT PROCEDURES & FULL PANEL

- **Objectives:** Become familiar with the instrument training airplane. Briefly review normal preflight, takeoff, and landing procedures. Practice attitude instrument flight with emphasis on precise aircraft control solely by instrument reference including basic instrument flight maneuvers.
- **References:**
  - → *Instrument/Commercial Manual* – Chapter 2, Section A:Flight Instrument Systems and Section B: Attitude Instrument Flying.
- **Content:**
  - → Preflight Preparation
    - Aircraft Certificates and Documents
    - Aircraft Logbooks
    - Airworthiness Requirements
    - Aircraft Performance
    - Aircraft Weight and Balance
    - Operation of Systems
    - Cockpit Resource Management
    - Use of Checklists
    - Positive Exchange of Flight Controls
    - Engine Starting
    - Collision Avoidance Procedures and CFIT
    - Controlled Flight Into Terrain (CFIT) Prevention
    - Normal and Crosswind Taxiing
    - Normal and Crosswind Takeoffs and Landings
    - Radio Communications and ATC Light Signals
    - Aeronautical Decision Making, Judgment, Flight Scenarios, Risk Management
    - Single-Pilot Resource Management
    - Runway Incursion
    - Situational Awareness
  - → Introduce

    <u>Full Panel Instrument</u>
    - Straight-and-Level Flight
    - Change of Airspeed
    - Standard-Rate Turns
    - Constant Airspeed Climbs
    - Climbing Turns
    - Constant Airspeed Descents
    - Descending Turns
    - Power-Off Stalls
    - Power-On Stalls
    - Maneuvering During Slow Flight
    - Recovery From Unusual Flight Attitudes
    - Operations in Turbulence
- **Completion Standards:** Takeoffs and landings will be conducted safely and at least at the private pilot proficiency level. During the flight the student will maintain altitude ±200 feet, heading ±15º and airspeed ±15 knots and bank angles within ±5º during turns.

FLIGHT LESSON 2: FULL PANEL & IFR SYSTEMS [ATD OPTION]

- **Objectives:** Review full panel instrument flying in preparation for partial panel flight. Introduce aircraft instrument systems, equipment, and preflight checks necessary for IFR flight.
- **References:**
  - → *Instrument/Commercial Manual* – Chapter 2, Section A:Flight Instrument Systems and Section B: Attitude Instrument Flying.
- **Content:**
  - → Review

    Full Panel Instrument
    - Straight-and-Level Flight
    - Change of Airspeed
    - Standard-Rate Turns
    - Constant Airspeed Climbs
    - Constant Airspeed Descents
  - → Introduce
    - Aircraft Systems Related to IFR Operations
    - Aircraft Flight Instruments and Navigation Equipment
    - Instrument Cockpit Check
    - IFR Takeoff Preparations
    - Steep Turns
    - Checking Instruments and Equipment at Engine Shutdown
    - Autopilot Use (if airplane is so equipped)
- **Completion Standards:** Demonstrate an understanding of and basic competence in full panel instrument attitude control. During the flight, the student will demonstrate understanding of aircraft attitude control by maintaining altitude ±200 feet, heading ±15º, airspeed ±15 knots, and bank angles within ±5º during turns. Display an understanding of the aircraft systems related to IFR operations and the importance of IFR preflight and takeoff preparations.

FLIGHT LESSON 3: REVIEW FULL PANEL

- **Objectives:** Review systems and equipment checks. Increase proficiency in full panel instrument flying.
- **References:**
  - → *Instrument/Commercial Manual* – Chapter 2, Section A:Flight Instrument Systems and Section B: Attitude Instrument Flying.
- **Content:**
  - → Review
    - Aircraft Systems Related to IFR Operations
    - Aircraft Flight Instruments & Navigation Equipment
    - Instrument Cockpit Check
    - Autopilot Use (if airplane so equipped)

      Full Panel Instrument
    - Straight-and-Level Flight
    - Constant Airspeed Climbs
    - Constant Airspeed Descents
    - Change of Airspeed
    - Standard-Rate Turns
    - Steep Turns
    - Power-Off Stalls
    - Power-On Stalls
    - Maneuvering During Slow Flight
    - Recovery From Unusual Flight Attitudes
    - Operations in Turbulence
- **Completion Standards:** The student will exhibit a basic understanding of systems and equipment related to IFR operations. The student will precisely control the airplane using full panel instrument reference. With minor exceptions, the student should be able to maintain altitude ±200 feet, heading within ±15º, airspeed within ±15 knots, and bank angles within ±5º during turns. Recognize the approach of stalls and demonstrate the correct recovery procedures from unusual flight attitudes.

FLIGHT LESSON 4: INTRODUCTION TO PARTIAL PANEL [ATD OPTION]

- **Objectives:** Review full panel instrument flight. Introduce partial panel attitude instrument flying including related systems and equipment malfunctions.
- **References:**
  - → *Instrument/Commercial Manual* – Chapter 2, Section A:Flight Instrument Systems and Section B: Attitude Instrument Flying.
- **Content:**
  - → Review
    - IFR Aircraft Systems
    - IFR Takeoff Preparations
    - Steep Turns
  - → Introduce
    - Electrical System Failure
    - Loss of Communications
    - Vacuum Pump Failure
    - Gyroscopic Instrument Failure
    - Pitot-Static Instrument Failure

      Partial Panel Instrument
    - Straight-and-Level Flight
    - Standard-Rate Turns
    - Change of Airspeed
    - Constant Airspeed Climbs
    - Constant Airspeed Descents
- **Completion Standards:** The student will begin to recognize and understand the effect of instrument systems and equipment malfunctions. Recognize the change in instrument crosscheck necessary to maintain aircraft control while using partial panel procedures.

FLIGHT LESSON 5: SYSTEMS & EQUIPMENT MALFUNCTIONS

- **Objectives:** Continue to review full and partial panel instrument flight. Become more familiar with related systems and equipment malfunctions. Introduce additional full/partial panel instrument maneuvers and procedures.
- **References:**
  - → *Instrument/Commercial Manual* – Chapter 2, Section A:Flight Instrument Systems and Section B: Attitude Instrument Flying.
- **Content:**
  - → Review:
    - Loss of Primary Flight Instrument Indicators
    - Loss of Communications

    <u>Partial Panel Instrument</u>
    - Straight-and-Level Flight
    - Standard-Rate Turns
    - Change of Airspeed
    - Constant Airspeed Climbs
    - Constant Airspeed Descents

    <u>Full Panel Instrument</u>
    - Steep Turns
    - Maneuvering During Slow Flight
    - Power-Off Stalls
    - Power-On Stalls
  - → Introduce

    <u>Full Panel Instrument</u>
    - Constant Rate Climbs
    - Constant Rate Descents
    - Timed Turns to Magnetic Compass Headings

    <u>Partial Panel Instrument</u>
    - Recovery From Unusual Flight Attitudes
    - Timed Turns to Magnetic Compass headings
    - Magnetic Compass Turns
    - Constant Rate Descents
- **Completion Standards:** Using partial panel instrument reference, the student will maintain altitude ±200 feet, heading ±15º, airspeed ±15 knots, and desired climb and descent rate ±150 feet per minute. Demonstrate a basic understanding of IFR systems operation and recognize systems and equipment malfunctions.

FLIGHT LESSON 6: FULL & PARTIAL PANEL

- **Objectives:** Further develop full and partial panel instrument attitude flying skills. Introduce partial panel stalls and maneuvering during slow flight.
- **References:**
  - → *Instrument/Commercial Manual* – Chapter 2, Section A:Flight Instrument Systems and Section B: Attitude Instrument Flying.
- **Content:**
  - → Review

    Full & Partial Panel Instrument
    - Straight-and-Level Flight
    - Constant Rate Climbs
    - Constant Airspeed Climbs
    - Constant Rate Descents
    - Constant Airspeed Descents
    - Timed Turns to Magnetic Compass Headings
    - Magnetic Compass Turns
    - Recovery From Unusual Flight Attitudes
  - → Introduce

    Partial Panel Instrument
    - Maneuvering During Slow Flight
    - Power-Off Stalls
    - Power-On Stalls
- **Completion Standards:** Using partial panel and full panel instrument reference, the student will recognize the typical indications of stalls, as well as perform recoveries without abrupt control usage. The student will perform correct recovery techniques from unusual attitudes, using full and partial panel instrument reference.

FLIGHT LESSON 7: REVIEW

- **Objective:** Enhance proficiency in the listed full panel attitude instrument maneuvers. Improve partial panel skills in stall recoveries, slow flight, and unusual attitude recoveries.
- **References:**
  - → *Instrument/Commercial Manual* – Chapter 2, Section A:Flight Instrument Systems and Section B: Attitude Instrument Flying.
- **Content:**
  - → Review

    Full Panel Instrument
    - Straight-and-Level Flight
    - Standard-Rate Turns
    - Constant Rate Climbs
    - Constant Airspeed Climbs
    - Constant Rate Descents
    - Constant Airspeed Descents
    - Power-Off Stalls
    - Power-On Stalls
    - Recovery From Unusual Flight Attitudes
    - Steep Turns

    Partial Panel Instrument
    - Maneuvering During Slow Flight
    - Power-Off Stalls
    - Power-On Stalls
    - Recovery From Unusual Flight Attitudes
- **Completion Standards:** Using full panel instrument reference, the student will maintain altitude ±150 feet, heading ±10º, airspeed ±15 knots, and desired descent and climb rate ±100 feet per minute. The student will perform correct recovery techniques from unusual attitudes using full and partial panel instrument reference. The student will use recovery techniques from stalls using full and partial panel instrument reference and positive control techniques with a minimum loss of altitude.
- **Study Assignment:** *Instrument/Commercial Manual* – Review Chapter 2, Section C: Instrument Navigation.

FLIGHT LESSON 8: VOR ORIENTATION [ATD OPTION]

- **Objectives:** Continue to develop proficiency in the basic listed attitude instrument maneuvers. Gain an understanding of VOR orientation as well as VOR radial interception and tracking.
- **References:**
  - → *Instrument/Commercial Manual* – Chapter 2, Section C: Instrument Navigation.
- **Content:**
  - → Review

    Partial Panel Instrument
    - Maneuvering During Slow Flight
    - Power-Off Stalls
    - Power-On Stalls
  - → Introduce
    - VOR Equipment Check
    - VOR Orientation
    - VOR Radial Interception and Tracking
    - Intercepting and Tracking DME Arcs (based on aircraft equipment)
- **Completion Standards:** Using full panel and partial panel instrument reference, the student will maintain altitude ±100 feet, heading ±10º, airspeed ±15 knots, and desired descent and climb rate ±100 feet per minute. The student will display basic knowledge of VOR radial interception and tracking.

FLIGHT LESSON 9: VOR NAVIGATION

- **Objectives:** Gain additional experience and understanding of VOR orientation and radial interception and tracking. Introduce ADF equipment and NDB procedures (based on aircraft equipment).
- **References:**
  - → *Instrument/Commercial Manual* – Chapter 2, Section C: Instrument Navigation.
- **Content:**
  - → Review
    - VOR Orientation
    - VOR Radial Interception and Tracking
    - Intercepting and Tracking DME Arcs (based on aircraft equipment)
  - → Introduce
    - NDB Orientation and Homing
    - NDB Bearing Interception and Tracking
- **Completion Standards:** The student will maintain altitude ±100 feet, heading ±10º, airspeed ±15 knots, and desired descent and climb rate ±100 feet per minute while performing the listed procedures. The student will demonstrate increased competency in basic VOR procedures and begin to understand ADF equipment and NDB procedures.

FLIGHT LESSON 10: NDB ORIENTATION [ATD OPTION]

- **Objectives:** Practice and gain proficiency in ADF navigation (based on aircraft equipment). Learn to program and use GPS equipment for IFR navigation (based on aircraft equipment).
- **References:**
  - → *Instrument/Commercial Manual* – Chapter 2, Section C: Instrument Navigation.
- **Content:**
  - → Review
    - NDB Orientation and Homing
    - NDB Bearing Interception and Tracking
  - → Introduce
    - GPS Preflight Check
    - GPS Programming
    - GPS Orientation
    - GPS Course Interception and Tracking
- **Completion Standards:** The student will demonstrate increased proficiency in all NDB navigation procedures. The student will exhibit understanding of basic GPS navigation procedures.

FLIGHT LESSON 11: LOCALIZER TRACKING

- **Objectives:** Continue to gain proficiency with GPS navigation (based on aircraft equipment). Introduce front and back course localizer tracking. Learn to interpret the CDI indications associated with the increased sensitivity of the localizer while tracking inbound on the front or back course.
- **References:**
  - → *Instrument/Commercial Manual* – Chapter 2, Section C: Instrument Navigation.
- **Content:**
  - → Review
    - GPS Preflight Check
    - GPS Programming
    - GPS Orientation
    - GPS Course Interception and Tracking
  - → Introduce
    - Localizer Tracking (Front Course)
    - Localizer Tracking (Back Course)
- **Completion Standards:** The student will demonstrate increased proficiency in GPS navigation. The student should maintain heading ±10º and altitude ±100 feet. The student will begin to understand localizer tracking.

FLIGHT LESSON 12: VOR/NDB TRACKING

- **Objectives:** Increase proficiency in basic attitude instrument flight procedures. Introduce VOR, GPS, NDB, and localizer navigation using partial panel.
- **References:**
  - → *Instrument/Commercial Manual* – Chapter 2, Section C: Instrument Navigation.
- **Content:**
  - → Review

    Full Panel Instrument
    - Localizer Tracking (Front Course)
    - Localizer Tracking (Back Course)

    Full and Partial Panel Instrument
    - Timed Turns to Magnetic Compass Headings
    - Magnetic Compass Turns
    - Straight-and-Level Flight
    - Standard-Rate Turns
    - Climbs
    - Descents
    - Power-Off Stalls
    - Power-On Stalls
    - Recovery From Unusual Flight Attitudes
  - → Introduce

    Partial Panel Instrument
    - VOR Navigation
    - GPS Navigation
    - NDB Navigation
    - Localizer Navigation
- **Completion Standards:** The student will demonstrate accurate VOR, GPS, NDB, and localizer navigation in full panel and partial panel situations. Using partial panel and full panel instrument reference, the student will maintain altitude ±100 feet, heading ±10º, airspeed ±15 knots, and desired descent and climb rate ±100 feet per minute. The student will perform correct recovery techniques from unusual attitudes using full and partial panel instrument reference. The student will demonstrate the correct recovery techniques from stalls using positive control techniques with a minimums loss of altitude.
- **Study Assignment:** Review, as required, in preparation for the Stage I Flight Check in Flight Lesson 13.

FLIGHT LESSON 13: STAGE I FLIGHT CHECK

- **Objectives:** The chief instructor, assistant chief, or a designated check instructor will evaluate the student's proficiency in attitude instrument flight and navigation to ensure the student is prepared for more complex instrument flying procedures.
- **References:**
  - → *Instrument/Commercial Manual* – Chapter 2.
- **Content:**
  - → Preflight Discussion
    - Stage I Oral Evaluation
    - Aircraft Systems Related to IFR Operations
    - Aircraft Flight Instrument and Navigation Equipment
    - Instrument Cockpit Check
    - IFR Takeoff Preparations
  - → Review
    - Stage I Flight Evaluation (Full And Partial Panel Instrument)
    - Steep Turns
    - Straight-and-Level Flight
    - Constant Rate Climbs and Descents
    - Constant Airspeed Climbs and Descents
    - Standard-Rate Turns
    - Recovery From Unusual Flight Attitudes
    - Timed Turns to Magnetic Compass Headings
    - Magnetic Compass Turns
    - Maneuvering During Slow Flight
    - Power-Off Stalls
    - Power-On Stalls
    - VOR Navigation
    - GPS Navigation
    - NDB Navigation
    - Localizer Navigation
- **Completion Standards:** The student will demonstrate accurate VOR, GPS, NDB, and localizer navigation at all times. The student will perform correct recovery techniques from unusual attitudes using full and partial panel instrument reference. The student will use recovery techniques from stalls using positive control techniques with a minimum loss of altitude. Using full panel and partial panel instrument reference, the student will maintain altitude ±100 feet, heading ±10º, airspeed ±15 knots, and desired descent and climb rate ±100 feet per minute.
- **Study Assignment:** *Instrument/Commercial Manual* – Chapter 5, Section C: Holding Procedures.

FLIGHT LESSONS: STAGE II

FLIGHT LESSON 14: VOR/NDB HOLDING (STANDARD) [ATD OPTION]

- **Objectives:** Review instrument systems and equipment malfunctions. The student should become familiar with VOR standard and nonstandard holding patterns. The student should become familiar with GPS and/or NDB (based on aircraft equipment) standard and nonstandard holding patterns.
- **References:**
  - → *Instrument/Commercial Manual* – Chapter 5, Section C: Holding Procedures.
- **Content:**
  - → Review
    - Systems and Equipment Malfunctions
    - Full and Partial Panel Instrument Flight
  - → Introduce
    - VOR Holding
    - NDB Holding
    - GPS Holding
    - Standard Holding
- **Completion Standards:** The student will demonstrate a basic understanding and proficiency in performing VOR, GPS, and/or NDB (based on aircraft equipment) holding pattern procedures. The student should maintain orientation at all times during both standard and nonstandard holding procedures.

FLIGHT LESSON 15: VOR/NDB HOLDING (NONSTANDARD)

- **Objectives:** The student should demonstrate increased proficiency in performing VOR, GPS, and/or NDB (based on aircraft equipment) holding patterns. Introduce standard and nonstandard localizer holding procedures.
- **References:**
  - → *Instrument/Commercial Manual* – Chapter 5, Section C: Holding Procedures.
- **Content:**
  - → Review
    - VOR Holding
    - GPS Holding
    - NDB Holding
  - → Introduce
    - Localizer Holding
    - Nonstandard Holding
- **Completion Standards:** The student will demonstrate the necessary skill and knowledge to perform the correct holding pattern entries and procedures for standard and nonstandard VOR, GPS, and/or NDB (based on aircraft equipment) holding patterns. The student will exhibit basic understanding and ability to fly standard and nonstandard localizer holding patterns using the appropriate entry, timing, and wind correction procedures.

FLIGHT LESSON 16: LOCALIZER/INTERSECTION HOLDING

- **Objectives:** The student will review the holding procedures introduced in previous lessons. The student will also be introduced to DME (based on aircraft equipment) and intersection holding patterns.
- **References:**
  → *Instrument/Commercial Manual* – Chapter 5, Section C: Holding Procedures.
- **Content:**
  → Review
    - VOR Holding
    - NDB Holding
    - GPS Holding
    - Localizer Holding
- **Introduce:**
    - DME Holding
    - Intersection Holding
- **Completion Standards:** The student will exhibit the ability to perform to correct holding pattern entries and procedures for intersection and DME (based on aircraft equipment) holding patterns. The student should maintain the desired altitude ±100 feet, assigned airspeed ±10 knots and headings ±10º, within ¾ scale deflection of the CDI during the hold.
- **Study Assignment:** *Instrument/Commercial Manual* – Chapter 7, Section A: Approach Charts, Section B: Approach Procedures, plus Chapter 8, Section A: VOR and NDB Approaches, and Section C: RNAV Approaches.

FLIGHT LESSONS 17: VOR APPROACHES I

- **Objectives:** Review previously learned holding pattern procedures and systems/equipment malfunctions. Familiarize the student with VOR approach procedures and missed approach planning.
  Note: The instructor and student must keep in mind FAR 61.1(b)(9) which states an instrument approach means an approach procedure defined in Part 97 of the Federal Aviation Regulations. If the training airplane is DME-equipped, the syllabus listings for VOR approaches may include VORTAC approaches or VOR-DME approaches.
- **References:**
  - → *Instrument/Commercial Manual* – Chapter 7, Section A: Approach Charts, Section B: Approach Procedures, and Chapter 8, Section A: VOR and NDB Approaches.
- **Review:**
  - Holding Procedures
  - Systems and Equipment Malfunction
- **Introduce:**
  - VOR Approaches
  - Approach Procedures to Straight-In Landing Minimums
  - Missed Approach Procedures
- **Completion Standards:** Demonstrate proficiency in the review maneuvers and procedures. The student also should be able to: (1) Explain and use the information displayed on the approach charts. (2) Execute several initial and intermediate approach segments to arrive at the final approach fix. (3) Complete the final approach and let down to the missed approach fix. (4) Demonstrate the missed approach procedure as appropriate to the published chart used.
- **Study Assignment:** *Instrument/Commercial Manual* – Chapter 8, Section C: RNAV Approaches.

FLIGHT LESSONS 18: VOR APPROACHES II [ATD OPTION]

- **Objectives:** Begin to develop proficiency in VOR approach procedures and missed approach planning. Familiarize the student with GPS and/or NDB (based on aircraft equipment) approach procedures. Introduce procedures for completing a circling approach and landing from a straight-in or circling approach.
- **References:**
  - → *Instrument/Commercial Manual* – Chapter 7, Section A: Approach Charts, Section B: Approach Procedures, plus Chapter 8, Section A: VOR and NDB Approaches, and Section C: RNAV Approaches.
- **Review:**
  - VOR Approaches
  - Approach Procedures to Straight-In Landing Minimums
  - Missed Approach Procedures
- **Introduce:**
  - GPS Approaches
  - NDB Approaches
  - Landing From a Straight-In or Circling Approach Procedure
  - Approach Procedures to Circling Landing Minimums
  - Visual Descent Point
  - Land and Hold Short Operations
- **Completion Standards:** The student will maintain an altitude of ±200 feet on the initial and intermediate approach segments. On the final approach segment the student should maintain heading ±10º and allow less than ¾ scale deflection of the CDI, airspeed ±10 knots, and altitude that is not more than 100 feet above and 0 feet below the MDA.

FLIGHT LESSONS 19: NDB APPROACHES [ATD OPTION]

- **Objectives:** Begin to develop proficiency in VOR approach procedures and missed approach planning. Familiarize the student with GPS and/or NDB (based on aircraft equipment) approach procedures. Introduce procedures for completing a circling approach and landing from a straight-in or circling approach.
- **References:**
  - → Instrument/Commercial Manual – Chapter 7, Section A: Approach Charts, Section B: Approach Procedures, plus Chapter 8, Section A: VOR and NDB Approaches, and Section C: RNAV Approaches.
- **Review:**
  - GPS Approaches
  - NDB Approaches
  - Approach Procedures to Straight-In Landing Minimums
  - Missed Approach Procedures
  - Approach Procedures to Circling Landing Minimums
  - Landing From a Straight-In or Circling Approach Procedure
  - Visual Descent Point
  - Land and Hold Short Operations
- **Completion Standards:** The student will maintain an altitude of ±200 feet on the initial and intermediate approach segments. On the final approach segment the student should maintain heading ±10º and allow less than ¾ scale deflection of the CDI, airspeed ±10 knots, and altitude that is not more than 100 feet above and 0 feet below the MDA.
- **Study Assignment:** *Instrument/Commercial Manual* – Chapter 8, Section B: ILS Approaches.

FLIGHT LESSON 20: ILS APPROACHES [ATD OPTION]

- **Objectives:** Improve proficiency VOR, GPS, and NDB approaches. Become familiar with ILS approach procedures.
- **References:**
  → Instrument/Commercial Manual – Chapters 7 and 8.
- **Review:**
  - Intercepting and Tracking DME Arcs (based on aircraft equipment)
  - VOR Approaches
  - Missed Approach Procedures
- **Introduce:**
  - Precision Approach (PA) Procedures
  - ILS Approaches
  - Front and Back Course Localizer Approaches
- **Completion Standards:** The student should exhibit knowledge of front and back course localizer approach procedures while maintaining specific descent rates and altitudes. During ILS approaches, the student should demonstrate localizer tracking, intercepting and maintaining the glide slope, and using power and attitude changes to control airspeed and descent rates.

FLIGHT LESSON 21: PARTIAL PANEL APPROACHES

- **Objectives:** Review full panel instrument approach procedures for precision and non-precision approaches. Introduce the student to procedure for an approach with a loss of the primary flight instrument indicators. Introduce the student to no-gyro radar vectoring and approach procedures.
- **References:**
  → Instrument/Commercial Manual – Chapters 7 and 8.
- **Review:**
  - VOR Approaches
  - GPS Approaches
  - NDB Approaches
  - ILS Approaches
  - Localizer Approaches
  - Landing From a Straight-In or Circling Approach Procedure
  - Intercepting and Tracking DME Arcs (based on aircraft equipment)
  - Visual Descent Point
  - Land and Hold Short Operations
- **Introduce:**
  - Approaches with Loss of Primary Flight Instrument Indicators
  - Approach with Loss of Primary Flight Instrument Indicators
  - No gyro radar vectoring and approach procedures
  - Partial panel non-precision approach procedures
  - Partial panel precision approach procedures
  - Missed Approach Procedure with Loss of Primary Flight Instrument Indicators
- **Completion Standards:** During the ILS approaches, the student should demonstrate accurate localizer interception and tracking and make a transition to the glide slope at the correct point. The glide slope and localizer should be maintained with no more than three quarter-scale needle deflection. During the non-precision approaches, the student should maintain an altitude ±200 feet on the initial and intermediate approach segments. On the final approach segment, the student should maintain an altitude that is not more than 100 feet above the MDA. The student will exhibit understanding of the procedures used to perform no-gyro radar vectoring and approaches and partial panel approach and missed approach procedures.

FLIGHT LESSON 22: REVIEW HOLDING & APPROACHES [ATD OPTION]

- **Objectives:** The student should review instrument approach procedures as well as holding pattern entries and procedures in preparation for the stage exam.
- **References:**
  → *Instrument/Commercial Manual* – Chapter 5, Section C: Holding Procedures and Chapters 7 and 8.
- **Review:**
  - VOR Holding
  - GPS Holding
  - NDB Holding
  - Localizer Holding
  - VOR, ILS, NDB Approaches
  - VOR Approaches
  - GPS Approaches
  - NDB Approaches
  - ILS Approaches
  - Localizer Approaches
  - Missed Approach Procedure
  - Approach with loss of Primary Flight Instrument Indicators
  - No-Gyro Radar Vectoring and Approach Procedures
  - Partial Panel Non-precision and Precision Approaches
- **Completion Standards:** The student will demonstrate proficiency in all holding and approach procedures in preparation for the Stage II Check.
- **Study Assignment:** *Instrument/Commercial Manual* – Chapter 5, Section C: Holding Procedures and Chapters 7 and 8 in preparation for the Stage II Flight Check.

FLIGHT LESSON 23: STAGE II FLIGHT CHECK

- **Objectives:** The chief instructor, assistant chief, or a designated check instructor will evaluate the student's proficiency in the proper execution of holding patterns and instrument approach procedures.
- **References:**
  → *Instrument/Commercial Manual* – Chapter 5, Section C: Holding Procedures and Chapters 7 and 8.
- **Review:**
  - VOR Holding
  - GPS Holding
  - NDB Holding
  - Localizer Holding
  - Intersection and DME Holding
  - VOR Approaches
  - GPS Approaches
  - NDB Approaches
  - ILS Approaches
  - Localizer Approaches
  - Approach Procedures to Straight-In Landing Minimums
  - Approach Procedures to Circling Landing Minimums
  - Missed Approach Procedure
  - Approach with loss of Primary Flight Instrument Indicators
  - Land and Hold Short Operations
- **Completion Standards:** The student should demonstrate instrument pilot proficiency, as outlined in the correct FAA Instrument Rating practical Test Standards, in each of the listed procedures.
- **Study Assignment:** *Instrument Commercial Manual* – Chapters 3, 4, 5, and 6, plus Chapter 9, Section A: Weather Factors, Section B: Weather Hazards, Section C: Printed Reports & Forecasts.

FLIGHT LESSONS: STAGE III

FLIGHT LESSON 24: IFR CROSS-COUNTRY PROCEDURES [ATD OPTION]

- **Objectives:** The student should be introduced to IFR cross-country procedures by conducting an IFR cross-country over 50 nautical miles from the original point of departure with an emphasis on planning and departure procedures. The student should develop an understanding of the appropriate emergency procedures for enroute IFR operations.
- **References:**
  - → *Instrument Commercial Manual* – Chapters 3, 4, 5, and 6, plus Chapter 9, Section A: Weather Factors, Section B: Weather Hazards, Section C: Printed Reports & Forecasts.
- **Review:**
  - → Approach Procedures
    - VOR Approaches (As Needed)
    - GPS Approaches (As Needed)
    - NDB Approaches (As Needed)
    - ILS Approaches (As Needed)
    - Missed Approach Procedures
    - Partial Panel Approaches
- **Introduce:**
  - → IFR Cross-Country Flight Planning
    - Weather Information Related to IFR Cross-Country Flight
    - Aircraft Performance, Limitation, and Systems Related to IFR Cross Country
    - Enroute Chart Interpretation
    - Navigation Log and Flight Plan Completion
    - Filing an IFR Flight Plan
  - → ATC Clearance
    - Clearance Copying and Readback
    - Departure Procedures and Clearances
    - Use of SIDs and ODPs
  - → IFR Cross-Country Flight
    - VOR Enroute Navigation
    - GPS Enroute Navigation (based on aircraft equipment)
    - Calculating ETEs and ETAs
    - Use of Radar
    - Radio Communications
    - Enroute Procedures and Clearances
    - Arrival Procedures and Clearances
    - Use of Standard Terminal Arrivals (STARs)
    - Holding
    - Canceling an IFR Flight Plan
    - Single-Pilot-Resource Management
    - Aeronautical Decision Making
  - → Simulated Emergency Procedures
    - Loss of Communications
    - Loss of Primary Flight Instrument Indicators
    - Partial Panel Flight
    - Systems and Equipment Malfunctions
    - Airframe and Powerplant Icing

- Turbulence
- Diversion
- Low Fuel Supply
- Engine Failure

- **Completion Standards:** The student will exhibit knowledge of the procedures involved in cross-country planning, filing IFR flight plans, and obtaining IFR clearances. The student will demonstrate a basic understanding of the various emergency procedures.
- **Study Assignment:** *Instrument Commercial Manual* – Chapter 9, Section D: Graphic Weather Products.

FLIGHT LESSON 25: IFR CROSS-COUNTRY

- **Objectives:** Perform an IFR cross-country over 50 nautical miles from the original point of departure, becoming familiar with IFR flight planning and IFR departure, enroute, and arrival procedures. Review the appropriate emergency procedures for enroute IFR operations.
- **References:**
  - → *Instrument Commercial Manual* – Chapters 3, 4, 5, 6, and 9.
- **Review:**
  - → IFR Cross-Country Flight Planning
    - Weather Information Related to IFR Cross-Country Flight
    - Aircraft Performance, Limitation, and Systems Related to IFR Cross Country
    - Enroute Chart Interpretation
    - Navigation Log and Flight Plan Completion
    - Filing an IFR Flight Plan
  - → ATC Clearance
    - Clearance Copying and Readback
    - Departure Procedures and Clearances
    - Use of SIDs and ODPs
  - → IFR Cross-Country Flight
    - VOR Enroute Navigation
    - GPS Enroute Navigation (based on aircraft equipment)
    - Calculating ETEs and ETAs
    - Use of Radar
    - Radio Communications
    - Enroute Procedures and Clearances
    - Arrival Procedures and Clearances
    - Use of Standard Terminal Arrivals (STARs)
    - Holding
    - Canceling an IFR Flight Plan
    - Single-Pilot-Resource Management
    - Aeronautical Decision Making
  - → Approach Procedures
    - VOR Approaches (As Needed)
    - GPS Approaches (As Needed)
    - NDB Approaches (As Needed)
    - ILS Approaches (As Needed)
    - Missed Approach Procedures
    - Partial Panel Approaches
  - → Simulated Emergency Procedures
    - Loss of Communications
    - Loss of Primary Flight Instrument Indicators
    - Partial Panel Flight
    - Systems and Equipment Malfunctions
    - Airframe and Powerplant Icing
    - Turbulence
    - Diversion
    - Low Fuel Supply
    - Engine Failure

- **Completion Standards:** The student will exhibit knowledge of the procedures involved in cross-country flight planning, filing an IFR flight plan, and obtaining IFR clearances. Demonstrate a basic understanding of the various simulated emergency procedures. Demonstrate a basic understanding of the various simulated emergency procedures.
- **Study Assignment:** *Instrument Commercial Manual* – Chapter 10.

FLIGHT LESSON 26: LONG IFR CROSS-COUNTRY

- **Objectives:** The student will continue to learn how to accurately plan and conduct an IFR cross-country flight and become more familiar with IFR departure, enroute, and arrival procedures. *NOTE: The flight is designed to meet the cross-country requirements stated in Part 141, Appendix C. The flight must be conducted under IFR in the category and class of airplane for which the course is approved and must be at least 250 nautical miles in length along airways or ATC-directed routing. One leg of the flight must be at least a straight-line distance of 100 nautical miles between airports. The student must perform an instrument approach at each airport and perform a minimum of three different types of approaches using navigation systems.*
- **References:**
  - → *Instrument Commercial Manual* – Chapters 3, 4, 5, 6, 9, and 10.
- **Review:**
  - → IFR Cross-Country Flight Planning
    - Weather Information Related to IFR Cross-Country Flight
    - Aircraft Performance, Limitation, and Systems Related to IFR Cross Country
    - Enroute Chart Interpretation
    - Navigation Log and Flight Plan Completion
    - Filing an IFR Flight Plan
  - → ATC Clearance
    - Clearance Copying and Readback
    - Departure Procedures and Clearances
    - Use of SIDs and ODPs
  - → IFR Cross-Country Flight
    - VOR Enroute Navigation
    - GPS Enroute Navigation (based on aircraft equipment)
    - Calculating ETEs and ETAs
    - Use of Radar
    - Radio Communications
    - Enroute Procedures and Clearances
    - Arrival Procedures and Clearances
    - Use of Standard Terminal Arrivals (STARs)
    - Holding
    - Canceling an IFR Flight Plan
    - Single-Pilot-Resource Management
    - Aeronautical Decision Making
  - → Approach Procedures
    - VOR Approaches (As Needed)
    - GPS Approaches (As Needed)
    - NDB Approaches (As Needed)
    - ILS Approaches (As Needed)
    - Missed Approach Procedures
    - Partial Panel Approaches
  - → Simulated Emergency Procedures
    - Loss of Communications
    - Loss of Primary Flight Instrument Indicators
    - Partial Panel Flight
    - Systems and Equipment Malfunctions
    - Airframe and Powerplant Icing

- Turbulence
- Diversion
- Low Fuel Supply
- Engine Failure

- **Completion Standards:** At the completion of this flight, the student should be proficient in cross-country operations, approach procedures, and simulated emergency procedures appropriate to the aircraft to be used for the practical test. The student should have command of the airplane at all times during the flight, exercise sound judgment, and accurately comply with ATC procedures and clearances.

FLIGHT LESSON 27: IFR CROSS-COUNTRY REVIEW

- **Objectives:** Increase student proficiency in planning and conducting all phases of the IFR cross-country flight in preparation for the Stage III Check. The student should take the appropriate actions and perform the correct procedures to mange emergency situations. Demonstrate competency in effective resource management and decision making skills for IFR cross-country operations.
- **References:**
  - → *Instrument Commercial Manual* – Chapters 3, 4, 5, 6, 9, and 10.
- **Review:**
  - → IFR Cross-Country Flight Planning
    - Weather Information Related to IFR Cross-Country Flight
    - Aircraft Performance, Limitation, and Systems Related to IFR Cross Country
    - Enroute Chart Interpretation
    - Navigation Log and Flight Plan Completion
    - Filing an IFR Flight Plan
  - → ATC Clearance
    - Clearance Copying and Readback
    - Departure Procedures and Clearances
    - Use of SIDs and ODPs
  - → IFR Cross-Country Flight
    - VOR Enroute Navigation
    - GPS Enroute Navigation (based on aircraft equipment)
    - Calculating ETEs and ETAs
    - Use of Radar
    - Radio Communications
    - Enroute Procedures and Clearances
    - Arrival Procedures and Clearances
    - Use of Standard Terminal Arrivals (STARs)
    - Holding
    - Canceling an IFR Flight Plan
    - Single-Pilot-Resource Management
    - Aeronautical Decision Making
  - → Approach Procedures
    - VOR Approaches (As Needed)
    - GPS Approaches (As Needed)
    - NDB Approaches (As Needed)
    - ILS Approaches (As Needed)
    - Missed Approach Procedures
    - Partial Panel Approaches
  - → Simulated Emergency Procedures
    - Loss of Communications
    - Loss of Primary Flight Instrument Indicators
    - Partial Panel Flight
    - Systems and Equipment Malfunctions
    - Airframe and Powerplant Icing
    - Turbulence
    - Diversion
    - Low Fuel Supply

- Engine Failure

- **Completion Standards:** The student should demonstrate instrument pilot knowledge and proficiency, as outlined in the current FAA Instrument Rating Practical Test Standards, in each of the listed procedures.
- **Study Assignment:** *Instrument Commercial Manual* – Chapters 3, 4, 5, 6, 9, and 10 in preparation for the Stage III Flight Check.

FLIGHT LESSON 28: STAGE III FLIGHT CHECK

- **Objectives:** The chief instructor, assistant chief, or a designated check instructor will evaluate the student's IFR cross-country skills. This is the final stage check in preparation for the instrument rating practical test.
- **References:**
  - → *Instrument Commercial Manual* – Chapters 3, 4, 5, 6, 9, and 10.
- **Review:**
  - → IFR Cross-Country Flight Planning
    - Weather Information Related to IFR Cross-Country Flight
    - Aircraft Performance, Limitation, and Systems Related to IFR Cross Country
    - Enroute Chart Interpretation
    - Navigation Log and Flight Plan Completion
    - Filing an IFR Flight Plan
  - → ATC Clearance
    - Clearance Copying and Readback
    - Departure Procedures and Clearances
    - Use of SIDs and ODPs
  - → IFR Cross-Country Flight
    - VOR and GPS Enroute Navigation (based on aircraft equipment)
    - Enroute Procedures and Clearances
    - Arrival Procedures and Clearances
    - Holding
    - Resource Use
    - Aeronautical Decision Making
  - → Approach Procedures
    - Non-precision Approaches
    - ILS Approaches
    - Missed Approach Procedures
    - Partial Panel Approaches
  - → Simulated Emergency Procedures
    - Loss of Communications
    - Loss of Primary Flight Instrument Indicators
    - Partial Panel Flight Systems and Equipment Malfunctions
    - Airframe and Powerplant Icing
    - Turbulence
    - Low Fuel Supply
    - Diversion
    - Engine Failure
- **Completion Standards:** The student should demonstrate complete understanding of all IFR cross-country procedures. The student will perform all IFR operations and simulated emergency procedures at the instrument pilot proficiency level, as outlined in the current FAA Instrument Rating Practical Test Standards.
- **Study Assignment:** *Instrument Commercial Manual* – Chapters 2 through 10 in preparation for the End-of-Course Flight Check.

FLIGHT LESSON 29: END-OF-COURSE FLIGHT CHECK

- **Objectives:** The chief instructor, assistant chief, or a designated check instructor will evaluate the student's IFR skills. This is the End-of-Course Flight Check in preparation for the Instrument Rating Practical Test. *NOTE: The types of navigation, holding procedures, and approach procedures evaluated will be based on the equipment in the training aircraft.*
- **References:**
  - → *Instrument Commercial Manual* – Chapters 2 through 10.
- **Review:**
  - → Full Panel Instrument
    - Steep Turns
  - → Full and Partial Panel Instrument
    - Straight-and-Level Flight
    - Constant Rate Climbs and Descents
    - Constant Airspeed Climbs and Descents
    - Standard-Rate Turns
    - Recovery From Unusual Flight Attitudes
    - Timed Turns to Magnetic Compass Headings
    - Magnetic Compass Turns
    - Power-Off Stalls
    - Power-On Stalls
  - → Instrument Navigation
    - VOR Navigation
    - GPS Navigation
    - NDB Navigation
    - Localizer Navigation
  - → Holding
    - VOR Holding
    - GPS Holding
    - NDB Holding
    - Localizer Holding
    - Intersection and DME Holding
  - → IFR Cross-Country Procedures
    - IFR Cross-Country Flight Planning
    - ATC Clearance
    - IFR Cross-Country Flight Procedures
  - → Approach Procedures
    - Non-precision Approaches
    - ILS Approaches
    - Missed Approach Procedures
    - Partial Panel Approaches
  - → Simulated Emergency Procedures
    - Loss of Communications
    - Loss of Primary Flight Instrument Indicators
    - Partial Panel Flight
    - Systems and Equipment Malfunctions
    - Airframe and Powerplant Icing
    - Turbulence

- Low Fuel Supply
- Diversion

- **Completion Standards:** The student will perform all IFR and simulated emergency procedures at the instrument pilot proficiency level, as outlined in the current FAA Instrument Rating Practical Test Standards.