

Instrument Pilot Ground School

Instructor:

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Course Objective

To provide the student with maximum academic and ground training in order to safely exercise the privileges of a instrument pilot rating and to meet the prerequisites to take the Instrument Knowledge Test.

Completion Standards

The course will be complete when the student has demonstrated through stage examinations, quizzes, and a final examination that they are able to meet the requirements to take and pass the Instrument Rating Knowledge Test and safely exercise the privileges of an Instrument pilot.

Course Overview

The Instrument Ground School course is designed to prepare the student to pass the instrument written and oral examinations. The course will be taught in a lecture format aided by the use of PowerPoint presentations. Students are expected to attend ground school daily, take notes, and participate in class discussions.

Course Materials

Required Books

- 2011 FAR/AIM
- Instrument Flying Handbook
- Instrument Procedures Handbook
- Aviation Weather
- Weather Services
- Instrument Practical Test Standards

Recommended Books

- Pilot's Handbook of Aeronautical Knowledge
- Airplane Flying Handbook

Other Materials

- Flight Computer
- AFD
- Low Altitude En-route Chart
- Instrument Approach Charts
- IFR Plotter

Policies and Procedures

Exams and Tests

There are 4 quizzes during this course equaling **16%** of your total score. Quizzes will be given on a weekly basis and will cover the material introduced during that week. More quizzes may be given at the discretion of the ground school instructor/manager. An 80% or higher grade on the quizzes is not required, but the quiz grades will be used when calculating the final, cumulative grade, which must be an 80% or higher to pass the course.

During this course there are 3 Stage exams worth **48%** of your total score and one final exam worth **32%** of your total score. Exams will be given when all the material from that stage has been covered and will **only** include the material from that particular stage. The **final exam will be cumulative** covering all material learned throughout the entire course. **All exams must be passed with a score of 80% or higher** for the student to be given credit for the course. This means that if the student does not get an 80% on any one of the tests, they must retake the course.

However, for the stage exams the student is given the opportunity to retake the test. The retake will be similar to the first test but will not be the same. If the student passes the retake exam with an 80% or higher, his/her score will be averaged with the first exam (Example: Exam 1 score: 70%, Retake exam 1 score: 90%: equals an average of 80%). If the student does not pass the test the second time, the student will have to retake the course. **There is no retest given for the final exam.** The student **must pass the final exam with an 80% the first time to pass the course.**

Grading

Quizzes, exams and homework will be graded by either the class instructor or the Chief Ground Instructor and those grades will be tracked throughout the course. **The student must make a cumulative grade of 80% in order to pass the class.** If the student's cumulative grade for the course does not add up to 80%, they must retake the course.

Assignments

There are 8 homework assignments given throughout the course. You are expected to complete all homework. Your homework grade is worth 4% of your total score. If you receive credit for all homeworks given, then your homework score is 100%. **Homework is due on the date designated by the instructor. LATE HOMEWORK WILL NOT BE ACCEPTED!**

Attendance

100 % attendance is required to pass the class! Attendance will be taken at the beginning of class. If the student is not present when attendance is taken, that student will be marked as being absent for the day. Any missed days of class must be rescheduled and completed at an additional cost to the student. Those who miss more than three days of class will be removed from the course. These students will have the option to retake the course at their own

expense. **There are zero unexcused absences. If you are going to be absent, it must be pre-arranged and approved by both the Chief Ground Instructor and the Group Manager.**

Students may be given additional credit based on attendance. Those who have 100 % attendance may be given 5 bonus points at the end of the course to be added to their final, cumulative grade.

Class Participation

Students are expected to participate during class discussions. **In order to adequately contribute to the discussions students should complete all homework and reading assignments before the beginning of each day's class.**

FAA Written Examinations

At the beginning of the course students will be scheduled to take the written examination beginning on the day after completion of the course. Endorsements for the test will be given by the ground school manager upon successful completion of the final examination as outline above. Students must be present on the day designated by the ground school manager after the completion of the ground school course in order to receive their endorsement. Students are required to take the test on the day and time that they are scheduled. If the student requests to reschedule their examination for any reason, they must meet with the ground school manager the day before they are to take the exam.

A student who fails a FAA written exam will be required to spend at least two hours receiving remedial training from the ground school manager or an appointed instructor. Following the remedial training the student will be given 3 mock FAA exams which must be passed with a score of 90% or higher to be authorized to retake the FAA written exam. If they do not receive a score of 90% or higher on three consecutive practice exams then they will be required to meet with the ground school manager to receive further training. **Do not let this happen to you!**

	LESSON	SUBJECT	TIME
WEEK 1	1	Course Overview; Expectations of an instrument rating; Flight physiology	4 HOURS
	2	Knowledge of flight instrument systems	4 HOURS
	3	Attitude instrument flying skills; Airport operations; The National Airspace System	4 HOURS
	4	IFR navigation systems	4 HOURS
	5	Applicable Federal Aviation Regulations for IFR flight operations; Appropriate information in the Aeronautical Information Manual;	4 HOURS
WEEK 2	6	Stage 1 Exam	2 HOURS
	7	Holding procedures as appropriated by the Aeronautical Information Manual; The air traffic control system and procedures for IFR operations	4 HOURS
	8	Uses of departure charts and departure procedures	4 HOURS
	9	Use of IFR Enroute and Area Charts	4 HOURS
	10	Use of Arrival Charts and procedures	4 HOURS
WEEK 3	11	Flight planning procedures as appropriated by the Federal Aviation Regulations for IFR operations	4 HOURS
	12	Use of Instrument Approach Procedure Charts	4 HOURS
	13	Use of non-precision instrument approach navigation systems	4 HOURS
	14	Use of precision instrument approach navigation systems	4 HOURS
	15	Stage 2 Exam	2 HOURS
WEEK 4	16	Recognition of critical weather situations on the ground and in flight and windshear avoidance	4 HOURS
	17	Procurement and use of aviation weather reports and forecasts; Aeronautical Decision Making and judgment; Crew Resource Management to include crew communication and coordination Safe and efficient operation of aircraft under IFR conditions	4 HOURS
	18	Stage 3 Exam	2 HOURS
	19	Course Review	4 HOURS
	20	End of Course Final Exam	2 HOURS
			72 Total Hours

Aviation Physiology

Stage 1- Lesson 1

Materials: Pilot's Handbook of Aeronautical Knowledge, Chapter 16

Objective: Familiarize the student with aviation physiology, its importance, and how it affects instrument flight.

Completion

Standards: The student will indicate, through oral quizzing, familiarity with the topics discussed as they apply to aviation physiology.

Content:

Course Overview and Expectations

Hypoxia

Definition

Symptoms

Types of Hypoxia

- Hypoxic Hypoxia
 - Definition
 - Percentage of Oxygen vs. Atmospheric Pressure
 - Oxygen Saturation
 - Time of Useful Consciousness
- Hypemic Hypoxia
 - Definition
 - Causes
 - CO Poisoning
 - Effect of Altitude on Hypemic Hypoxia
 - Smoking
- Stagnant Hypoxia
 - Definition
- Histotoxic Hypoxia
 - Definition

- Prevention of Hypoxia

Hyperventilation

Definition

Symptoms

Triggers

Alleviating Symptoms

Disorientation

Three Sources of Awareness

- Vision
- Vestibular System
- Kinesthetic Sense
 - Definition
 - Unreliability

Susceptibility

- Fatigue
- Anxiety
- Workload
 - Symptoms
 - Lightheadedness

- Dizziness

The Importance of Trusting Instruments

Spatial Disorientation

Definition

Visual Illusions

Vestibular Disorientation

Definition

- Vestibular System
- Vestibular Illusions

How the Vestibular System is Affected in Flight

Motion Sickness

Symptoms

Overcoming Motion Sickness

Stress

Positive Stress

Negative Effects of Stress

Stress During Flight

Life Stressors

Fatigue

Definition

Fatigue and Flying

Overcoming Fatigue

- Can't be taught
- The importance of rest

Alcohol and Drugs

OTC Medication

- Side Effects of Drugs
- Role of an Aviation Medical Examiner

Alcohol

- Impairment of Function
- Risk
- FAR Rules
 - 8 hours
 - .04%

Decompression Sickness

Definition

Scuba Diving

- Nitrogen
- Scuba Diving and Flying Rules

Rapid Decompression

Fitness for Flight

The IMSAFE Checklist

- Illness
- Medication
- Stress
- Alcohol
- Fatigue
- Eating/Emotion

Night Flight

Night Vision

- Night Visual Illusions
- Night Landing Illusions

Assignment: Read the Instrument Flying Handbook Chapter 3, pages 3-1 through 3-37 in preparation for Lesson 2, Knowledge of Flight Instrument Systems.

Knowledge of Flight Instrument Systems

Stage 1- Lesson 2

Materials: Instrument Flying Handbook Chapter 3

Objective: Gain a working knowledge of the function and use of the flight instrument component and systems; become familiar with the limitations and common errors of the flight instrument systems and components.

Completion

Standards: Demonstrate understanding of IFR instrument requirements as well as instrument flight systems, instrument operations, and instrument errors during oral quizzing by instructor at completion of lesson.

Content:

Flight Instruments

The 6 primary flight instruments
Instruments and equipment required for
IFR flight

Pitot – Static Instruments

Pitot Tube

- Explanation and Purpose

Static Port

- Explanation and Purpose

Airspeed Indicator

- Purpose
- How it Works
- Airspeeds
 - Indicated
 - Calibrated
 - Equivalent
 - True
 - Mach
- Where and how to find each
- Errors
- Instrument Check

Altimeter

- Purpose
 - Sensitive altimeter definition
 - How it works
 - Types of Altitude
 - Indicated
 - Calibrated
 - Pressure
 - Density
 - True
 - Absolute
 - Where and how to find each
 - Altimeter Setting
 - Effect of not using the local altimeter setting
 - Areas of high vs. low pressure and temperature
 - Instrument Check
- Vertical Speed Indicator
- Purpose
 - Rate Information
 - Trend Information
 - How it works

- Instrument Check

System Errors

- Pitot Blockade
 - Affect on the airspeed indicator
- Static Blockade
 - Affect on all pitot-static instruments
 - Corrective actions

Magnetic Compass

Purpose

Errors

- Variation
- Deviation
- Magnetic Dip
 - Northerly Turning Error (UNOS)
 - Acceleration/Deceleration Error (ANDS)
- Oscillation

Instrument Check

Gyroscopic Flight Instruments

Rigidity in Space

- Definition
- Gimbals

Precession

- Definition
- Demonstration

Vacuum System

Attitude Indicator

- Purpose
- How it works
 - Pendulous Vanes
- Errors
 - Turns
 - Acceleration and Deceleration
- Instrument Tumbling

Heading Indicator

- Purpose
- How it works
- Errors

Turn Indicators

- Purpose
- Calculating a standard rate turn
- The 2 types
 - Turn and Slip Indicator
 - Turn Coordinator
- Inclinator
 - Slips and Skids

Instrument Checks

Analog Pictorial Displays

HSI

Integrated Flight Control Systems

- Autopilot

Integrated Displays

Explanation and Definition

How it works

Primary Flight Displays

- Definition
- Purpose

Multifunction Display

- Definition
- Components
 - Moving Map
 - Terrain
 - Charts
 - Weather
 - Traffic
 - Lightning Strikes

- Systems Page
 - Checklists

Malfunctions and Failures

- Limited Failures
- Major Failures
- Electrical Failures
- Corrective Actions

Assignment: Read the Instrument Flying Handbook Chapter 4, Section I and Chapter 5, Section 1, in preparation for Lesson 3, Attitude Instrument Flying Skills.

Attitude Instrument Flying Skills

Stage 1- Lesson 3

Materials: Instrument Flying Handbook; Chapter 4, Section 1 and Chapter 5, Section 1

Objectives: 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 the instrument system failures and partial panel flight procedures.

Completion

Standards: Demonstrate understanding of basic attitude instrument flying during oral quizzing by instructor; exhibit knowledge of partial panel instrument flight procedures.

Content:

Attitude Instrument Flying Concepts

Control and Performance Concept

- Control Instruments
- Performance Instruments
- Navigation Instruments
- Applying Control and Performance

Primary/Support Concept

- Pitch Instruments
- Bank Instruments
- Power Instruments

Fundamental Skills

Instrument Cross Check

- Scanning Techniques
 - Hub and Spoke
 - Racetrack
 - Inverted V
- Frequent Errors
 - Fixation
 - Omission
 - Emphasis

Instrument Interpretation

Aircraft Control

Basic Flight Maneuvers

Straight and Level Flight

- Primary Instruments/Supporting Instruments
- Pitch/Bank/Power Control
- Common Errors

Climbs

- Constant Airspeed Climbs
 - Cruise and V_x , V_y Climbs
 - Primary/Supporting Instruments
- Constant Rate Climbs
 - Primary/Supporting Instruments

Descents

- Constant Airspeed Descents
- Constant Rate Descents

Level-Off

Climb/Descent Common Errors

Standard Rate Turns

- Primary/Supporting Instruments
- Pitch/Bank/Power Control

Steep Turns

Climbing and Descending Turns
Common Errors in Turns
Approach to Stall

Coping With Instrument Failure

Identifying an Instrument Failure

- Vacuum System Failure
- Single Instrument Failure
 - Attitude Indicator Failure
 - Heading Indicator Failure

Partial Panel Flying

What to do if instruments fail
Straight and Level Flight
Turns

Compass Turns

- UNOS rule

Timed Turns

- 3 degrees per second rule

Climbs and Descents

Pitot Static Instrument Failures

Unusual Attitude Recovery

Recognizing Unusual Attitudes

Nose – High Attitude

- Power/Pitch/Bank

Nose – Low Attitude

- Power/Bank/Pitch

Common Errors

Partial Panel

Assignment: The student should read the Instrument Flying Handbook Chapter 5 in preparation for Lesson 4 over IFR Navigation Systems.

IFR Navigation Systems

Stage 1- Lesson 4

Materials: Instrument Flying Handbook Chapter 7

Objectives: Learn the function, use, and limitations of VOR, DME, and ADF radio equipment for navigation. Become familiar with other types of instrument navigation including RNAV and GPS.

Completion

Standards: Demonstrate understanding of the use and limitations of navigation systems during oral quizzing by instructor at completion of lesson.

Content:

ADF Navigation

- Compass Locators
- Relative Bearings, Magnetic Bearings,
Magnetic Headings
Radio Magnetic Indicators
Intercepting a bearing
Tracking
Time and distance to a station
- Formula Method (same as VOR)
 - Flight Computer Method
- Station Passage

VOR Navigation

- Horizontal Situation Indicators (HSI)
Tracking
Intercepting a Radial
Time and distance to a station
- Formula Method
 - Flight Computer Method
- Station Passage

Operational Considerations

- Ground Facilities
- VOR Frequencies and Ranges
 - NDB Frequencies and ranges

VOR Checks

- VOR Test Facilities
- How to perform
 - Allowable Error
- VOR Checkpoints
- How to perform
 - Allowable Error
- Dual System Check
- How to perform
 - Allowable Error

Distance Measuring Equipment

- Types of Nav aids with DME
Operation
Slant Range Distance
DME Arcs
- Use
 - Flying a DME Arc
 - Correcting for a Crosswind

Area Navigation

- RNAV Definition
- Benefits of RNAV
- Use of Waypoints
 - VOR Stations
 - Lat. and Long. Coordinates
- Required Navigation Performance (RNP)

以上内容仅为本文档的试下载部分，为可阅读页数的一半内容。如要下载或阅读全文，请访问：<https://d.book118.com/558130055002006121>