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School of aviation and transportation technology | Purdue Polytechnic Institute

AT24900 Curriculum outline

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Session 1: Introduction

Learner Objectives:

At the conclusion of this session the students will be able to:

1. Know the course instructor(s).
2. Identify the objectives for the course.
3. Understand how information in this course will apply in their flying.
4. Describe how the readings and exams are structured for the course.
5. Locate and utilize reference materials on Blackboard.

Materials:

* PowerPoint Presentation: AT249 Instrument Lectures Intro
* Syllabus – print out to hand out
* iPad/Tablet with Jepp Charts
* Index cards
* Sign In Attendance Sheet

Agenda:

|  |  |  |  |
| --- | --- | --- | --- |
| **Duration** | **Content** | **Learning Technique** | **Theory** |
| Pass out Attendance Sheet |
| 10 mins | Brief description of Instructor(s):* Name
* Background info/interesting facts
* Office Hours and Office
 | PowerPoint presentation with instructor lecture. | Behaviorist |
| 10 mins | Activity 1: Know Your StudentsOn index cards have students write down:1. Name
2. Where from
3. Interesting fact to share with instructor(s)
4. A goal they want to accomplish by the end of the course.
 | Students set a goal so they can work throughout the semester to accomplish it. Instructor gets to know students a bit more (since class size is large) | Goal Theory of Motivation (TARGET acronym) |
| 15 mins | Importance of course:* Answer the question – how is this information important for your flying career?
 | PowerPoint presentation with instructor lecture. | TARGET (by understanding why they need to know the information, they can set goals and do well in the course).CIP – selective attention |
| 20 mins | Go through syllabus:* Use Doc Cam and your own copy of syllabus to go through it.
 | PowerPoint presentation with instructor lecture.Materials in syllabus:Can bring iPad with Jepp app to show what it is.  | BehavioristEncoding Specificity |
| 5 mins | Go through Blackboard Site:* Walk through how to use site and access reference materials.
 | Pull up Blackboard on computer and display with projector.  | CIP/Encoding Specificity |
| 5 mins | Explain to students that they will have a reading assignment for the next two sessions.  | Syllabus will show the details of reading assignments.  |  |
| 10 mins | Time for any questions from students. |  |  |
| Collect Attendance Sheet |

Session 2 & 3: Flight Instruments

Learner Objectives:

At the conclusion of this session the students will be able to:

1. Classify the flight instruments into two basic categories, gyroscopic or pitot/static instruments.
2. Explain how the basic “6 Pack” flight instruments function/operate.
3. Identify and explain instrument errors associated with each of the basic “6 Pack” instruments.
4. Explain how the “glass cockpits” function/operate.
5. Describe the advantages and disadvantages of “glass cockpit” and its flight instruments.

Materials:

* PowerPoint Presentation: Flight Instruments
* Sign In Attendance Sheet

Agenda:

|  |  |  |  |
| --- | --- | --- | --- |
| **Duration** | **Content** | **Learning Technique** | **Theory** |
| Pass out Attendance Sheet |
| 10 mins | **The Basic “6 Pack”*** General overview of which instrument these are.
* Separate the instruments into the two categories: gyroscopic and pitot/static.
 | Discussion: ask students for the instruments that fall under the “6 Pack” once get answers show powerpoint slide. PowerPoint Presentation | TARGET: by asking students they become engaged, they should already know this information.  |
| 40 mins | **Gyroscopic Instruments*** What is a gyroscope?

Attitude Indicator:* How it functions/operates
* Errors: Precession

HSI/DG:* Difference between the HSI and DG
* How it functions
* Errors:
	+ Slaved vs free mode

Rate of Turn Indicator:* How it functions
* What is standard rate
* How to determine standard rate

Slip and Skid Indicator:* How it works
* The differences of a skidding and slipping turn.
 | PowerPoint Presentation with instructor lecture and discussion. With slide, ask students if anyone knows and would like to explain to class how attitude indicator works. [Can do this process for all the instruments in this section] | Behaviorist as the presentation will be run by the instructor.Look at PowerPoint presentation: the slides have been created to match the CIP and encoding specificity theories.Retrieval Practice and Encoding specificity: students should have a basic knowledge on these instruments, by asking them to tell class, they are challenged to practice retrieving info and also they would be encoding them in a different way.  |
| 5 mins | **Q&A** | Before moving on to next section ask students if there are any confusions/questions.  | Retrieval PracticeCIP – rehearsal concept |
| 20 mins | **Pitot/Static Instruments*** Brief overview of the pitot/static systems

Airspeed Indicator:* How it functions
* Types of Airspeed
 | PowerPoint presentation with instructor lecture and discussion.Student should have basic knowledge – ask students on types of airspeed. | Encoding specificity: students should have a basic knowledge on these instruments, by asking them to tell class, they are challenged to practice retrieving info and also they would be encoding them in a different way. Look at PowerPoint presentation: the slides have been created to match the CIP and encoding specificity theories. |
| *On first day: finish after talking about airspeed indicator.* **Collect Attendance Sheet.** |

|  |
| --- |
| Pass out Attendance Sheet |
| 5 mins | Start class with question on the airspeed indicator (look at powerpoint slide).  |
| 20 mins | Altimeter:* How it works
* Types of altitudes

VSI:* How it works

Errors of system:* Pitot tube blockages and remedies
* Static port blockages and remedies
 | PowerPoint Presentation with instructor lecture and discussion. With slide, ask students if anyone knows and would like to explain to class how attitude indicator works. [Can do this process for all the instruments in this section]New info: Errors of system. | Behaviorist as the presentation will be run by the instructor.Look at PowerPoint presentation: the slides have been created to match the CIP and encoding specificity theories.Retrieval Practice and Encoding specificity. |
| 20 mins | **Magnetic Compass*** Errors:
	+ Magnetic Dip
	+ Deviation and Variation
	+ ANDS
	+ UNOS
 | PowerPoint Presentation with instructor lecture. | BehavioristLook at PowerPoint presentation: the slides have been created to match the CIP and encoding specificity theories. |
| 30 mins | **Glass Cockpits*** Components and how they function
	+ PFD
	+ MFD
	+ AHRS
	+ ADC
	+ Other computers (varies depending on model)
* Advantages and Disadvantages
 | PowerPoint Presentation with instructor lecture.Adv/Disadv. – ask students what they think are some advantages or disadvantages of this system.  | Look at PowerPoint presentation: the slides have been created to match the CIP and encoding specificity theories. |
| Collect Attendance Sheet |

Session 4: Basic Aerodynamics

Learner Objectives:

At the conclusion of this session the students will be able to:

* Summarize and explain the four forces of flight.
* Describe how aircraft performance is affected in the regions of command.
* Explain how an airplane climbs/descends and describe how it incorporates into instrument flying.
* Explain how an airplane turns and how varying bank or airspeed affects the turn.

Materials:

* Video: <https://www.youtube.com/watch?v=aFO4PBolwFg>
* Diagrams:
	+ Drag Curve
	+ Rate or Turn/Radius of Turn
	+ Load Factors
* Sign In Attendance Sheet

Agenda:

|  |  |  |  |
| --- | --- | --- | --- |
| **Duration** | **Content** | **Learning Technique** | **Theory** |
| Pass out Attendance Sheet |
| 5 mins | Announcements* Starting next week will have weekly quizzes on Thursday covering material for that week.
* Any other from instructor
 |
| 45 mins | **Forces of Flight:**Lift* 2 theories of lift generation
	+ Bernoulli and Newton
* Lift Equation
	+ Explain how pilot can affect components of equation.

Weight* What is weight
* CG

Thrust* What is thrust

Drag* 2 types of drag:
	+ Induced
		- what is it and how caused
	+ Parasite
		- The 3 types that make it up
		- How each is created
* Drag Curves
	+ What it is
	+ How to read
	+ The 2 regions of command and its effects.
 | Discussion with class. LiftVideo to explain theories of lift.Use chalkboard to write our lift equation and explain. Weight and Thrust: discussion and chalkboard as needed. Drag:Discussion. Ask students questions on: * 2 types of drag and how they are caused.

Use Doc Cam in class to show drag curves and explain.  | Students should know this information as it was taught during their training for a private pilot certificate. Therefore, a discussion led by instructor will be conducted. With this method, the student will be forced to recall information (retrieval practice), make it interesting and challenging (TARGET), and will help produce cues for encoding and retrieval (encoding specificity/CIP).  |
| 20 mins | **Basic Flight:** Straight and LevelClimbs and Descents* Standard rate and/or airspeed requirements for IFR flight
* Why is it important for IFR flight?

Turns* Rate or turn and radius of turn diagrams
* Load factors
 | Discussion with class. Ask: how does an airplane maintain straight and level flight?Ask: how does an airplane climb? Descent?Explain what ATC would expect in IFR conditions. Use chalkboard to draw forces acting on plane during turn – explains how plane turns. In IFR: explain standard rate turnUse Doc Cam to show diagrams of:* Rate of Turn and Radius of Turn changes based on airspeed and bank.
* Load Factors diagram
 |
| Collect Attendance Sheet  |

Session 5 & 6: Attitude Instrument Flying

Learner Objectives:

At the conclusion of this session the students will be able to:

* List and explain the three fundamental skills for instrument flying.
* Explain the two methods of instrument flying to distinguish the differences and similarities between them.
* Relate the two flying methods to their own methods and modify them to match.
* Determine whether an instrument is inoperative and how to correct it.
* Identify unusual attitudes and explain how to correct them.

Materials:

* PowerPoint Presentation: Attitude Instrument Flying
* Quiz 1
* Sign In Attendance Sheet

Agenda:

|  |  |  |  |
| --- | --- | --- | --- |
| **Duration** | **Content** | **Learning Technique** | **Theory** |
| Pass out Attendance Sheet |
| 5 mins | **Announcements*** Any announcements the instructor(s) need to say.
 |
| 40 mins | **Fundamental Skills:**Instrument scan/cross-check* What it is/definition
* Types of scans
	+ Spoke
	+ Rectangular
	+ Inverted V
	+ Others
* Explain each scan in both steam gauge and glass
* Errors:
	+ Fixation
	+ Omission
	+ Emphasis

 Instrument interpretation* What it is/definition

Aircraft control* What it is/definition
 | PowerPoint Presentation with instructor lecture.Scans:Using Doc Cam have picture of a steam gauge and glass cockpit as you explain the types of scan.  | BehavioristCIP/Encoding Specificity: by explaining with words, demonstrating with pictures, and using examples students will be able to store in WM and transfer to Long-term memory and have retrieval cues.  |
| 20 mins | **Instrument Flying Methods:**Control and Performance* What it is/definition
* Instruments associated with each component of method
* How to use it
* Example: from straight and level flight to a climb
 | PowerPoint Presentation with instructor lecture. |  |
| *End first day at the control and performance method.* **Collect Attendance Sheet.** |

|  |
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| Pass out Attendance Sheet |
| 10 mins | Quiz 1 | Hand out quiz | Retrieval Practice |
| 5 mins | Review on Control & Performance Method  | On PowerPoint slide use questions to ask the class. | Retrieval Practice |
| 30 mins | Primary and secondary* What it is/definition
* Primary instruments
	+ Which instruments are these
* Secondary instruments
	+ Which instruments are these
* How to use it
* Examples:
	+ Straight and level to turn
	+ Climb to level off
 | PowerPoint Presentation with instructor lecture. | BehavioristCIP/Encoding Specificity: by explaining with words, demonstrating with pictures, and using examples students will be able to store in WM and transfer to Long-term memory and have retrieval cues. |
| 10 mins | **Inoperative Instruments:*** How to detect when instrument is inoperative
* Use examples from GLEIM book
 | PowerPoint Presentation with instructor lecture. | Behaviorist |
| 15 mins | **Unusual attitudes:*** Two types:
	+ Nose up
	+ Nose down
* How are they caused
	+ Spatial disorientation (give examples)
	+ Inoperative equipment
* How to detect
	+ In team gauge and glass cockpits
* How to correct
	+ For nose up
	+ For nose down
 | PowerPoint Presentation with instructor lecture. | Behaviorist PowerPoint slides are created using CIP/Encoding Specificity principles.  |
| Collect Attendance Sheet |

Session 7 & 8: Navigation Systems

Learner Objectives:

At the conclusion of this session the students will be able to:

* Describe how a VOR works and how it can be used for navigation.
* Explain what DME is and describe how it can be used for navigation.
* List the various components of a GPS navigation system and explain how they work.
* List and explain how the components of an ILS system work to give navigational information.
* Summarize the advantages and disadvantages of using an autopilot for instrument flight.

Materials:

* PowerPoint Presentation: Navigation Systems
* Quiz 2
* Sign In Attendance Sheet

Agenda:

|  |  |  |  |
| --- | --- | --- | --- |
| **Duration** | **Content** | **Learning Technique** | **Theory** |
| Pass out Attendance Sheet |
| 5 mins | **Announcements*** Any announcements from instructor(s)
 |
| 20 mins | **VOR: Very High Frequency Omnidirectional Receiver*** What is it/How it works
* Components
* Frequencies of Use
* How to Use it
 | PowerPoint Presentation with Instructor Lecture/Discussion. | Look at PowerPoint presentation: the slides have been created to match the CIP and encoding specificity theories. |
| 10 mins | **DME: Distance Measuring Equip.*** What is it/How it works
* Components
* Frequencies of use
* How to Use it
* FARs associated
	+ Requirements
	+ Substitutions
 | PowerPoint Presentation with Instructor Lecture/Discussion. | Look at PowerPoint presentation: the slides have been created to match the CIP and encoding specificity theories. |
| 30 mins | **GPS: Global Positioning System**General* What is it/How it works
* Components
* FAR requirements to use in IFR

RAIM: Receiver Autonomous Integrity Monitoring* What is it
* Components
* How it Works

WAAS: Wide Area Augmentation System* What is it
* Components
* How it Works
* FARs associated with use in IFR flight
 | PowerPoint Presentation with Instructor Lecture/Discussion. | Look at PowerPoint presentation: the slides have been created to match the CIP and encoding specificity theories. |
| *Finish day one with GPS systems*. **Collect Attendance Sheet.**  |

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| --- |
| Pass out Attendance Sheet |
| 10 mins | **Quiz 2** | Pass out quiz | Retrieval Practice |
| 30 mins | **ILS: Instrument Landing System*** What it is
* Components
* Frequencies of use
* How it works
* How to use it for IFR flight
 | PowerPoint Presentation with Instructor Lecture/Discussion. | Look at PowerPoint presentation: the slides have been created to match the CIP and encoding specificity theories. |
| 20 mins | **Autopilot*** What is an autopilot
* Requirements for use in IFR flight
* Advantages of using it
* Disadvantages of using it
 | PowerPoint Presentation with Instructor Lecture/Discussion. | Look at PowerPoint presentation: the slides have been created to match the CIP and encoding specificity theories. |
| Collect Attendance Sheet |

Session 9 & 10: Federal Aviation Regulations

Learner Objectives:

At the conclusion of this session the students will be able to:

* Interpret the regulations associated with Instrument Flying found in:
	+ FAR Part 1: Definitions and Abbreviations
	+ FAR Part 43: Maintenance, Preventive Maintenance, Alterations, and Repairs
	+ FAR Part 61: Certification – Pilots, Flight Instructors, and Ground Instructors
	+ FAR Part 91: General Operating and Flight Rules
	+ NTSB Part 830
* Find the location of rules pertaining to IFR flight in the database of FARs.

Materials:

* PowerPoint Presentation: FARs
* Quiz 3
* Sign In Attendance Sheet

Agenda:

|  |  |  |  |
| --- | --- | --- | --- |
| **Duration** | **Content** | **Learning Technique** | **Theory** |
| Pass out Attendance Sheet |
| 5 mins | **Announcements*** Any announcements by the instructor(s).
 |
| 10 mins | **Part 1: Definitions and Abbreviations*** Using slides explain the definitions pertaining to IFR flight
 | PowerPoint Presentation with instructor lecture. | Look at PowerPoint presentation: the slides have been created to match the CIP and encoding specificity theories. |
| 15 mins | **FAR Part 43: Maintenance, Preventive Maintenance, Alterations, and Repairs.*** Only cover Appendix E and F of this part using slides.
 | PowerPoint Presentation with instructor lecture. | Look at PowerPoint presentation: the slides have been created to match the CIP and encoding specificity theories. |
| 15 mins | **FAR Part 61: Certification – Pilots, Flight Instructors, and Ground Instructors*** Using slides cover:
	+ 61.3
	+ 61.51
	+ 61.57
	+ 61.65
	+ 61.133
 | PowerPoint Presentation with instructor lecture. | Look at PowerPoint presentation: the slides have been created to match the CIP and encoding specificity theories. |
| 20 mins | **FAR Part 91: General Operating and Flight Rules*** Using slides cover:
	+ 91.21
	+ 91.103
	+ 91.109
	+ 91.123
	+ 91.129
	+ 91.131 – 91.135
	+ 91.155 – 91.157
 | PowerPoint Presentation with instructor lecture. | Look at PowerPoint presentation: the slides have been created to match the CIP and encoding specificity theories. |
| *Finish with 91.157 as the next part of 91 is all together*. **Collect Attendance Sheet**. |

|  |
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| Pass out Attendance Sheet |
| 10 mins | **Quiz 3** | Pass out quiz | Retrieval Practice |
| 50 mins | **Finish up Part 91:*** 91.167 – 91.179
	+ 91.183 – 91.187
	+ 91.205
	+ 91.411
	+ 91.413
 | PowerPoint Presentation with instructor lecture. | Look at PowerPoint presentation: the slides have been created to match the CIP and encoding specificity theories. |
| 5 mins | **NTSB Part 830*** What is this part
* Why should pilots know about it
* What does it cover
 | PowerPoint Presentation with instructor lecture. | Look at PowerPoint presentation: the slides have been created to match the CIP and encoding specificity theories. |
| Collect Attendance Sheet |

Session 11 & 12: Airport Markings, ATC, and Airspace

Learner Objectives:

At the conclusion of this session the students will be able to:

* Distinguish the type of runway at an airport based on its markings.
* Name and describe the various airport markings and signs.
* Find examples of the various airport lights used at an airport and describe where they are located at an airport.
* Summarize how the ATC environment is set up for IFR flight.
* Recall from memory the procedure for a radio failure and mandatory reporting points in IFR flight.
* Explain the differences, requirements, and rule associated with each class of airspace (A-G).
* Distinguish the special use airspaces from the general airspace.
* Explain the requirements for each type of special use airspace.

Materials:

* PowerPoint Presentation: Airports Powerpoint, ATC Communications, Airspace
* Quiz 4
* Sign In Attendance Sheet

Agenda:

|  |  |  |  |
| --- | --- | --- | --- |
| **Duration** | **Content** | **Learning Technique** | **Theory** |
| Pass out attendance sheet |
| 5 mins | **Announcements*** Any announcements the instructor(s) need to say.
 |
| 30 mins | **Airport:*** Runways
	+ 3 types based on approaches
* Markings
	+ On runways, taxiways, ramp
	+ Include new ones for IFR
* Signs
	+ Mandatory
	+ Destination
	+ Direction
	+ IFR related
* Lights
	+ Approach Light Systems
	+ Runway Lights
	+ Taxiway Lights
	+ Beacons
 | PowerPoint Presentation with instructor lecture.Most of this information should already be known by the class as they are pilots; as you go along ask students questions on the material before showing it on slide.  | Look at PowerPoint presentation: the slides have been created to match the CIP and encoding specificity theories. |
| 40 mins | **ATC:** Structure and Service:* How it’s structured
	+ Explain each component in the structure
* Provide examples from personal flying experience
* Services provided to IFR pilots

Clearances:* What it is/definition
* Components: CRAFT
* Types of Clearances
	+ Explain various types with powerpoint slides
	+ Give examples from personal flying experience

Mandatory reports:* What are they
	+ Explain which ones you would need at certain times and which ones don’t need.
 | PowerPoint Presentation with instructor lecture.Using Doc Cam have Jeppesen App on iPad on low en-route chart to demonstrate how to determine which component of structure flying in/through/with.  | Look at PowerPoint presentation: the slides have been created to match the CIP and encoding specificity theories.CIP: By providing examples of real life situations, you can give students an ability to connect information with their own experiences and create better encoding for long-term memory. |
| *End first day after Mandatory Reports.* **Collect Attendance Sheet.** |

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| Pass out Attendance Sheet |
| 10 mins | Quiz 4 | Hand out quiz | Retrieval Practice |
| 5 mins | Q&A  | Ask class if any questions on material covered on first day.  | Retrieval Practice |
| 50 mins | **Airspace:***Cover requirements, limitations, weather, depictions on low enroute charts, etc.* General Airspace:* Class A
* Class B
* Class C
* Class D
* Class E
* Class G

Special Use Airspace* What is their purpose
* Go through each one, use acronym: MCWRAPWNSATTM
 | PowerPoint Presentation with instructor lecture and discussion.Students should know this information, as you go along ask students questions before showing information on slide.  | Look at PowerPoint presentation: the slides have been created to match the CIP and encoding specificity theories. |
| Collect Attendance Sheet |

Session 13: Aeromedical Factors

Learner Objectives:

At the conclusion of this session the students will be able to:

* Differentiate between hypoxia and hyperventilation based on their symptoms.
* Explain the different types of hypoxia, its symptoms, and how to treat it.
* Explain the symptoms, causes, and treatment for hypoxia.
* Summarize the anatomy of the eye and how it can lead to illusions.
* List the various visual illusions associated with flying and explain them.
* Discuss how the brain maintains spatial orientation and list the three systems it uses.
* List and explain the spatial illusions associated with instrument flight.
* Recall and explain the various components of the IMSAFE checklist.

Materials:

* PowerPoint Presentation: Aeromedical Factors
* Quiz 5
* Sign In Attendance Sheet

Agenda:

|  |  |  |  |
| --- | --- | --- | --- |
| **Duration** | **Content** | **Learning Technique** | **Theory** |
| Pass out Attendance Sheet |
| 5 mins | **Announcements*** Test 1 opens Thursday after class and closes next Tuesday before class. On Blackboard
* Next session: half of it will be a review for exam, come with any questions.
* Any announcements the instructor(s) need to say.
 |
| 15 mins | Hypoxia:* Definition
* 4 Types
* Symptoms
* Treatment
 | PowerPoint Presentation with class discussion.Students should know this information as it was covered during their training for private pilots, as you go through the slides ask the class questions before showing information on slides.  | Look at PowerPoint presentation: the slides have been created to match the CIP and encoding specificity theories.TARGET: by asking questions from class they are being engaged, challenged as they attempt to recall information, and given practice at recall of info.  |
| 10 mins | Hyperventilation:* Definition
* Causes
* Symptoms
* Treatment
* Difference from Hypoxia
 |
| 15 mins | Visual System* Brief anatomy of the eye
* Night Vision

Illusions:* Autokinesis
* False Horizon
* Flicker Vertigo
* Landing Illusions
* Featureless Terrain Illusion
* Haze and Fog
 |
| 15 mins | Spatial Disorientation:* Causes of spatial disorientation
* Correction of ailment

Illusions:* The leans
* Coriollis Illusion
* Inversion Illusion
* Somatogravic Illusion
 |
| 10 mins | IMSAFE checklist:* Go through each step of checklist
* Illness
* Medication
* Stress – mention two types
* Alcohol – mention FAR requirements
* Fatigure – mention two types
* Eating/Emotions
 |
| Collect Attendance Sheet |

Session 14: Aeronautical Decision Making, Review Session

Learner Objectives:

At the conclusion of this session the students will be able to:

* Summarize what Aeronautical Decision Making is.
* Explain what Single-Pilot Resource Management is and how it applies to IFR flight.
* Understand the importance of declaring an emergency and what that means.

Materials:

* Handout of Sources of Pressure
* Sign In Attendance Sheet

Agenda:

|  |  |  |  |
| --- | --- | --- | --- |
| **Duration** | **Content** | **Learning Technique** | **Theory** |
| Pass out Attendance Sheet |
| 5 mins | **Announcements*** Test 1 opens today after class and closes next Tuesday before class. On Blackboard.
* Any other announcements the instructor(s) need to say.
 |
| 10 mins | **ADM:*** What it is/Definition
* Acronyms used by FAA:
	+ DECIDE
	+ 3 Ps
* How we use it as pilots
 | Discussion with class.Use chalkboard as needed. Using Doc Cam, have handout of sources of pressure.  | As the class are pilots, this discussion will ask students to bring any comments and experiences that have led them to use these concepts. This way the class will be able to relate to their lives as pilots and apply it in the future (CIP and TARGET).  |
| 10 mins | **SRM:*** What it is/Definition
* How it applies to IFR flight
 |
| 15 mins | **Importance of SRM and ADM:*** Why do we need to know them?
* Sources of Pressure

Emergencies:* When do you declare an emergency inflight?
* What does it mean for you when declare an emergency?
* What are your responsibilities.
 |
| The rest of the session will be used as a review session. Any student is open to ask questions on a topic. If no one has anything, session is over for the day. **Collect Attendance Sheet.** |

Session 15 & 16: Holding Patterns

Learner Objectives:

At the conclusion of this session the students will be able to:

* Identify and describe the components of a hold and what makes it standard.
* Write down and interpret a holding clearance.
* Analyze a holding clearance to draw the hold and determine the holding entry.

Materials:

* PowerPoint Presentation: Holds
* Quiz 6 – In Class
* Sign In Attendance Sheet

Agenda:

|  |  |  |  |
| --- | --- | --- | --- |
| **Duration** | **Content** | **Learning Technique** | **Theory** |
| Pass out Attendance Sheet |
| 5 mins | **Announcements*** Any announcements the instructor(s) need to say.
 |
| 10 mins | **What is a Hold?*** Components of hold
* Standard vs non-standard
* Speed restrictions
 | PowerPoint Presentation with class discussion.Make sure to ask questions on understanding of concept before moving on.  | BehavioristLook at PowerPoint presentation: the slides have been created to match the CIP and encoding specificity theories.Retrieval Practice & TARGET: with the class activities you are asking the students to retrieve information that they just encoded. This will help them practice the retrieval process as well as reinforce the encoding of information. By giving them time to figure out the holding instructions, you are giving them some freedom to look through material and try to figure out. Also, since it’s a class activity they can ask their neighbors/friends for help – thus using principles of group work.  |
| 5 mins | **Why Hold?*** Using slide go over various reasons
 | PowerPoint Presentation with class discussion. |
| 45 mins | **Procedures*** Step by Step overview
* ATC Clearances
* Entries
	+ Direct
	+ Parallel
	+ Teardrop
 | PowerPoint Presentation with class discussion.Once have covered details, go over the clearance and what it means to the pilot. **Class Activity:** Pretend to be ATC and give the class some holding clearances. Ask them to write them down and draw out the hold, give 5 mins. Then show them the correct answer. Answer any questions the class has. Repeat as necessary until about 70% of class understands. Describe to class how hold is divided to determine the type of entry required. Then describe the three types.**Class Activity**: Again pretend to be ATC and give holding instructions. Ask the class to draw out the hold AND to determine the type of entry required (make sure to tell them a position report). Give about 5-10mins. Show class the correct response and answer questions. Repeat as necessary until about 70% of class understands. |
| *End first day after Hold Entries.* **Collect Attendance Sheet.** |

|  |
| --- |
| Pass out Attendance Sheet |
| 20 mins for quizVideo is 10 mins | **Quiz 6: Class Quiz*** As a class review ATC holding clearances and entries.
 | Same procedure as the class activities done in the previous day. BUT this time have a student come up front to give the answer (draw hold, provide correct entry). Answer any further questions class may have. **Make sure to not move on until the class understands the concept.**To help the class understand: <https://www.youtube.com/watch?v=whYISFIQuBQ> | Retrieval Practice |
| 15 mins | **Flying the Hold*** How to correct for wind to
	+ Achieve 1 min. legs
	+ Correct for drift
* ATC Reports
 | PowerPoint Presentation with class discussion.Provide examples from your experience to have class understand the importance of wind corrections.  |  |
| Remainder of Class | Study Time/Q&A | This time is allotted for the class or individual students to ask any questions they still have on holding patterns. This topic is tricky to teach, so it’s important to ensure it’s understood. Release class for those that don’t have questions.  | TARGET: Considering student’s needs and helping them succeed.  |
| Collect Attendance Sheet |

Session 17 & 18: Instrument Approach Procedures

Learner Objectives:

At the conclusion of this session the students will be able to:

* Distinguish between precision and non-precision approaches when looking at a chart.
* Identify the fixes that separate approach segments and trace the segments on a chart.
* Recall and match sections on an approach chart.
* Brief an approach based off the chart.
* Interpret a taxi diagram.

Materials:

* PowerPoint Presentation: Instrument Approach Procedures
* Jeppsen/Garmin Pilot subscription for approach plates
* Quiz 7
* Sign In Attendance Sheet

Agenda:

|  |  |  |  |
| --- | --- | --- | --- |
| **Duration** | **Content** | **Learning Technique** | **Theory** |
| Pass out Attendance Sheet |
| 5 mins | **Announcements*** Any announcements the instructor(s) need to say.
 |
| 10 mins | **2 Main Types*** Precision
* Non-precision
 | PowerPoint Presentation with class discussion. | Look at PowerPoint presentation: the slides have been created to match the CIP and encoding specificity theories. |
| 30 mins | **Approach Segments*** Feeder Routes
* Initial approach segment
* Intermediate approach segment
* Final approach segment
* Missed approach
 | PowerPoint Presentation with class discussion and an approach plate and DocCam. Go through the segments of an approach on the chart. Make sure to point out the symbols in the chart to determine the fixes (i.e. FAF, IAF, MAP, etc.). **Class Activity:** On a chart ask students to tell you which are the fixes that define the segments and where the segments are located. Do for at least 2 charts.  | Look at PowerPoint presentation: the slides have been created to match the CIP and encoding specificity theories.CIP/Encoding Specificity: By having chart along with discussion and PowerPoint, students have access to more cues to encode information.Activity: retrieval practiceTARGET and encoding specificity.  |
| 20 mins | **Approach Charts*** Sections:
	+ Heading Section
	+ MSA
	+ Plan View
	+ Profile View
	+ Landing Minimums
	+ INOP Components
 | PowerPoint Presentation with class discussion and an approach plate and DocCam. Go through an approach chart and point out the sections as you go through PowerPoint. Explain any symbols on the chart that are required knowledge on exam.  | Look at PowerPoint presentation: the slides have been created to match the CIP and encoding specificity theories.CIP/Encoding Specificity: By having chart along with discussion and PowerPoint, students have access to more cues to encode information. |
| *End class at approach chart sections*. **Collect Attendance Sheet.**  |

|  |
| --- |
| Pass out Attendance Sheet.  |
| 10 mins | Quiz 7 | Pass out quiz | Retrieval Practice |
| 20 mins | **Approach Charts*** Briefing:
	+ Explain to class how to brief an approach plate.
	+ Explain when you would deviate from standard briefing procedure.
 | Class Discussion with Approach chart on DocCam. Provide your own method of briefing a chart. Provide real life examples of when you had to deviate from standard briefing procedure. | Behaviorist |
| 15 mins | **Types of Approaches*** Contact Approaches
* Visual Approaches
 | PowerPoint Presentation with class discussion.Provide examples of your experience of when you’ve done these approaches.  | BehavioristLook at PowerPoint presentation: the slides have been created to match the CIP and encoding specificity theories. |
| 20 mins | **Taxi Charts*** Components
	+ Frequencies
	+ Airport Diagram
	+ Additional Runway Info
	+ Hotspots
	+ Take-off Minimums and Departure Procedure
	+ Filing Alternate Airport WX mins
 | PowerPoint Presentation with class discussion and an approach plate and DocCam. As you go through taxi diagram make sure class understands it can be more than one page. Also, relate information on this chart to what they have already learned.  | BehavioristCIP/Encoding Specificity |
| Collect Attendance Sheet |

Session 19 & 20: Instrument Procedures – Departure, Enroute, Arrival

Learner Objectives:

At the conclusion of this session the students will be able to:

* Recall standard takeoff minimums and locate where non-standard minimums are printed.
* Interpret and brief a departure procedure.
* Summarize the information presented in a low en route IFR chart.
* Interpret and brief an arrival procedure.

Materials:

* PowerPoint Presentation: Dep., EnRoute, Arr. Procedures
* Jeppsen/Garmin Pilot subscription for approach plates
* Quiz 8
* Sign In Attendance Sheet

Agenda:

|  |  |  |  |
| --- | --- | --- | --- |
| **Duration** | **Content** | **Learning Technique** | **Theory** |
| Pass out Attendance Sheet |
| 5 mins | **Announcements*** Any announcements the instructor(s) need to say.
 |
| 20 mins | **Takeoff Minimums*** + Standard vs. Non-Standard
	+ Where to find them
	+ Who it applies to
	+ Measure of Visibility
		- Types of visibility
 | PowerPoint Presentation with class discussion and an approach plate and DocCam. With chart show where the T.O. mins are and how they apply to pilots. | Look at PowerPoint presentation: the slides have been created to match the CIP and encoding specificity theories. |
| 40 mins | **Departure Procedures*** What are they?
* Components
* 4 Types
	+ SIDs
	+ ODPs
	+ VFR Departure
	+ Diverse Vector Areas
* Procedures/Rules
* Conversion Equation
 | PowerPoint Presentation with class discussion and an approach plate and DocCam. As you go through each type of Departure, show a chart/text with DocCam.Make sure to review how to interpret the chart/text. Use examples from your own experience on how you flew a certain departure procedure. Ask questions to students as you go along to ensure they comprehend material.  | Look at PowerPoint presentation: the slides have been created to match the CIP and encoding specificity theories.BehavioristCIP/Encoding Specificity: By having chart along with discussion and PowerPoint, students have access to more cues to encode information. |
| *End session after going through departure procedures.* **Collect Attendance Sheet.**  |

|  |
| --- |
| Pass out Attendance Sheet.  |
| 10 mins | Quiz 8 | Pass out quiz | Retrieval Practice |
| 20 mins | **En Route:*** Low vs High En route Charts
	+ Components of each
	+ Show examples
* Minimum IFR Altitudes
	+ MEA
	+ MCA
	+ MRA
	+ MORA
	+ MOCA
 | PowerPoint Presentation with class discussion and a chart on DocCam. As you go through each type of altitude, show an example on low enroute chart. Go through the symbols and how it’s depicted.Ask questions to students to see if they can find the altitudes (after going through them as a class).  | Look at PowerPoint presentation: the slides have been created to match the CIP and encoding specificity theories.BehavioristCIP/Encoding Specificity: By having chart along with discussion and PowerPoint, students have access to more cues to encode information.Retrieval Practice |
| 20 mins | **Arrival:*** STARs
	+ What are they?
	+ Components
	+ How to interpret chart
 | PowerPoint Presentation with class discussion and a chart on DocCam.As you go through each type of STAR, show a chart/text with DocCam.Make sure to review how to interpret the chart/text. Use examples from your own experience on how you flew a certain arrival procedure.  | Look at PowerPoint presentation: the slides have been created to match the CIP and encoding specificity theories.BehavioristCIP/Encoding Specificity: By having chart along with discussion and PowerPoint, students have access to more cues to encode information. |
|  | If end the discussion on arrivals and still have time left in class to talk about a topic: Start the weather theory presentation.  |
| Collect Attendance Sheet. |

Session 21 & 22: Aviation Weather

Learner Objectives:

At the conclusion of this session the students will be able to:

* Identify and describe three forces that affect wind patterns.
* Recall what causes weather phenomenon and in what layer of the atmosphere.
* Correlate how temperature and dew point spreads to flying and weather phenomenon.
* Discriminate between the different types of clouds and fog.
* Explain what an airmass is and types of weather it could bring.
* Summarize how a thunderstorm is formed and the dangers for flying near them.
* List the types of icing and explain dangers to flying.
* List the categories and types of turbulence, to include windshear and microbursts.
* Explain the dangers of volcanic ash to flying.

Materials:

* PowerPoint Presentation: Weather Theory
* Quiz 9
* Sign In Attendance Sheet

Agenda:

|  |  |  |  |
| --- | --- | --- | --- |
| **Duration** | **Content** | **Learning Technique** | **Theory** |
| Pass out Attendance Sheet |
| 5 mins | **Announcements*** Any announcements the instructor(s) need to say.
 |
| 70 mins | **The Atmosphere*** What it’s made of
* Layers of the atmosphere

**What is Weather?*** Definition
* High and Low Pressure areas

**Winds*** 3 forces that cause wind
* Local breezes
* Jet stream

**Temperature/Dew Point*** Lapse rates
* Temperature inversions
* Temp/dew point spread and implications

**Clouds*** Types and details

**Fog*** Radiation fog
* Advection fog
* Upslope fog
* Precipitation induced fog

**Air Masses*** Definition
* Types
* Fronts
 | PowerPoint Presentation with class discussion.Ask questions to class as you go along with presentation. Most of this information should be review as they learned it while getting private pilot. Some information is new.  | BehavioristLook at PowerPoint presentation: the slides have been created to match the CIP and encoding specificity theories.Retrieval Practice: by asking questions throughout lecture forcing students to recall previous knowledge.  |
| *End session after Air Masses*. **Collect Attendance Sheet.**  |

|  |
| --- |
| Pass out Attendance Sheet.  |
| 10 mins | Quiz 9 | Pass out quiz | Retrieval Practice |
| 60 mins | **Thunderstorms*** What are they
* Details
* 3 Stages

**Icing*** Induction
* Structural
* Ground
* In-Flight
* Likelihood of Icing

**Turbulence*** Categories of Turbulence
* Types
	+ Low Level
	+ Near Thunderstorms
	+ CAT
	+ Mountain Wave

**Windshear*** What it is
* Low Level
* Frontal

**Microbursts*** What are they
* How they are dangerous
* How to fly in them

**Static Electricity*** What it is
* How it’s created

**Volcanic Ash*** Dangers to Pilots
 | PowerPoint Presentation with class discussion.Ask questions to class as you go along with presentation. Most of this information should be review as they learned it while getting private pilot. Some information is new.  | BehavioristLook at PowerPoint presentation: the slides have been created to match the CIP and encoding specificity theories.Retrieval Practice: by asking questions throughout lecture forcing students to recall previous knowledge.  |
| Collect Attendance Sheet.  |

Session 23 & 24: Aviation Weather Services

Learner Objectives:

At the conclusion of this session the students will be able to:

* Interpret each of the weather services presented in this lesson, which includes current reports, forecasts, and severe weather reports.
* List the weather phenomenon associated with each weather services report presented in this lesson.
* Recall the issue and valid times for each weather services report presented in this lesson.

Materials:

* Websites: aviationweather.org ; 1800wxbrief.com ; fltplan.com ; etc.
* GLEIM Book
* Sign In Attendance Sheet

Agenda:

|  |  |  |  |
| --- | --- | --- | --- |
| **Duration** | **Content** | **Learning Technique** | **Theory** |
| Pass out Attendance Sheet |
| 5 mins | **Announcements*** Any announcements the instructor(s) need to say.
 |
|  | **Current Reports*** METARs
* PIREPs
* RADAR
* SATELLITE

**Forecasts*** TAFs
* Winds Aloft
* Prognostic Charts
	+ Surface Analysis
	+ Low Level Sig. Wx Chart
	+ High Leve Sig. Wx Chart

**Severe Weather*** AIRMETs
* SIGMETs
* CONVECTIVE SIGMETs
 | Using GLEIM book as reference, cover the various weather services required for the written exam.Using websites – pull up the weather services and as a class go through them. Since this is information they already know, ask students to read a certain weather service to the class. Make corrections as necessary. | BehavioristRetrieval Practice: by asking questions throughout lecture, forcing students to recall previous knowledge |
| For each of the weather services, talk about:* What it is
* How it’s determined
* Types (if applicable)
* Type of weather phenomenon it reports
* Issue and valid times
* How to interpret/read (from text or graph or chart)
 |
| The time it takes to cover the weather services varies depending on how much the students already know. Since the class will be based mostly around discussion, having specific times on this lesson plan was difficult. **Therefore, it will be up to the instructor to monitor the time for each of the two sessions to ensure all the material is covered**. The instructor will ensure that Attendance Sheets are passed out and collected for each of the two sessions.  |

Session 25: IFR Flight Planning

Learner Objectives:

At the conclusion of this session the students will be able to:

* Plan an IFR cross country flight.
* Interpret NOTAMs to determine how it will affect their flight.
* File an IFR flight plan.

Materials:

* IFR Flight Planning Sheet – enough for everyone in the class
* Jeppesen/Garmin Pilot subscription for IFR charts
* Calculator/Flight Computer
* [www.faa.gov](http://www.faa.gov) – Chart Supplements online
* Sign In Attendance Sheet

Agenda:

|  |  |  |  |
| --- | --- | --- | --- |
| **Duration** | **Content** | **Learning Technique** | **Theory** |
| Pass out Attendance Sheet |
| 5 mins | **Announcements*** Next session is a review. Bring any questions on anything you are confused or don’t understand.
* Test 2 starts Thursday after class.
* Endorsement Exam 3 will be next Tuesday.
* Any other announcements the instructor(s) need to say.
 |
| 70 mins | **IFR Flight Planning*** Selecting a Route
	+ Preferred IFR Routes
	+ Departure and/or Arrival Procedures
	+ NAV equipment
	+ Direct?
* Selecting an Altitude
	+ Minimum altitudes
	+ Obstacles
	+ Airspace
	+ Weather – Icing
* Alternate Airport Requirements and Criteria
* Calculations required in flight planning sheet
* NOTAMs
	+ FDC Notams for instrument procedures
	+ TFRs
* Filing Flight Plan
 | As a class we will plan an IFR cross country. The instructor will select the two airports of departure and arrival. Based on the day and what weather is doing. Instructor will teach how to plan the cross country while the students follow along. Lecture will be needed when the instructor must explain a concept or how to do something, otherwise it will be a class collaboration work.  | TARGET, CIP, Encoding Specificity |
| Collect Attendance Sheet.  |

Session 26: Review Session

Learner Objectives:

At the conclusion of this session the students will be able to:

* Understand material necessary to pass the Endorsement Exam 3.

Materials:

* Whatever materials the instructor believes necessary to bring to review session.

Agenda:

|  |  |  |  |
| --- | --- | --- | --- |
| **Duration** | **Content** | **Learning Technique** | **Theory** |
| 5-10 mins | **Announcements*** Test 2 opens today after class and closes Tuesday before class. On Blackboard.
* On Tuesday next week, we will have the Endorsement Exam. Necessary to get endorsement to take the FAA Written Exam. Must pass with 70% or higher.
* Any other announcements the instructor(s) need to say.
 |
|  | **Answer any questions students have about exam, endorsement, FAA written, etc.**  |
| The session will be used as a review session. Any student is open to ask questions on any topic. If no one has anything, session is over for the day. The instructor will be available for anyone who didn’t feel comfortable asking questions in front of class.  |

Session 27: Exam 3 “Final” for Endorsement

Learner Objectives:

At the conclusion of this session the students will be able to:

* Take and receive a minimum of 70% on the exam.

Materials:

* Exam 3
* Exam 3 Supplement
* Exam 3 Answer Sheet
* Endorsements – Blank
* Attendance Sheet

Agenda:

|  |  |  |  |
| --- | --- | --- | --- |
| **Duration** | **Content** | **Learning Technique** | **Theory** |
| Pass Out Attendance Sheet |
| 5 mins | **Announcements*** If you require more time to finish exam, let instructor know when turning it in. We’ll find time later today or tomorrow to finish exam.
* If you don’t pass we will have a retake exam next Tuesday. We will post grades on Blackboard so you know if you passed.
* Any last minute questions.
* Any other announcements the instructor(s) need to say.
 |
| 5 mins | **Exam Rules:*** No electronic devices on the desk. That includes phones, iPads, tablets, computers, etc.
* Calculators and flight computers allowed. No calculators on phone.
* Take time and carefully read each section. Some questions have figures associated with them, make sure to look at the correct one.
* If have any questions during exam come up front and ask instructor.
* You have the whole class period to take the exam.
* Good luck!
 |
|  | **Pass Out Exam.** Once class period ends. Make sure to collect all exams and supplements. Collect Attendance Sheet.  |

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**AT24900 Quiz1**

1. List the instruments that use the pitot-static system:
	1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. List the instruments that use a gyroscope:
	1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. True or False. For IFR flight, FAR part 91 requires an aircraft to be equipped with an airspeed indicator, a sensitive altimeter, and a magnetic compass.
4. When a pilot uses the alternate static source, what will he/she expect the instruments to show?
	1. The altimeter will read lower than actual
	2. The airspeed will read higher than actual
	3. The VSI will show a continuous climb
	4. Neither of these
5. What is the purpose of the encoding altimeter?
	1. An encoding altimeter allows the pilot to input changes in pressure through a Kollsman window to have a correct indicated altitude.
	2. An encoding altimeter is paired with a transponder to transmit a signal to ground radar for ATC to see the plane’s altitude.
	3. An encoding altimeter uses standard pressure (29.92” Hg) to ensure pressure altitude is being indicated when flying at or above FL180.
6. True or False. A correction card for the magnetic compass is found in the airplane to help pilots correct their course due to magnetic variation errors.
7. What power source can gyroscopic instruments use in an aircraft?
	1. Pneumatic system
	2. Electrical system
	3. Vacuum pump system
	4. All of the above
	5. Neither of these
8. What is the maximum amount of time the gyroscope in the attitude indicator can take to get into the upright position for flight?
	1. 3 minutes
	2. 5 minutes
	3. 7 minutes
9. In a turn coordinator, how do you know if you are at standard rate of turn?
	1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
10. If you are using a non-slaved gyroscopic directional gyro, how often do you have to check the heading with the magnetic compass?
	1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**AT24900 Quiz 2**

1. What is the definition of center of pressure?
	1. A point along the longitudinal axis where all the weight is centered
	2. A point along the longitudinal axis where all the lift is centered
	3. A point along the chord line of an airfoil were lift is centered
2. List the three types of drag that make up parasite drag
	1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. True or False. As the angle of attack increases, induced drag decreases.
4. What is Newton’s Third Law?
	1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. True or False. When flying at slow airspeeds separation of the boundary layer from the airfoil is more prominent; therefore, vortex generators are used to delay this separation.
6. A standard rate turn for IFR flight is accomplished when the plane is turning at a rate of
	1. 5° per second
	2. 3° per second
	3. 2° per second
7. What are the fundamental skills required by a pilot to fly safely in IMC conditions?
	1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
8. What are the basic errors associated with instrument cross-check?
	1. Fixation
	2. Omission
	3. Emphasis
	4. All of these
	5. None of these
9. For the control and performance method of instrument flying, select **ALL** the instruments that are considered performance instruments.
	1. Attitude indicator
	2. Altimeter
	3. VSI
	4. RPM gauge
10. For the primary/supporting instrument method of instrument flying, select **ALL** the instruments that are considered bank instruments.
	1. Attitude indicator
	2. Altimeter
	3. Heading indicator
	4. Turn coordinator

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**AT24900 Quiz 3**

1. To be instrument current, a pilot in the last 6 months must accomplish
	1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Who can conduct an IPC?
	1. An FAA examiner
	2. A CFII
	3. A DPE
	4. Neither of the above
	5. All of the above
3. When can a pilot deviate from an ATC clearance?
	1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. True or False. Fuel requirements for an IFR flight plan include enough fuel to get to destination and then fuel for 30 minutes of flight at cruise power.
5. When is an alternate airport required?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What are the three things you need to descend below a DA/MDA?
	1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Which are required equipment for IFR flight? Select all that apply
	1. Altimeter
	2. Clock
	3. Manifold pressure gauge
	4. GPS

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**AT24900 Quiz 4**

1. For a flight under IFR, the pilot in command shall become familiar with:
	1. Weather reports and forecasts
	2. Traffic delays
	3. Fuel requirements
	4. All of these
	5. None of these
2. Write out the acronyms.
	1. RVR \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. REIL \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	3. TDZL \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. True or False. To log time in a flight simulator/training device for instrument aeronautical experience, an instructor must be present and must sign the person’s logbook.
4. Under what circumstances can a pilot in command deviate from an ATC clearance?
	1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. True or False. Under IFR, ATC will assign an altitude for cruise flight that must be followed by the pilot.
6. In order to maintain IFR currency, within the last 6 calendar months, a pilot must
	1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and
	2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and
	3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. If no minimum altitude is given in a mountainous area, the pilot needs to fly an altitude of
	1. 1,500ft above highest obstacle and 3NM from the course to be flown
	2. 2,000ft above highest obstacle and 4NM from the course to be flown
	3. 2,500ft above highest obstacle and 5NM from the course to be flown
8. An instrument proficiency check must be completed when the pilot has failed to meet the instrument recency requirements for more than
	1. 10 months
	2. 6 months
	3. 3 months
9. A pilot may not make a procedure turn when
	1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
10. True or False. To operate an aircraft in controlled airspace under IFR, a pilot ONLY needs to have filed an IFR flight plan.

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**AT24900 Quiz 5**

1. What are the four types of hypoxia?
	1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. True or False. Symptoms of hyperventilation include: loss of consciousness, euphoria, headaches, impaired judgment.
3. Which are spatial illusions? Select all that apply
	1. The leans
	2. Autokinesis
	3. Featureless Terrain
	4. Somatogravic illusion
4. What does the IMSAFE checklist stand for?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Which part of the eye are used for night vision?
	1. Rods
	2. Cones
	3. Both
	4. Neither

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**AT24900 Quiz 7**

1. True or False. A precision approach provides you with lateral and vertical guidance where a non-precision approach only gives you vertical guidance.
2. An intermediate approach segment
	1. Starts at FAF and ends at MAP
	2. Starts at the IF and ends at the FAF
	3. Starts at the IAF and ends at the IF
3. A minimum safe altitude has a radius of
	1. 30 miles
	2. 25 miles
	3. 20 miles
4. Aircraft approach categories are determined by
	1. 1.3Vso
	2. 1.2Vso
	3. 1.4Vso
5. What weather minimums are required for a contact approach?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**AT24900 Quiz 8**

1. True or False. A part 91 operator must comply with all takeoff minimums.
2. RVR is reported in
	1. Feet
	2. Miles
	3. Feet and miles
3. In order to do a departure procedure the pilot must have a minimum of
	1. The graphical format
	2. The textual format
	3. Both of the above
	4. Neither of the above
4. What are the four types of departure procedures?
	1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. True or False. Low En Route IFR Charts are below 18,000 feet MSL.
6. How can you avoid doing a STAR into an airport?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**AT24900 Quiz 9**

1. What causes weather? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What are the three forces that act upon wind?
	1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. True or False. If the temperature and dew point spread is small (within 5 degrees) we can expect visible moisture and low visibilities.
4. What is true about radiation fog?
	1. It forms on cool and calm nights
	2. It requires wind for air to blow over to a cold surface
	3. It requires lifting action for air to get cooled
5. What are the three conditions required to make a thunderstorm?
	1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. True or False. The three stages of a thunderstorm include: creation stage, mature stage, and the raining stage.
7. What are three types of icing?
	1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
8. Microbursts can last up to
	1. 10 minutes
	2. 15 minutes
	3. 20 minutes
9. True or False. ATC will advise you if low level windshear occurs at the airport.
10. What are three categories of turbulence?
	1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_