



MERCER
COUNTY COMMUNITY COLLEGE

COURSE OUTLINE

Course Number AVI 132	Course Title Commercial Pilot II	Credits
Hours: 3 Lecture	Prerequisite: AVI 131, AVI 113, AVI 114 Corequisite: AVI 113 or AVI 114	Implementation Fall 2023

Catalog description:

Basic knowledge to pass the Federal Aviation Administration commercial pilot knowledge test. Includes Advanced multi-engine performance control, advanced meteorology, advanced multi-engine airplane Systems, advanced radio navigation, commercial pilot FARs, physiology of flight, environmental systems, flight planning and commercial maneuvers.

General Education Category:
Not GenEd

Course coordinator:
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Required texts & Other materials:

1. Pilot's Handbook of Aeronautical Knowledge by US Department of Transportation, FAA (Free Download)
2. Airplane Flying Handbook by US Department of Transportation, FAA (Free Download)

Downloads available at https://www.faa.gov/regulations_policies/handbooks_manuals

Course Student Learning Outcomes (SLO):

The Course Student Learning Outcomes (SLO) are outlined in the requirements for the issuance of commercial pilot certificate in 14 CFR 141 Appendix D Section 3 b(1)-(15):

Upon successful completion of this course the student will be able to explain:

1. Applicable Federal Aviation Regulations that relate to commercial pilot privileges, limitations and flight operations. **(PLO 1,4,6) (ILG 1,4,9)**
2. Accident reporting requirements of the National Transportation Safety Board. **(PLO 1,4,5,6) (ILG 1,4,5,9)**
3. Basic aerodynamics and the principles of flight. **(PLO 1,4,5) (ILG 1,2,3,4,11)**
4. Meteorology to include recognition of critical weather situations, wind shear recognition and avoidance and the use of aeronautical weather reports and forecasts. **(PLO 1,4,5,6) (ILG 1,3,4,10,11)**
5. Safe and efficient operation of aircraft. **(PLO 1,4,6) (ILG 1,2,3,4,11)**
6. Weight and balance computations. **(PLO 1,4,5) (ILG 1,2,4,11)**
7. Use of performance charts. **(PLO 1,4,5) (ILG1,2,4,11)**
8. Significance and effects of exceeding performance limitations. **(PLO 1,4,5,6) (ILG 1,4,9,10)**
9. Use of Aeronautical charts and magnetic compass for pilotage and dead reckoning. **(PLO 1,4,5) (ILG 1,2,4,11)**

10. Use of navigational facilities. **(PLO 1,4,5) (ILG 1,3,4)**
11. Aeronautical decision making and judgment. **(PLO 1,4,5,6) (ILG 1,4,5,9,10,11)**
12. Principles and functions of aircraft systems. **(PLO 1,4,5) (ILG 1,3,4,11)**
13. Maneuvers, procedures and emergency operations appropriate to the aircraft. **(PLO 1,4,5,6) (ILG 1,4)**
14. Night and high altitude operations. **(PLO 1,4) (ILG 1,3,4,10)**
15. Procedures for operating within the National Airspace System. **(PLO 1,4,5) (ILG1,4,10)**

Course-specific Institutional Learning Goals (ILG):

Institutional Learning Goal 1. Written and Oral Communication in English. Students will communicate effectively in both speech and writing.

Institutional Learning Goal 2. Mathematics. Students will use appropriate mathematical and statistical concepts and operations to interpret data and to solve problems.

Institutional Learning Goal 3. Science. Students will use the scientific method of inquiry, through the acquisition of scientific knowledge.

Institutional Learning Goal 4. Technology. Students will use computer systems or other appropriate forms of technology to achieve educational and personal goals.

Institutional Learning Goal 5. Social Science. Students will use social science theories and concepts to analyze human behavior and social and political institutions and to act as responsible citizens.

Institutional Learning Goal 9. Ethical Reasoning and Action. Students will understand ethical frameworks, issues, and situations.

Institutional Learning Goal 10. Information Literacy: Students will recognize when information is needed and have the knowledge and skills to locate, evaluate, and effectively use information for college level work.

Institutional Learning Goal 11. Critical Thinking: Students will use critical thinking skills understand, analyze, or apply information or solve problems.

Program Learning Outcomes for Aviation Technology (PLO)

1. Demonstrate the knowledge and skills required to obtain the private and commercial certificates and instrument rating, including aeronautical technical skills and decision-making, while demonstrating safety as their primary focus
4. Demonstrate effective and correct written and verbal communication
5. Research and present information pertinent to their aviation discipline individually and in teams
6. Demonstrate an awareness of the ethical and professional issues associated with the aviation industry, including the importance of becoming a life-long learner in the aviation world

Commercial Ground Instruction Course Objectives

The purpose of this course is to have the student acquire the knowledge and information to meet the requirements specified in the Code of Federal Regulations Part 141 that pertain to the commercial pilot certificate CFR 61.125 Section (b).

Course Completion Standards

The student must demonstrate through written testing and classroom activities that they have gained the knowledge and information necessary to pass the FAA commercial rating airplane knowledge test with a minimum grade of 70%. All quizzes and unit tests, whether oral or written, must be corrected to 100% accuracy upon review by the student.

Units of study in detail – Unit Student Learning Outcomes:

Unit 1 - Basic Aerodynamics (Supports SLO #3)

180 minutes

Learning Objectives

After completing this lesson, the student will understand basic aerodynamics and the principles of flight.

Lesson Content

Basic Airplane Aerodynamics

The student will be able to...

1. Define Lift
 - a) Lift Equation
2. List Several High Lift Devices
3. Define Drag
 - a. Induced Drag
 - b. Parasite Drag
 - c. Total Drag
4. Define Thrust
5. Define Propeller Efficiency
6. Discuss Flight in the Area of Reverse Command
7. Define Weight
8. Discuss Aircraft Stability
 - a. Static
 - b. Dynamic
 - c. Dutch Roll
 - d. Spiral Instability
 - e. Longitudinal
 - f. Lateral
 - g. Directional
9. Define and Contrast Aerodynamics and Flight Performance
 - a. Straight and Level Flight
 - b. Climbs
 - c. Turns
 - d. Glides
 - e.

Lesson Completion Requirements

The student must pass the unit test on Gleim AVLearn Software with a minimum grade of 84%.

Unit 2 - Advanced Airplane Systems (Supports SLO #12)

240 minutes

Learning Objectives

The objective of this lesson is for the student to gain an understanding of the principals and functions with the various systems found in complex and multi-engine airplanes.

Lesson Content

Propellers, Fuel Injection, Turbo Charging, and Landing Gear

A. Controllable Pitch Propellers

The student will be able to...

1. Define Constant Speed Propellers and Contrast with other Propellers
2. Define Propeller Efficiency
3. Define RPM Control
4. State Operation Procedures
5. Propeller Overspeed Indications and Corrections

B. Fuel Injection and Turbo Charging

The student will be able to...

1. Define Fuel Injection Systems and Contrast with Carburetor System
 - a. Components
 - b. Normal Starting Procedures
 - c. Detonation
 - d. Pre-Ignition
 - e. Carburetor Icing
 - f. Induction Icing
2. Define Exhaust Gas Temperature (EGT) Gauge and State its Use
3. List Mixture Leaning Procedure
4. Define Alternate Air Source and State How it is Used
5. Define Turbo Charging and List its Effect on Performance
 - a. System Components
 - b. Turbo Charging Operations

C. Landing Gear Systems

The student will be able to...

1. Define Retractable Landing Gear and Contrast with Fixed Gear
2. Contrast and State Advantages and Disadvantages of:
 - a. Electrical System
 - b. Hydraulic System
 - c. Electro-Hydraulic System
3. Landing Gear Components
 - a. Micro-Switches
 - b. Squat-Switches
 - c. Pressure Switches
 - d. Warning Horn and Lights
 - e. Position Indicators
 - f. Emergency Gear Extension
4. Landing Gear Malfunctions

5. Airspeed Limitations – VLE / VLO

Lesson Completion Requirements

The student must pass the unit test on Gleim AVLearn Software with a minimum grade of 84%.

Unit 3 - Aeronautical Information Manual, Airports, Air Traffic Control, and Airspace (Supports SLOs #5 and #15)

160 minutes

Learning Objectives

The objective of this lesson is for the student to review and understand the procedures of operating within the National Airspace System.

Lesson Content

Operating Procedures and Flight Information for Airspace And Airports

The student will be able to...

1. Explain Collision Avoidance
2. Define and Identify Class “A” Airspace
3. Define and Identify Class “B” Airspace
4. Define and Identify Class “C” Airspace
5. Define and Identify Class “D” Airspace
6. Define and Identify Class “E” Airspace
7. Define and Identify Class “G” Airspace
8. Define and Identify Special Use Airspace
 - a. Prohibited
 - b. Restricted
 - c. Warning
 - d. Alert
 - e. MOA’s
9. Other Airspace
 - a. TFRs
 - b. SFRA
10. Airport Signs and Markings
11. Collision Avoidance Procedures
12. Wake Turbulence Avoidance
13. Land and Hold Short Operations (LAHSO)
14. Wind Direction Indicators – Segmented Circles

Lesson Completion Requirements

The student must pass the unit test at the College Testing Center with a minimum grade of 84%.

Lesson Completion Requirements

The student must pass the Unit test on Gleim AVLearn Software with a minimum grade of 84%. Students will complete an quiz on AIM with a score of 70% or better.

Unit 4 - Federal Aviation Regulations/National Transportation Safety Board (Supports SLOs #1 and #2)

160 minutes

Learning Objectives

The objective of this lesson is for the student to have a thorough understanding of the areas in Parts 61, 91 as it pertains to commercial privileges, limitations and flight operations. In addition,

student will review other applicable FAR's which pertain to commercial privileges. The student will also understand the accident reporting procedures of NTSB 830.

Lesson Content

Code of Federal Aviation Regulations and Implications

The student will be able to understand and explain...

A. FAR Part 1

Part 1 of the FARs alphabetically lists the definitions of terms used in the subsequent regulations. In addition, any abbreviations or symbols used in FARs are defined and explained in Part 1.

1	Definitions and Abbreviations
23	Airworthiness Standards: Normal, Utility, and Acrobatic Category Airplanes
43	Maintenance, Rebuilding, and Alteration

B. FAR Part 61

61.3	Requirements for Certificates, Ratings, and Authorizations
61.5	Certificates and Ratings Issued Under this Part
61.19	Duration of Pilot and Flight Instructor Certificates
61.23	Duration of Medical Certificates
61.31	General Limitations
61.51	Pilot Logbooks
61.55	Second-In-Command Qualifications
61.56	Flight Review
61.57	Recent Flight Experience: Pilot in Command
61.58	Pilot In command Proficiency Check: Operation of Aircraft requiring more than one pilot flight crew member
61.60	Change of Address
61.69	Glider Towing: Experience and Instruction Requirements
61.129	Airplane Rating: Aeronautical Experience
61.133	Commercial Pilot Privileges and Limitations

C. FAR Part 91

91.21	Portable Electronic Devices
91.3	Responsibility and Authority of the Pilot In Command
91.7	Civil Aircraft Airworthiness
91.9	Civil Aircraft Flight Manual, Marking, and Placard Requirements
91.15	Dropping Objects
91.23	Truth in Leasing Clause Requirements in Leases and Conditional Sales Contracts
91.103	Pre-flight Action
91.105	Flight Crewmembers at Stations
91.107	Use of Safety Belts
91.111	Operating Near Other Aircraft
91.113	Right-of-Way Rules; Except Water Operations
91.117	Aircraft Speed
91.119	Minimum Safe Altitudes: General
91.121	Altimeter Settings
91.123	Compliance with ATC Clearances and Instructions

91.144	Temporary Restrictions on Flight Operations during abnormally High Barometric Pressure Conditions
91.155	Basic VFR Weather Minimums
91.157	Special VFR Weather Minimums
91.159	VFR Cruising Altitudes or Flight Level
91.167	Fuel Requirements for Flight in IFR Conditions
91.169	IFR Flight Plan: Information Required
91.171	VOR Equipment Check for IFR Operations
91.175	Takeoff and Landing under IFR
91.177	Minimum Altitudes for IFR Operations
91.183	IFR Communications
91.187	Operation under IFR in controlled airspace: Malfunction Repts
91.203	Civil Aircraft: Certifications required
91.205	Powered Civil Aircraft with Standard Category U.S. Airworthiness Certificates; Instrument and Equipment Requirements
91.207	Emergency Locator Transmitters
91.209	Aircraft Lights
91.211	Supplemental Oxygen
91.213	Inoperative Instruments and Equipment
91.215	ATC Transponder and Altitude Reporting Equipment and Use
91.225	ADS-B Out Equipment Use
91.227	ADS-B Out Equipment Performance Requirements
91.303	Acrobatic Flight
91.307	Parachutes and Parachuting
91.311	Towing: Other than Under 91.17
91.313	Restricted Category Civil Aircraft: Operating Limitations
91.315	Limited Category Civil Aircraft; Operating Limitations
91.319	Aircraft having Experimental Certificates: Operating Limitations
91.403	Maintenance, Preventive Maintenance, and Alterations: General
91.405	Maintenance Required
91.407	Operation after Maintenance, Preventive Maintenance, Rebuilding or Alteration
91.409	Inspections
91.413	ATC Transponder Tests and Inspections
91.417	Maintenance Records
91.421	Rebuilt Engine Maintenance

D. NTSB Part 830

Notifications and Reporting of Aircraft Accidents, Incidents, and Overdue Aircraft, etc.

E. Additional Applicable Regulations

1. FAR Part 135
2. Hazmat Part 175
3. TSA Part 1500
4. Part 119 Air Carrier and Commercial Operators
5. Part 121 Domestic Air Carrier

Lesson Completion Requirements

The student must pass the unit test on Gleim AVLearn Software with a minimum grade of 84%.

Unit 5 - Advanced Performance Control and Weight and Balance (Supports SLOs #6, #7, and #8)
320 minutes

Learning Objectives

The objective of this lesson is for the student to gain a firm understanding of the use of performance charts, the significance of exceeding aircraft performance limitations, and focus attention on decision-making and judgment. In addition, the student will review weight and balance theory and computations, and reinforce his/her understanding of the significance and effects of exceeding aircraft performance limitations.

Lesson Content

Commercial Advanced Airplane Performance Control and Weight and Balance

The student will be able to...

1. Calculate Aircraft Performance from Information Provided
2. Define and Calculate Density Altitude
3. Define Pressure Altitude and State How to Obtain it
4. List the Effects of Humidity on Performance
5. Use Multi-engine Performance Charts to Extract Performance Data
 - a. Takeoff
 - b. Accelerate-Stop Distance
 - c. Single-Engine Takeoff
 - d. Climb
 - e. Best Angle of Climb
 - f. Best Rate of Climb
 - g. Cruise Climb
 - h. Cruise Control
 - i. Landing
6. Discuss Safe and Efficient Operation Procedures for Multi-engine and Complex Single-engine Aircraft
7. List Airplane Inspection and Certification Documents
8. State Operating Limitations of a Specific Airplane and Where they are Found
9. Define Airplane Performance Speeds and State Where Each is Used
10. Compute Runway Distance and Obstacle Clearance
11. Calculate Crosswind Component and State Effects on Performance
12. VMC
 - a. Definitions
 - b. Factors Influencing Vmc
13. Critical Engine
 - a. Forces Associated with Single Engine Operations
14. Trim Tabs Use for Multi-Engine Operations
15. Engine Failure
 - a. Takeoff
 - b. Climb
 - c. Cruise
 - d. Descent
 - e. Landings

Weight and Balance

16. Define Ramp Weight, Takeoff Weight, BEW, Payload, Useful Load, Datum,
17. Define Center of Gravity, Aerodynamic Center
18. State Effects of Overload
19. Describe Importance of the Center of Gravity Envelope

20. List Effects of Load Forward of CG Limit
21. List Effects of AFT Loading
22. Perform Weight and Balance Computations
 - a. Computation Method
 - b. Table Method
 - c. Graph Method
23. Compute Weight and Balance Problems Involving Adding, Removing and Shifting Weight
24. Standard Weights
 - a. Passenger
 - b. AV Fuel
 - c. Jet Fuel
 - d. Oil

The student must pass the unit test on the Gleim AVLearn Software with a minimum grade of 84%.

Unit 6 - Flight Physiology and Aeronautical Decision Making (Supports SLO #11)

240 minutes

Learning Objectives

The objective of this lesson is for the student to become familiar with certain physiological factors associated with flight and the consequences of the detrimental factors. In addition students will review the factors associated with the decision making process, which defines the problem, evaluates the circumstances, and resolves the problem.

Lesson Content

Physiology of Flight

1. Oxygen Requirements

The student will be able to...

 - a. Define Hypoxia and Describe its Effects
 - b. Define Hyperventilation and its Effects
 - c. Describe effects of Pressure Change
 - d. Describe Sinus Cavities and Associated Problems
 - e. Describe Decompression and its Effects
 - f. Describe Fatigue and its Effects
 - g. Describe Circadian Rhythms and its Effects
 - h. Describe Sensory Illusions and the Associated Effects
 - i. Define Vestibular Sense
 - j. Define Kinesthetic Sense
 - k. Carbon Monoxide Dangers
 - l. Scuba Diving Restrictions
 - m. Motion Sickness
2. Vertigo and Vision

The student will be able to...

 - a. List Motion Illusions / Spatial Disorientation
 - b. List Visual Illusions
 - c. Define Flicker Vertigo
 - d. List Vertigo Prevention Procedures
 - e. Define Light Sensitivity
 - f. Define Dark Adaptation – Function of Rods and Cones
 - g. Explain Scanning Techniques
3. Blood Donations and Flight
4. Pilot in Command Responsibility

- a. Factors Influencing Responsibilities
 - b. Hazardous Attitudes
 - c. Interpersonal Relationships
- 5. Communications
 - a. Effective Listening
 - b. Barriers to Communications
 - c. Verbal and Non-verbal Communications
- 6. Workload Management
 - a. Planning and Preparation
 - b. Prioritizing
 - c. Work Overload
- 7. Resource Use
 - a. Resource Recognition
 - b. Internal Resources
 - c. External Resources
- 8. Situational Awareness
 - a. Operational Conditions
 - b. Environmental Condition
 - c. Obstacles to Maintaining Situational Awareness
- 9. Accidents and Incidents
 - a. Accident Synopsis
 - b. Human Factor Training in Action
 - i. United Flight 232 7/19/1989
 - ii. US Airways Hudson River

Unit 7 and 8 - Meteorology (Supports SLO #4)
240 minutes

Learning Objectives

The objective of this lesson is to provide a basic working knowledge of meteorology, recognition of critical weather hazards, wind shear avoidance, and the use of aeronautical weather reports and forecasts.

Lesson Content

Weather Factors, Weather Hazards, Printed Reports and Forecasts

A. Weather Factors

The student will be able to understand...

- 1. Layers of the Atmosphere
- 2. Atmosphere Circulation
- 3. Moisture
- 4. Atmospheric Stability
- 5. Clouds and Cloud Formations, Mountain Wave Turbulence
- 6. Air Masses, Fronts and Weather Associated with Each Type

B. Weather Hazards

The student will be able to understand...

- 1. Thunderstorms
- 2. Thunderstorm Avoidance
- 3. Turbulence
- 4. Reporting Turbulence
- 5. Wake Turbulence
- 6. Low Visibility

7. Restrictions to Visibility
8. Icing
9. Estimating Freezing Level
10. Avoiding Ice
11. Hydroplaning
12. Cold Weather Operations
13. Mountain Wave Phenomena
14. Clear Air Turbulence

C. Printed Reports and Forecasts

The student will be able to understand...

1. Surface Aviation Weather Reports
2. Radar Weather Report
3. Terminal Forecasts
4. Area Forecasts
5. Winds and Temperatures Aloft
6. Severe Weather Reports and Forecasts
7. In-flight Weather Services
8. Automated Weather Observation System (AWOS)

D. Charts and Graphs and Inform

1. Pireps
2. HIWAS
3. Weather Depiction
4. Constant Pressure Charts
5. Freezing Level
6. Low and High Level Significant Weather Prognostic Charts

Lesson Completion Requirements

The student must pass the unit test on the Gleim AVLearn Software with a minimum grade of 84% and complete a weather project assigned by instructor with a minimum grade of 70%.

Unit 9 - Flight Computer and Aeronautical Charts (Supports SLO #9)

240 minutes

Learning Objectives

The objective of this lesson is for the student to review the functions and uses of the flight computer for problem solving and the use of aeronautical charts and the plotting of magnetic courses for pilotage and dead reckoning.

Lesson Content

Flight Computer Problem Resolution; Plotting Courses, Designating Checkpoints, and Calculation of Time Based Upon Winds for Pilotage and Dead Reckoning with Aeronautical Charts

1. Flight Computer

The student will be able to...

- a. Identify Calculator Side
- b. Calculate Density Altitude
- c. Calculate TAS
- d. Calculate Time-Speed-Distance
- e. Calculate Fuel Consumption
- f. Identify Wind Side
- g. Gather Wind Data
- h. Plot the Wind
- i. Find Heading with Groundspeed

- j. Calculate Unknown Winds
 - k. Explain Wind Component Chart
2. Aeronautical Charts
- The student will be able to...*
- a. Plot Courses
 - b. Determine True Course
 - c. Calculate Wind Correction Angle
 - d. Apply Isogonic Variation for Magnetic Heading
 - e. Understand Variation for Course Heading
 - f. Establish Checkpoints
 - g. Fill out Navigation Log
3. IFR Enroute Low Altitude Charts
- a. Chart Legend
 - b. Change Over Points
 - c. ARTCC Symbols
 - d. MEA/MOCA/GNSS Symbols
 - e. Holding Pattern Symbols
 - f. Altitude Change Symbols
 - g. DME Designations
 - h. MRA
 - i. Low Altitude vs. High Altitude Symbols
4. Approach Charts
- a. Top and Bottom Margin Identification
 - b. Planview
 - c. Profile View
 - d. Minimums Section
 - e. Airport Diagram
 - f. RVR Information
 - g. IAF/IF
 - h. Aircraft Categories and Speeds
 - i. NonStandard Takeoff and Alternate Minimum Symbols
 - j. Runway terminology (TDZE, ELEV, THRE, HAT, MDA, DA, DH)
 - k. LDA/SDF Approaches
 - l. Side Step Approaches
 - m. Localize/ILS Approaches
 - n. VOR and RNAV Approaches
 - o. Missed Approaches
 - p. Category II and III Approaches

Lesson Completion Requirements

The student must pass the in-class quiz with a minimum grade of 70%.

Unit 10 - Use of Air Navigational Facilities (Supports SLO #10)

160 minutes

Learning Objectives

After completing this lesson, the student will be able to use radio facilities for cross-country navigation. He/she will be able to use ground-based radar and a transponder as aids to navigation.

Lesson Content

Radio Navigation Systems

1. VOR Navigation and DME
The student will be able to...
 - a. Define VOR Navigation and State Advantages of VOR
 - b. List Classes of VOR Facilities
 - c. Apply VOR Orientation and Navigation to Simulated Flights
 - d. Define Distance Measuring Equipment and List Characteristics
 - e. Describe Horizontal Situation Indicator and Contrast with VOR Indicator and Heading Indicator

2. Area Navigation, GPS
The student will be able to...
 - a. Explain RMI
 - b. Relate how to use RMI
 - c. State RMI Accuracy Checks
 - d. Describe RNAV
 - e. Describe Course-Line Computers
 - f. Explain GPS Principles and Use
 - g. Explain VOR Use – Reception, ID, Tracking Intercepting, Bracketing

3. Radar and Transponders
The student will be able to...
 - a. Define Radar
 - b. Explain the Purpose of Primary Radar
 - c. Explain the Purpose of Secondary Surveillance Radar
 - d. Define Transponder
 - e. List Transponder Modes
 - f. Explain Transponder Codes
 - g. List Transponder Controls and their Purposes
 - h. Define Weather Avoidance Radar

Lesson Completion Requirements

The student must pass the unit test at the College Testing Center with a minimum grade of 84%.

Next Assignment

Federal Aviation Regulations and National Transportation Safety Board

Unit 11 - Operating Procedures and Flight Information (Supports SLOs #13 and #14) 160 minutes

Learning Objectives

The objective of this lesson is for students to review the fundamentals of flight operations, including basic taxi, takeoff, and landing procedures as well as emergency procedures. In addition the student will review cold weather operation procedures, procedures to follow when encountering turbulence, and night flight operations.

Lesson Content

1. Fundamentals of Flight
 - a. Straight and Level
 - b. Turns
 - c. Climbs
 - d. Descents

2. Taxi Procedures
 - a. Proper Aileron position
 - b. Procedures during windy conditions

3. Takeoff Procedures
 - a. Normal Takeoffs
 - b. Crosswind Takeoffs
4. Landing Procedures
 - a. Gusty Wind Approaches
 - b. Factors associated with Landing in a tailwind
 - c. Go-Around Procedures
5. Emergency Procedures
 - a. Procedures for Engine failure – Takeoff, Cruise, and Landing
 - b. Diversion procedures
6. Cold Weather Operations
 - a. Importance of pre-heating engine
 - b. Inspecting all areas of aircraft for ice
 - c. Factors associated with taking off from a contaminated runway
7. Turbulence
 - a. Speeds required when operating in turbulent air
 - b. Importance of V_A
 - c. Clear Air Turbulence
8. Night Flight Operations
 - a. Dark Adaptation – Function of Rods and Cones
 - b. Airport Lighting Systems
 - c. Lighted Obstructions
 - d. Importance of weather briefings and knowing signs of flying into reduced visibility
 - e. Considerations when performing an emergency landing at night

Unit 12 - Environmental Systems, (Supports SLO #12)

160 minutes

Learning Objectives

The objective of this lesson is to gain understanding and knowledge of the various oxygen systems used in aviation, cabin pressurizations, and ice control systems.

Lesson Content

Oxygen Systems, Cabin Pressurizations, and Structural Ice Control Systems

The student will be able to...

1. Define and contrast Oxygen Systems
 - a. Continuous Flow Oxygen Systems
 - b. Diluter-Demand Oxygen Systems
 - c. Pressure-Demand Oxygen Systems
2. Calculate Oxygen Supply Duration
3. Define different Cabin Pressurization
 - a. Describe Operation
 - b. List Safety Features
 - c. List Other Features
 - d. Itemize Pressurization Instruments and Controls
4. Define Structural Ice Control Systems
 - a. Explain Ice Control Equipment and Systems
 - b. Describe Electrical Propeller Anti-Ice

- c. Describe Fluid Propeller Anti-Ice
- d. Describe Wing De-Icing and Anti-Icing Equipment
- e. Describe Electrically Heated Windshield
- f. Describe Ground Applied Anti-Icing Chemicals
- g. Describe Operation of De-Icing Equipment

Lesson Completion Requirements

The student must pass the in-class quiz with a minimum grade of 70%.

Evaluation of student learning:

Grading Criteria:

Unit Tests	30%
In-Class Quizzes	30%
FAA Knowledge Test*	20%
Class Work**	20%
Total	100%

*A score of less than 70 on the FAA Knowledge Test will result in a failure for AVI 132

**Projects, Homework, Participation