Private Pilot Lesson Plan: Task A. Emergency Descent (FAA-S-ACS-6)

Lesson Overview

Title: Emergency Descent
Area of Operation: IX. Emergency Operations, Task A. Emergency Descent
References:

- FAA-S-ACS-6C (Private Pilot Airplane Airman Certification Standards)
- FAA-H-8083-2 (Risk Management Handbook)
- FAA-H-8083-3 (Airplane Flying Handbook)
- FAA-H-8083-25 (Pilot's Handbook of Aeronautical Knowledge)
- Airplane Pilot Operating Handbook (POH)/Airplane Flight Manual (AFM)

Objective: The student will demonstrate satisfactory knowledge, risk management, and skills associated with performing an emergency descent. The student will understand situations requiring an emergency descent, execute the procedure safely, and apply risk management principles to mitigate hazards.

Lesson Schedule:

- Ground Instruction: 1.0 hour
- Preflight Briefing: 0.3 hour
- Flight Instruction: 0.5 hour (including demonstration and practice)
- Postflight Debrief: 0.3 hour

Equipment and Materials:

- Classroom aids (whiteboard, projector for diagrams)
- Relevant sections from FAA-H-8083-3 (Chapter 18: Emergency Procedures), FAA-H-8083-25 (Chapter 17: Aeromedical Factors), and FAA-H-8083-2 (general risk management principles)
- Airplane POH/AFM for specific configurations and airspeeds
- Training airplane equipped for VFR flight

Instructor Actions:

- Explain the ACS elements using references from the handbooks.
- Demonstrate the maneuver in flight.
- Monitor student performance and provide corrective feedback.
- Emphasize risk management throughout.

Student Actions:

- Review assigned reading from handbooks prior to lesson.
- Participate in ground discussion and ask questions.
- Perform the emergency descent in flight under instructor supervision.
- Complete checklists and communicate appropriately.

Completion Standards: The student meets the ACS skills criteria, including maintaining airspeed +0/-10 knots, leveling off at ±100 feet, and completing checklists. The student identifies and mitigates risks effectively.

Ground Instruction Content

1. Introduction to Emergency Descent

From FAA-H-8083-3 (Airplane Flying Handbook, Chapter 18: Emergency Procedures): An emergency descent is a maneuver for descending as rapidly as possible to a lower altitude or to the ground for an emergency landing. It may be required due to an uncontrollable fire, sudden loss of cabin pressurization, penetration of hazardous weather (e.g., icing), or any situation demanding immediate rapid descent.

From FAA-H-8083-25 (Pilot's Handbook of Aeronautical Knowledge, Chapter 17: Aeromedical Factors): Situations like cabin depressurization can lead to hypoxia. A rapid descent to a breathable altitude (below 10,000 feet MSL) is critical to prevent loss of consciousness. Effects of atmospheric conditions, such as high altitude and low oxygen, impact descent performance.

2. Knowledge Elements (PA.IX.A.K1–K4 from FAA-S-ACS-6C)

The student must demonstrate understanding of:

- **PA.IX.A.K1:** Situations requiring an emergency descent (e.g., depressurization, smoke, engine fire, or hazardous weather).
- **PA.IX.A.K2:** Immediate action items and emergency procedures, including use of checklists and communication with ATC.
- **PA.IX.A.K3:** Airspeed considerations, including limitations (V_NE, V_A, V_FE, V_LE) and best rate of descent speed per POH/AFM.
- **PA.IX.A.K4:** Aircraft performance and limitations, including effects of altitude, wind, and configuration on descent rate.

Reference discussions from FAA-H-8083-3 on configurations (clean vs. dirty) and FAA-H-8083-25 on environmental effects.

3. Risk Management Elements (PA.IX.A.R1–R4 from FAA-S-ACS-6C)

Using FAA-H-8083-2 (Risk Management Handbook), emphasize identifying, assessing, and mitigating risks. The handbook notes that 85% of accidents involve pilot error, often from poor

workload management. Apply the PAVE checklist (Pilot, Aircraft, enVironment, External pressures) and 3P model (Perceive, Process, Perform) to emergency scenarios.

The student must identify, assess, and mitigate:

- **PA.IX.A.R1:** Altitude, wind, terrain, obstructions, gliding distance, and available landing distance considerations (e.g., plan for recovery altitude).
- **PA.IX.A.R2:** Collision hazards (e.g., scan for traffic, terrain, obstacles during descent).
- **PA.IX.A.R3:** Configuring the airplane (e.g., improper flap/gear extension exceeding limitations).
- **PA.IX.A.R4:** Distractions, task prioritization, loss of situational awareness, or disorientation (e.g., divide attention between flying, navigating, and communicating).

Additional principles from FAA-H-8083-2: Develop personal minimums, use checklists habitually, and manage workload to avoid overload during high-stress emergencies.

Risk Element	Identification	Assessment	Mitigation
Altitude/Terrain (R1)	Low altitude start or mountainous area	High risk of ground collision	Select descent path away from obstacles; recover at least 1,500 feet AGL
Collision Hazards (R2)	Busy airspace or poor visibility	Moderate to high	Clear area with turns; make radio calls
Configuration (R3)	Exceeding speed limits in turbulence	High structural stress	Comply with V_A; configure per POH
Distractions (R4)	Emergency stress leading to fixation	High loss of awareness	Use SRM/CRM; prioritize aviate-navigate-communicate

4. Skills Elements (PA.IX.A.S1–S8 from FAA-S-ACS-6C)

From FAA-H-8083-3: Perform the descent at maximum allowable airspeed for increased drag and high descent rate, while maintaining positive load factors.

The student must demonstrate:

- **PA.IX.A.S1:** Clear the area (scan for traffic and potential landing sites).
- **PA.IX.A.S2:** Establish and maintain appropriate airspeed and configuration per POH/AFM for the scenario.
- **PA.IX.A.S3:** Maintain orientation, divide attention, and plan a smooth recovery.
- **PA.IX.A.S4:** Use bank angle between 30° and 45° to maintain positive load factors (G-forces).
- **PA.IX.A.S5:** Maintain airspeed +0/-10 knots; level off at specified altitude ±100 feet.
- **PA.IX.A.S6:** Complete appropriate checklist(s).
- **PA.IX.A.S7:** Make radio calls as appropriate (e.g., "Mayday" or practice transmissions).
- **PA.IX.A.S8:** Use single-pilot resource management (SRM) or crew resource management (CRM).

Flight Instruction Content

Preflight Briefing (0.3 hour)

- Review ground knowledge and risks.
- Discuss scenario (e.g., simulated engine fire or depressurization).
- Cover POH-specific procedures (e.g., power off, gear/flaps down for dirty configuration if applicable).

In-Flight Procedure (Based on FAA-H-8083-3)

1. **Clear the area:** Perform clearing turns to scan for traffic and identify potential landing areas.
2. **Configure the airplane:** Reduce power to idle; extend gear/flaps if per POH (dirty configuration for max drag); establish bank of 30°–45°.
3. **Establish descent:** Maintain V_NE or recommended speed; monitor for positive G-loads.
4. **Monitor and orient:** Divide attention (instruments, outside references); avoid disorientation.
5. **Recovery:** At safe altitude, reduce bank, retract gear/flaps, add power smoothly; level off ±100 feet.
6. **Checklist and communication:** Complete emergency checklist; simulate ATC calls.
7. **Debrief:** Discuss performance against ACS standards.

Notes:

- Do not exceed structural limits (e.g., in turbulence, limit to V_A).
- For engine fire, high speed may extinguish flames; for structural concerns, use lower speeds.
- Practice at altitudes allowing full recovery (e.g., start at 5,000 feet AGL).

Postflight Debrief (0.3 hour)

- Review execution, risks encountered, and improvements.
- Assign reading: Revisit FAA-H-8083-2 for risk scenarios and FAA-H-8083-25 for aeromedical factors.

This lesson plan integrates knowledge from the specified handbooks to ensure comprehensive training aligned with FAA standards.