CHOOSE AEROSPACE

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Aviation Maintenance Curriculum

Weight and Balance Syllabus

About The Course:

The Weight and Balance course aligns with the general knowledge and skill requirements established by the Federal Aviation Administration (FAA) and the Aviation Mechanic Airman Certification Standards (ACS).

This course provides a comprehensive understanding of how aircraft weight, loading, and balance affect safety, performance, and regulatory compliance. Learners will explore foundational weight and balance concepts, key terminology, procedures for weighing aircraft, and methods for calculating center of gravity in both empty and loaded conditions.

Building on this foundation, the course introduces applied weight and balance procedures, including preparing aircraft for weighing, using appropriate weighing equipment and documents, performing forward and aft extreme condition checks, calculating ballast requirements, and using loading graphs and center of gravity envelopes to verify safe operating limits. Learners will also examine FAA recordkeeping requirements and special weight and balance considerations for helicopters and large airplanes.

By the end of this course, learners will have the knowledge and calculation skills needed to perform, evaluate, correct, and document aircraft weight and balance procedures accurately, safely, and in compliance with regulatory standards.

Couse Number: FAA-ACS-AM-IC-WAB

ACS Reference: Weight and Balance (AM.I.C)

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Course Objectives:

1. Explain the principles, terminology, and safety importance of aircraft weight and balance.
2. Identify and use appropriate scales, weighing equipment, and documents, including the Type Certificate Data Sheet, for aircraft weighing operations.
3. Prepare an aircraft for weighing and perform calculations to determine empty weight and empty weight center of gravity.
4. Use four-column and six-column charts to calculate weight, moments, and center of gravity in empty, loaded, and equipment-change conditions.
5. Determine an aircraft's airworthiness by comparing calculated weight and center of gravity values to approved limits.
6. Perform forward and aft extreme condition checks to assess safe loading boundaries.
7. Calculate ballast requirements and apply corrections when center of gravity falls outside allowable limits.
8. Use loading graphs and CG envelopes to verify that loaded aircraft conditions fall within approved operating limits.
9. Perform weight and balance calculations for helicopters, including longitudinal and lateral center of gravity.
10. Perform weight and balance calculations for large airplanes, including determining center of gravity as a percentage of Mean Aerodynamic Chord (%MAC).
11. Maintain accurate and current FAA-required weight and balance records after modifications, alterations, or equipment changes.

Module 1: Weight and Balance Control

- Lesson 1.1 – Aircraft Weight and Balance
- Lesson 1.2 – Need and Requirements for Aircraft Weighing
- Lesson 1.3 – Weight and Balance Terminology

Module 2: Procedures for Weight and Balance

- Lesson 2.1 -General Concepts

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- Lesson 2.2 – Weight and Balance Data
- Lesson 2.3 – Weight and Balance Equipment
- Lesson 2.4 – Preparing an Aircraft for Weighing
- Lesson 2.5 – Aircraft Jacking

Module 3: Loading and Extreme Conditions

- Lesson 3.1 – Weighing the Aircraft
- Lesson 3.2 – Center of Gravity Range and Envelope
- Lesson 3.3 – Loading an Aircraft for Flight
- Lesson 3.4 – Weight and Balance Extreme Conditions
- Lesson 3.5 – Equipment Change and Aircraft Alteration
- Lesson 3.6 – The Use of Ballast

Module 4: Graphs, Records, and Other Considerations

- Lesson 4.1 – Loading Graphs and CG Envelopes
- Lesson 4.2 – Helicopter Weight and Balance
- Lesson 4.3 – Weight and Balance for Large Airplanes
- Lesson 4.4 – Weight and Balance Records

SkilRedi Simulations included in this course:

- Identify Terms of the Aircraft
- Aircraft Weighing

Hands on labs

- Research Project
- Weigh-a-Plane

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Each lesson contains the following:

- Lesson Objectives
- Video lecture
- Multiple readings with interactive animations
- Assigned readings in the applicable FAA 8083 Chapter
- Summary and Key Terms
- Assessment Activities

Each Module contains the following:

- Standards and Objectives
- Pre-Assessment
- Key Concepts and Terms
- Further Study
- Module Quiz
- Module Critical Thinking Activity
- Module Survey

Each Course contains the following:

- Course Pre-Test
- Course Introduction
- Course Comprehensive Assessment
- Course Survey

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