CHOOSE AEROSPACE

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Aviation Maintenance Curriculum

Materials, Inspection, Hardware, and Processes Course Syllabus

About The Course:

The Aircraft Materials, Hardware, and Processes course is designed to align with the general knowledge and skill requirements outlined in the Federal Aviation Administration's Mechanic Airman Certification Standards.

This course introduces important materials, processes, inspection methods, and hardware used in aircraft maintenance. You will learn about aircraft metals, nonmetallic materials, material properties, metalworking processes, nondestructive inspection methods, precision measuring tools, aircraft hardware, control cables, shock absorber cords, seals, welding, weld inspection, soldering, and crimping. You will also learn about proper installation, torque application, safetying practices, and the importance of following approved maintenance procedures.

The information in this course is intended as a general guide for aircraft materials, processes, inspections, and hardware. Always review and follow the specific aircraft manufacturer's manuals and approved maintenance data before performing any aircraft maintenance or repair.

Couse Number: FAA-ACS-AM-IE-MHP

ACS Reference: Aircraft Materials, Hardware and Processes (AM.I.E)
Inspection Concepts and Techniques (AM.I.K)

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Course Objectives:

1. Identify common aircraft metals, nonmetallic materials, and their properties.
2. Describe common metalworking and heat treatment processes used in aircraft maintenance.
3. Identify common nondestructive inspection methods and explain their use in evaluating aircraft components.
4. Identify precision measuring tools and explain their use in inspection practices.
5. Identify aircraft hardware, including fasteners, rivets, screws, cables, shock absorber cords, seals, and sealing compounds.
6. Describe proper practices for installing, torquing, reusing, and safetying aircraft hardware.
7. Identify common welding and soldering processes used in aviation maintenance.
8. Describe basic weld inspection criteria and explain how soldering and crimping are used in aircraft electrical systems.

Module 1: Aircraft Metals and Non-Metallic Materials

- Lesson 1.1 – Properties and Types of Metals
- Lesson 1.2 – Metal Working Processes
- Lesson 1.3 – Nonmetallic Aircraft Materials

Module 2: Inspection Techniques

- Lesson 2.1 – Nondestructive Inspection Concepts and Techniques
- Lesson 2.2 – Visual and Liquid Penetrant Inspection
- Lesson 2.3 – Ultrasonic and Acoustic Inspection
- Lesson 2.4 – Magnetic Inspection Tools
- Lesson 2.5 – Radiographic Inspection Tools
- Lesson 2.6 – Composite Material Inspection
- Lesson 2.7 – Calipers and Micrometers

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Module 3: Aircraft Hardware

- Lesson 3.1 – Threaded Fasteners - Bolts, Nuts, and Washers
- Lesson 3.2 – Rivets, Screws, & Safetying Methods
- Lesson 3.3 – Aircraft Control Cables and Fittings
- Lesson 3.4 – Shock Absorber Cords and Seals

Module 4: Welding and Soldering

- Lesson 4.1 – Welding
- Lesson 4.2 – Weld Inspection
- Lesson 4.3 – Soldering

SkilRedi simulations included in this course:

- Dye Penetrant
- Micrometer
- Safety Wiring

Hands on labs

- Safety Wire
- Hardware Identification

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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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