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Aviation Maintenance Curriculum

Physics for Aviation Syllabus

About The Course:

The Physics for Aviation course was developed in alignment with the FAA Airman Certification Standards and provides the general knowledge, risk management, and skill elements required for aviation physics.

The course is divided into four modules that cover a range of topics, including matter, energy, force, work, power, torque, simple machines, stress and strain, motion, heat, pressure, gas laws, fluid mechanics, sound, the atmosphere, and theory of flight. Learning centers on physics principles that are routinely used by aviation maintenance technicians in their work. Each lesson provides a deeper understanding of these topics and the associated principles, laws, and theories, as well as the factors that affect aircraft systems, structures, and engine performance.

Lastly, this course establishes a working knowledge of various skills required by technicians to support and maintain aircraft, including temperature unit conversion, calculating density and pressure altitude, horsepower, force, area, pressure, work, power, torque, and mechanical advantage in aviation maintenance applications.

Couse Number: FAA-ACS-AM-IJ-PFA

ACS Reference: Physics (AM.I.J)

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Course Objectives:

1. Describe and recognize the types of matter, energy, and simple machines.
2. Explain the differences between force, work, power, and torque.
3. Calculate work, power, and torque in given situations, as well as the mechanical advantage created through the use of simple machines.
4. Describe the different types of stress, motion, heat, pressure, and gas laws and explain how their characteristics affect aircraft.
5. Calculate and convert between different temperature scales and pressure types and apply them to gas law calculations.
6. Discuss how the characteristics of fluid mechanics, sound, and the atmosphere affect aircraft.
7. Apply Pascal's Law to a given situation.
8. Correctly interpret data and graphs related to atmospheric effects on aircraft and engine performance.
9. Explain the theory of lift, related terminology, and the four forces of flight.
10. Locate and identify various types of airfoils, planforms, and primary and secondary flight control devices that control fixed-wing and rotorcraft aircraft about their three axes.

Module 1: Matter, Energy, and Simple Machines

- Lesson 1.1 – Matter
- Lesson 1.2 – Energy
- Lesson 1.3 – Force, Work, Power, and Torque
- Lesson 1.4 – Simple Machines

Module 2: Stress, Motion, Heat, Pressure, and Gas

- Lesson 2.1 – Stress and Strain
- Lesson 2.2 – Motion
- Lesson 2.3 – Heat
- Lesson 2.4 – Pressure
- Lesson 2.5 – Gas Laws

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Module 3: Fluid Mechanics, Sound, and the Atmosphere

- Lesson 3.1 – Fluid Mechanics
- Lesson 3.2 – Sound
- Lesson 3.3 – Atmosphere in Aircraft and Engine Performance

Module 4: Theory of Flight

- Lesson 4.1 – Theory of Flight Part One
- Lesson 4.2 – Theory of Flight Part Two
- Lesson 4.3 – Theory of Flight Part Three

SkilRedi simulations included in this course:

- Reading pressure altitude
- Reading density altitude
- Density altitude impact on engine performance
- Density altitude impact on aircraft performance
- Connecting external power

Hands on labs

- Explore Mechanical Advantages in Levers
- Explore Mechanical Advantages in Pulleys
- Explore Mechanical Advantages in Inclined Planes
- Calculate Force, Area, and Pressure

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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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