

# INTRODUCTION TO AVIATION MAINTENANCE

## BASIC MATHEMATICS, BASIC PHYSICS AND WEIGHT & BALANCE

### Pierce County Careers Connection Dual Credit Articulation Agreement

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Upon completion of high school courses equivalent to the following competencies:

- Using the worksheets provided by the instructor, find the solutions to the problems:
  - Extract Roots.
  - Raise numbers to a given power.
  - Determine areas of various geometrical shapes.
  - Determine volume of various geometrical shapes.
  - Solve ratio problems.
  - Solve proportion problems.
  - Solve percentage problems.
  - Perform algebraic functions involving addition and subtraction, using positive and negative numbers.
  - Perform algebraic functions involving multiplication and division, using positive and negative numbers.
- Use and demonstrate knowledge of the principles of simple machines:
  - Using worksheets provided, starting with the basic logic of a lever, learn the basic formula, that is:  
 $W \times A = f \times a$   
When  $W$  = the weight or load  
 $A$  = the arm supporting the load  
 $f$  = the force applied  
 $a$  = the arm of the force applied
  - This basic knowledge will be used in the study of weight and balance for aircraft.
  - Work on through the complete worksheet of instruction and exercises presented.
- Use and demonstrate knowledge of the principles of sound dynamics:
  - Using worksheet, identify the characteristics of sound traveling through water, air, or a solid medium.
  - Select the proper explanation for the speed of sound (Mach number), and identify the db level for some common sound sources.
- Use and demonstrate knowledge of the principles of fluid dynamics:
  - Using worksheet provided, select the appropriate solutions to the fluid dynamics problems presented.
  - Explain buoyancy.
  - Discuss and furnish examples of the use of Bernoulli's principle.
- Use and demonstrate knowledge of the principles of heat dynamics:
  - Using worksheet provided, select the appropriate responses to explaining:
    - Transfer of heat
    - Means of measuring heat
  - Use and demonstrate knowledge of the principles of heat dynamics (cont'd):
    - Effects of heat on gases, fluids, liquids, and solids.
    - Know how to use the temperature conversions.
- Use and demonstrate knowledge of the principles of basic aerodynamics:
  - Use worksheet provided to explain how Bernoulli's principle functions with fluid flow around airfoil, and how the basic flight control systems are used to modify flight.
- Use and demonstrate knowledge of the principles of basic aircraft structures:
  - Using worksheet identify the different aircraft structure components, and their functions.
  - Be prepared to discuss orally the different kinds of loads imposed on the different structural members, and how those loads dictate their construction.
- Use and demonstrate knowledge of the principles of basic theory of flight:
  - Using the appropriate worksheet, enter the correct responses to the problems presented.
  - Be prepared to discuss your responses, and explain your reasoning.
- Weigh aircraft and perform a complete weight and balance check and record data:
  - Using the handout provided, prepare the aircraft and its associated equipment for weighing.
  - Place the aircraft on the roll-on scales leveled according to the service manual.
  - Record the scale readings and the tare.
  - Remove the aircraft from the scales.
  - Complete the weighing form, calculating the moments and the C.G.
  - Compute minimum operating weight.
  - Compute forward and aft C.G. loading.
  - Demonstrate the ability to calculate a new weight and balance by knowing the weight and arm of equipment added to or removed from an aircraft.
  - Demonstrate the ability to calculate fixed ballast required to compensate for equipment added to, or removed from, an aircraft.
  - Demonstrated the ability to measure points from datum using a plumb bob and measuring tape.
  - Discuss the requirements for weighing aircraft, the different methods utilized for different types of aircraft, and then different types of scales commonly used.

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A student earning a "C" grade or better may earn college credit at the following college:

<u>College</u>	<u>Course</u>	<u>Credits</u>
Clover Park Technical College	AMT 104 (CIP Code: 470607)	5

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