

1. Title	Piston engine II (Mechanics Repair and Maintenance)
2. Code	EMAMBG502A
3. Range	The knowledge is needed for a wide range of aircraft repair and maintenance works, e.g. applicable to aircrafts, analysis, machineries, airworthiness, airframes, avionics, materials, tests, documentation, safety, health and tools etc.
4. Level	5
5. Credit	3
6. Competency	<p style="text-align: center;"><u>Performance Requirement</u></p> <p>6.1 Knowledge</p> <ul style="list-style-type: none"> <li>◆ Able to understand the piston engine fundamentals <ul style="list-style-type: none"> <li>• Mechanical, thermal and volumetric efficiencies.</li> <li>• Operating cycles.</li> <li>• Piston displacement and compression ratio.</li> <li>• Engine configuration and firing order.</li> </ul> </li> <li>◆ Able to understand the engine performance <ul style="list-style-type: none"> <li>• Power calculation and measurement.</li> <li>• Factors affecting engine power.</li> <li>• Mixtures / leaning, pre-ignition.</li> </ul> </li> <li>◆ Able to understand the engine construction <ul style="list-style-type: none"> <li>• Crank case, crank shaft, cam shaft and sumps.</li> <li>• Accessory gearbox.</li> <li>• Cylinder and piston assemblies.</li> <li>• Connecting rods, inlet and exhaust manifolds.</li> <li>• Valve mechanisms.</li> <li>• Propeller reduction gearboxes.</li> </ul> </li> </ul>

- ◆ Able to understand the engine fuel systems
  - Carburetors type, construction and principles of operation.
  - Carburetors icing and heating.
  - Fuel injection systems type, construction and principles of operation.
- ◆ Able to understand the starting and ignition systems
  - Starting systems.
  - Magneto types, construction and principles of operation.
  - Ignition harnesses and spark plugs.
  - Low and high tension systems.
- ◆ Able to understand the induction, exhaust and cooling systems
  - Construction and operation of induction systems, including alternate air systems
  - Exhaust systems and engine cooling systems.
- ◆ Able to understand the supercharging / turbocharging
  - Principles and purpose of supercharging and its effects on engine parameters.
  - Construction and operation of supercharging / turbocharging system.
  - System terminology.
  - Control systems.
  - System protection.
- ◆ Able to understand the lubricants and fuels
  - Properties and specifications.
  - Fuel additives.
  - Safety precautions.
- ◆ Able to understand the lubrication systems
  - System operation / lay-out and components.

	<ul style="list-style-type: none"> <li>◆ Able to understand the engine indication systems <ul style="list-style-type: none"> <li>• Engine speed.</li> <li>• Cylinder head temperature.</li> <li>• Oil pressure and temperature.</li> <li>• Exhaust Gas Temperature.</li> <li>• Fuel pressure and flow.</li> <li>• Manifold pressure.</li> </ul> </li> <li>◆ Able to understand the powerplant installation <ul style="list-style-type: none"> <li>• Configuration of firewalls, cowlings, acoustic panels, engine mounts, anti-vibration mounts, hoses, pipes, feeders, connectors, wiring looms, control cables and rods, lifting points and drains.</li> </ul> </li> <li>◆ Able to understand the engine monitoring and ground operation <ul style="list-style-type: none"> <li>• Procedures for starting and ground run-up.</li> <li>• Interpretation of engine power output and parameters.</li> <li>• Inspection of engine and components: criteria, tolerances, and data specified by engine manufacturer.</li> </ul> </li> <li>◆ Able to understand the engine storage and preservation <ul style="list-style-type: none"> <li>• Preservation and depreservation for the engine and accessories / systems.</li> </ul> </li> </ul> <p>6.2 Theoretical and practical aspects</p> <ul style="list-style-type: none"> <li>◆ Able to apply the following knowledge in the aircraft maintenance. <ul style="list-style-type: none"> <li>• Engine fundamental.</li> <li>• Engine performance.</li> <li>• Engine construction.</li> <li>• Engine fuel system.</li> <li>• Carburetors.</li> </ul> </li> </ul>
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	<ul style="list-style-type: none"> <li>• Fuel injection systems.</li> <li>• Starting and ignition systems.</li> <li>• Induction, exhaust and cooling systems.</li> <li>• Supercharging / turbocharging.</li> <li>• Lubricants and fuels.</li> <li>• Engine indication system.</li> <li>• Powerplant installation.</li> <li>• Engine monitoring and ground operation.</li> <li>• Engine Storage and Preservation</li> </ul> <p>6.3 Professional approach</p> <ul style="list-style-type: none"> <li>◆ Able to understand the principal elements of the subjects.</li> <li>◆ Able to understand the general knowledge of the theoretical and practical aspects of the subjects</li> <li>◆ Able to apply the knowledge in the aircraft maintenance task.</li> <li>◆ Able to understand the detailed knowledge of the theoretical and practical aspects of the following subjects. <ul style="list-style-type: none"> <li>• Engine monitoring and ground operation..</li> </ul> </li> <li>◆ Able to combine and apply the separate elements of knowledge in a logical and comprehensive manner.</li> </ul>
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<p>7. Assessment Criteria</p>	<p>The integral outcomes requirement of this UoC are:</p> <ul style="list-style-type: none"> <li>(i) Able to understand the theory of the subjects and interrelationships with other subjects.</li> <li>(ii) Able to give a detailed description of the subject using theoretical fundamentals and specific examples.</li> <li>(iii) Able to understand and be able to use mathematical formulae related to the subject.</li> <li>(iv) Able to read, understand and prepare sketches, simple drawings and schematics describing the subject.</li> <li>(v) Able to apply the knowledge relating to mechanics repair and maintenance in a practical manner using manufacturer's instructions.</li> <li>(vi) Able to interpret results from various sources and measurements and apply corrective action where appropriate.</li> </ul>
<p>8. Remarks</p>	<p>Ref: HKAR-66 Module 16: Piston engine.</p>