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| 1. Title | Materials and hardware II (Simple Light Aeroplane Repair and Maintenance) |
| 2. Code | EMAMBY402A |
| 3. Range | The knowledge is needed for a wide range of simple light aeroplane repair and maintenance works,e.g. applicable to aircrafts, analysis, machineries, airworthiness, airframes, avionics, materials, tests, documentation, safety, health and tools etc. |
| 4. Level | 4 |
| 5. Credit | 5 |
| 6. Competency | Performance Requirement<br>6.1 Knowledge<br>♦ Able to understand the Aircraft Materials - Ferrous<br>• Characteristics, properties and identification of common alloy steels used in aircraft.<br>• Heat treatment and application of alloys steels.<br>♦ Able to understand the Aircraft Materials – Non-ferrous<br>• Characteristics, properties and identification of common non-ferrous materials used in aircraft.<br>• Heat treatment and application of nonferrous materials.<br>♦ Able to understand the Aircraft Materials – Composite and Non-metallic<br>• Characteristics, properties and identification of common composite and non-metallic materials, other than wood, used in aircraft.<br>• Sealants and bonding agents. |

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| | • The detection of defects in composite material.<br>• Repair of composite material.<br>♦ Able to understand the corrosion<br>• Chemical fundamentals.<br>‣ Formation by: galvanic action process, microbiological, stress.<br>• Types of corrosion and their identification.<br>‣ Causes of corrosion.<br>‣ Material types, susceptibility to corrosion.<br>♦ Able to understand the Fasteners<br>• Screw threads<br>‣ Screw nomenclature.<br>‣ Thread forms, dimensions and tolerances for standard threads used in aircraft.<br>‣ Measuring screw threads.<br>• Bolts, studs and screws<br>‣ Bolt types: specification, identification and marking of aircraft bolts, international standards.<br>‣ Nuts: self locking, anchor, standard types.<br>‣ Machine screws: aircraft specifications.<br>‣ Studs: types and uses, insertion and removal.<br>‣ Self tapping screws, dowels.<br>• Locking devices |

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| | ‣ Tab and spring washers, locking plates, split pins, pal-nuts, wire locking, quick release fasteners, keys, circlips, cotter pins.<br>• Aircraft rivets<br>‣ Types of solid and blind rivets: specifications and identification, heat treatment.<br>♦ Able to understand the Pipes and Unions<br>• Identification of, and types of rigid and flexible pipes and their connectors used in aircraft.<br>• Standard unions for aircraft hydraulic, fuel, oil, pneumatic and air system pipes.<br>♦ Able to understand the Springs<br>• Types of springs, materials, characteristics and applications.<br>♦ Able to understand the Bearings<br>• Purpose of bearings, loads, material, construction.<br>• Types of bearings and their application.<br>♦ Able to understand the Transmissions<br>• Gear types and their application.<br>• Gear ratios, reduction and multiplication gear<br>• systems, driven and driving gears, idler gears,<br>• mesh patterns.<br>• Belts and pulleys, chains and sprockets.<br>♦ Able to understand the Control Cables<br>• Types of cables.<br>• End fittings, turnbuckles and compensation devices.<br>• Pulleys and cable system components. |

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| | | • Bowden cables.<br>• Aircraft flexible control systems.<br>♦ Able to understand the Electrical Cables and Connectors<br>• Cable types, construction and characteristics.<br>• High tension and co-axial cables.<br>• Crimping.<br>• Connector types, pins, plugs, sockets, insulators, current and voltage rating, coupling, identification codes. |
| | 6.2 Theoretical and practical aspects | ♦ Able to apply the following knowledge in the aircraft maintenance.<br>• Aircraft Materials – Ferrous<br>• Aircraft Materials - Non-Ferrous<br>• Aircraft Materials - Composite and Non-Metallic<br>• Corrosion<br>‣ Types of corrosion and their identification.<br>‣ Causes of corrosion.<br>‣ Material types, susceptibility to corrosion.<br>• Fasteners<br>• Pipes and Unions<br>• Springs<br>• Bearings<br>• Transmissions<br>• Control Cables<br>• Electrical Cables and Connectors |

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| | 6.3 Professional approach | ♦ Able to understand the principal elements of the subjects.<br>♦ Able to understand the general knowledge of the theoretical and practical aspects of the following subjects.<br>• Aircraft Materials – Ferrous<br>• Aircraft Materials - Non-Ferrous<br>• Aircraft Materials - Composite and Non-Metallic<br>• Fasteners<br>• Pipes and Unions<br>• Springs<br>• Bearings<br>• Transmissions<br>• Control Cables<br>• Electrical Cables and Connectors<br>♦ Able to apply the knowledge in the aircraft maintenance task.<br>♦ Able to understand the detailed knowledge of the theoretical and practical aspects of the following subjects.<br>• Corrosion<br>‣ Types of corrosion and their identification.<br>‣ Causes of corrosion.<br>‣ Material types, susceptibility to corrosion.<br>♦ Able to combine and apply the separate elements of knowledge in a logical and comprehensive manner. |

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| 7. Assessment Criteria | The integral outcome requirement of this UoC is:<br>(i) Able to understand the theory of the subjects and interrelationships with other subjects.<br>(ii) Able to give a detailed description of the subject using theoretical fundamentals and specific examples.<br>(iii) Able to understand and be able to use mathematical formulae related to the subject.<br>(iv) Able to read, understand and prepare sketches, simple drawings and schematics describing the subject.<br>(v) Able to apply the knowledge relating to simple light aeroplane repair and maintenance in a practical manner using manufacturer's instructions.<br>(vi) Able to interpret results from various sources and measurements and apply corrective action where appropriate. |
| 8. Remarks | Ref: HKAR-66 Module 6: Materials and Hardware. |