1. Title	Electronic fundamentals II (Avionics Repair and Maintenance)
2. Code	EMAMBX447A
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	4
5. Credit	3
6. Competency	Performance Requirement 6.1 Knowledge ♦ Able to understand the semiconductors • Diode ‣ Diode symbols. ‣ Diode characteristics and properties. ‣ Diodes in series and parallel. ‣ Main characteristics and use of silicon controlled rectifiers (thyristors), light emitting diode, photo conductive diode, varistor, rectifier diodes. ‣ Functional testing of diodes. ‣ Materials, electron configuration, electrical properties. ‣ P and N type materials: effects of ‣ impurities on conduction, majority and minority carriers. ‣ PN junction in a semiconductor, ‣ development of a potential across a PN junction in unbiased, forward biased and reverse biased conditions. ‣ Diode parameters: peak inverse voltage, maximum forward current, temperature, frequency, leakage current, power dissipation.

	‣ Operation and function of diodes in the following circuits: clippers, clampers, full and half wave rectifiers, bridge rectifiers, voltage doublers and triplers. ‣ Detailed operation and characteristics of the following devices: silicon controlled rectifier (thyristor), light emitting diode, Shottky diode, photo conductive diode, varactor diode, varistor, rectifier diodes, Zener diode. • Transistors ‣ Transistor symbols. ‣ Component description and orientation. ‣ Transistor characteristics and properties. ‣ Construction and operation of PNP and NPN transistors. ‣ Base, collector and emitter configurations. ‣ Testing of transistors. ‣ Basic application of other transistor types and their uses. ‣ Application of transistors: classes of amplifier (A, B, C). ‣ Simple circuits including: bias, decoupling, feedback and stabilisation. ‣ Multistage circuit principles: cascades, push-pull, oscillators, multivibrators, flipflop circuits. • Integrated Circuits ‣ Description and operation of logic circuits and linear circuits.

		‣ Introduction to operation and function of an operational amplifier used as: integrator, differentiator, voltage follower, comparator. ‣ Operation and amplifier stages connecting methods: resistive capacitive, inductive (transformer), inductive resistive (IR), direct. ‣ Advantages and disadvantages of positive and negative feedback. ♦ Able to understand the printed circuit boards • Description and use of printed circuit boards. ♦ Able to understand the servomechanisms • Understanding of the following terms: Open and closed loop, follow up, servomechanism, analogue transducer, null, damping, feedback, deadband. • Construction, operation and use of the following synchro system components: resolvers, differential, control and torque, E and I transformers, inductance transmitters, capacitance transmitters, synchronous transmitters. • Servomechanism defects, reversal of synchro leads, hunting.
	6.2 Theoretical and practical aspects	♦ Able to apply the electronic fundamentals knowledge in the aircraft maintenance.
	6.3 Professional approach	♦ Able to understand the principal elements of the subjects. ♦ Able to understand the general knowledge of the theoretical and practical aspects of the subjects.

	♦ Able to apply the knowledge in the aircraft maintenance task.
7. Assessment Criteria	The integral outcomes requirement of this UoC are: (i) Able to understand the theoretical fundamentals of the subjects. (ii) Able to give a general description of the subjects using, as appropriate, typical examples. (iii) Able to use mathematical formulae in conjunction with physical laws describing the subjects. (iv) Able to read and understand sketches, drawings and schematics describing the subjects. (v) Able to apply the knowledge relating to avionics repair and maintenance in a practical manner using detailed procedures.
8. Remarks	Ref: HKAR-66 Module 4: Electronic fundamentals