Maintenance of ECG & ICCU Instruments (Level 2)

Name of the Module : **Maintenance of ECG & ICCU Instruments (Level 2)**

Sector : **Electronics**

Code *:* **ELC214**

Duration **:** *120 Hrs*

Entry qualification **:** *8th std pass with age atleast 14 years. + level 1 certification in ECG & ICCU Instruments or Persons with work experience in maintenance of ECG & ICCU Equipment or Certification in "BASIC ELECTRONICS" module*

Terminal competency:

- Should be able to test electrical earth, test & replace faulty power chord, test patient cables, test & replace battery, charge battery
- Should be able to do performance test and study symptoms on ECG Recorders, ECG Monitors, Pulse Oximeter, and NIBP Machine.
- Should able to dismantle the equipment
- Should be able to do identify the faulty PCB's & Fuses in ECG Recorders, ECG Monitors, Pulse Oximeter, NIBP Machine and replace them
- Test components and replace faulty electronic components

Contents:

Practical Competencies	Underpinning Knowledge (Theory)
Practice procedures for safety and health hazards measures	*Electrical and personal safety, dangers and preventions*
a. Operate Multimeter & Measure Resistance, voltage, current b. Use tools & Perform soldering and de-soldering c. Perform power chord maintenance of equipments d. Test earth using test lamp or multimeter e. Perform cable maintenance f. Open equipment g. replace fuses which are outside the equipment	Programme Contents: • Multimeter and its application • Basics of electricity – define DC, AC // practical measuring units of voltage, current, resisistance. • Testing of earth using test lamp • Testing of earth using multimeter • fuse – types, use, testing • Basic Electronics – passive and active components, testing of components, • Op-Amp – Introduction, applications, construction, differential amplifier, biomedical amplifier, filters – integrator, differentiator, notch filters, comparators • Digital electronics – gates and its application, multiplexers, de-multiplexers, counters
a. Test the performance of ECG Recorder , study symptoms & Identify the faulty PCB b. Test the performance of ECG Monitor, study symptoms & Identify the faulty PCB c. Test the performance of pulse oximeter, study symptoms & Identify the faulty PCB d. Test the performance of NIBP Machine, study symptoms &	• Operation of ECG Recorders, Operation of ECG Monitors, defibrillatr, pulse oximeter, NIBP Machine • block diagram of ECG recorder, Common PCB's and identification of PCB's, fuses in the PCB • performance of ECG Recorder – study of symptoms and finding out the faulty PCB, fuses in the PCB • block diagram of ECG Monitor, Common

Practical Competencies	Underpinning Knowledge (Theory)
Identify the faulty PCB e. List out the tools required for performing intermediate level maintenance f. Follow dismantling procedure open the equipment and replace the faulty board g. Remove, test and replace blown fuse in the PCB	PCB's and identification of PCB's, fuses in the PCB • performance of ECG Monitor – study of symptoms and finding out the faulty PCB, fuses in the PCB • block diagram of pulse Oximeter , Common PCB's and identification of PCB's, fuses in the PCB • performance of Pulse Oximeter – study of symptoms and finding out the faulty PCB, fuses in the PCB • block diagram of NIBP Machine , Common PCB's and identification of PCB's, fuses in the PCB • performance of Pulse Oximeter – study of symptoms and finding out the faulty PCB, fuses in the PCB

Resources

1. Multimeter
2. Soldering Iron
3. De-soldering gun
4. regulated power supply
5. ECG Recorder cable – single channel
6. ECG Recorder cable – Automatic
7. ECG Monitor cable
8. Pulse Oximeter cable
9. Defibrillator cables