

Maintenance of X-Ray Machine (Level 2)

Name of the Module	: Maintenance of X-Ray Machine (Level 2)
Sector	: Electronics
Code	: ELC216
Duration	: 240 Hrs
Entry qualification	: 8th std pass with age atleast 14 years. + Level 1 certification in X-Ray Machine or Persons with work experience in maintenance of X-Ray Machine or Certification in "BASIC ELECTRONICS" module

Terminal competency:

- Should able to use multimeter
- Should be able to test electrical earth, test & replace faulty power chord, test high-tension cables cables, test
- Test fuse in the equipment and replace them when required
- Test switches, interlocks, magnetic relay, and circuit breakers and replace
- Maintain patient table, tube stands and tracks
- Should able to replace fused bulb in collimator
- Should be able to do performance test
- Should able to dismantle the x-ray machine
- Should able to maintain the x-ray tube housing
- Test components and replace faulty electronic components

Contents :

Practical Competencies	Underpinning Knowledge (Theory)
<p><i>Practice procedures for safety and health hazards measures</i></p> <ol style="list-style-type: none"> a. Operate Multimeter & Measure Resistance, voltage, current b. Use line-tester, c. Perform power chord maintenance of equipments d. Test earth using test lamp or multimeter e. Replace fuse in the equipment and replace them when required f. Test switches, interlocks, magnetic relay, and circuit breakers and replace g. Maintain patient table, tube stands and tracks 	<p><i>Electrical and personal safety, dangers and preventions</i></p> <p>Programme Contents:</p> <ul style="list-style-type: none"> • Multimeter and its application • Basics of electricity – define DC, AC // practical measuring units of voltage, current, resistance. • Use of line-tester • Testing of earth using test lamp • Testing of earth using multimeter • 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 • Layout of a x-ray room, safety features required • Fuse – use, types used in X-Ray Machine, ratings • Switches and interlocks, relay, circuit breakers in x-ray machine • Power cord maintenance, changing broken 3-pin plug

	<ul style="list-style-type: none"> • high tension cables & its precautions • General care and maintenance for mobile x-ray machine and stationary x-ray machine
<p>h. Test the performance of X-ray Machine , test exposure timer, mille ampere testing, kilo voltage testing</p> <p>i. Test the performance using non-invasive x-ray QC device</p> <p>j. Maintaining of log book</p> <p>k. List out the tools required for performing maintenance</p> <p>l. X-ray tube housing – maintenance</p> <p>j. Replacemen of fused bulb in Collimator</p> <p>k. Follow dismantling procedure open the equipment and replace the faulty board</p>	<ul style="list-style-type: none"> • Operation of X-Ray Machine • block diagram of x-ray machine, Common PCB's and identification of PCB's, fuses in the PCB • performance of x-ray machine –use of spinning top, wisconsin test tool, aluminium test wedge, dosimeter , Wisconsin test cassette • non-invasive x-ray QC device – use, operation • bucky tray and its maintenance • x-ray tube – types, working, rating chart, faults in x-ray tube, tube housing • collimator – use, construction, bulb in collimator – rating & replacement

Resources

1. x-ray machine (mobile)
2. x-ray machine (stationary)
3. performance test tools
4. non-invasive x-ray QC device