NIELIT/SHL/ Medical Electronics/2k14-15/171/962 Dated: 23th October 2015

Information about Medical Electronics Project at NIELIT Shillong.

(Status as on 23th October 2015)

Brief about Medical Electronics Project

1. Medical electronics laboratory has been setup at NIELIT Shillong for testing, calibration, repairing and maintenance of Medical Electronics Equipments.
2. The project is mainly to solve the technical issues faced by the various Hospitals in Meghalaya, in regard to Electro medical Equipments Maintenance.
3. Project Duration: 3 (Three) Years (July 2014 to July 2017).

Equipments installed during First phase

1. ECG Acquisition Machine
2. ECG Simulator
3. Portable Suction Unit
4. Digital Blood Pressure Machine

Items in the Second phase

1. Bio-Medical Instrumentation Trainers (EEG, EMG, GSR Module, Temperature Module)
2. Ultrasound Wattmeter
3. Defibrillator Analyzer
4. Electro Surgery Analyzer
5. Patient Simulator
6. Pulse Oximeter Simulator

Scope of the Project

1. For testing, calibration, repairing and Maintenance of Medical Electronics Equipments of various Hospitals in Meghalaya
2. To solve the problems faced by the Hospitals and patients due to non-operable defective hospital equipments.
3. To provide training to Para- medical & medical staff of various government as well as private hospitals of Meghalaya and the youth of the state (at least 75 nos).

A course on "Certificate Course in Medical Electronics Equipments Maintenance" has been designed for 200 hours and this course will be started soon, detailed as below-

1. Course Name: "Certificate Course in Medical Electronics Equipment Maintenance"
2. Eligibility: 10^{th} + ITI (Electronics/Electrical) or 12^{th} Science
3. Course Duration: 4 months/200 Hours (100 Th + 100 Pr), (Theory 1 hr per day, practical 2 hrs per day: Th = Theory, Pr = Practical)

THEORY : - (100 hours)

a. Basic Circuit Theory: (10T + 5P)
b. Basic Circuit Theory: (10T + 5P)
c. Basic Electrical Engineering: (25T + 30P)
d. Basic Electronics Engineering: (25T + 30P)
e. Biomedical Equipment and Medical Electronics (40T + 35 P)

PRACTICAL:- (100 hours)

1. Familiarization with components such as Resistors, Capacitors, Diodes, Transistors, FET's, Op-Amps, DC Power supply, Multimeter, CRO etc.
2. Identification of resistor values by using color code and multimeter.
3. SMD replacement, soldering and desoldering of SMD's using SMD/SMT Rework Station.
4. To verify Ohms Law.
5. To design inverting, non- inverting, instrumentation amplifier using 741/LM358 (P).
6. To design & realization of basic logic gates: (Verification of truth tables of logic gates).
7. Digital IC testing.
8. To design and study on circuits using R, L and C.
9. To measuring the power in single phase A.C. Circuits.
10. To perform Open circuit and Short Circuit Tests on a single phase transformer.
11. To determine the Open Circuit Characteristic of D.C. Generator.
12. To measure and control the Speed of D.C. motors using Tachometer.
13. Measurement of waveform, amplitude, durations and frequency using CRO, triggering of beam with an external signal.
14. Analysis of ECG, EEG, and EMG signals: Acquisition, calibration, troubleshooting and to measure the amplitude, frequency.
15. Method of Blood Pressure Measurement. (Troubleshooting)
16. To determine the oxygen saturation level in the blood with Pulse Oxymeter. (Troubleshooting)
17. To study the operation of Defibrillators, Ventilators. (Troubleshooting)

Director Incharge
NIELIT Shillong