A HOSPITAL VISIT REPORT ON

BIO-POTENTIAL INSTRUMENT

DEPARTMENT:- INSTRUMENTATION & CONTROL ENGINEERING

BATCH:- B3

(2019-2020)

PREPARED AT :

GMERS, GANDHINAGAR

AIM of Hospital Visit

Hospital Visit is one of the best method of exploring the Bio Potential Instrumentation subject with the practical examples. The main reason behind this hospital visit helps us to know things practically through interaction, working methods. Moreover, it gives exposure to many advance Bio medical Instruments from academic point of view.

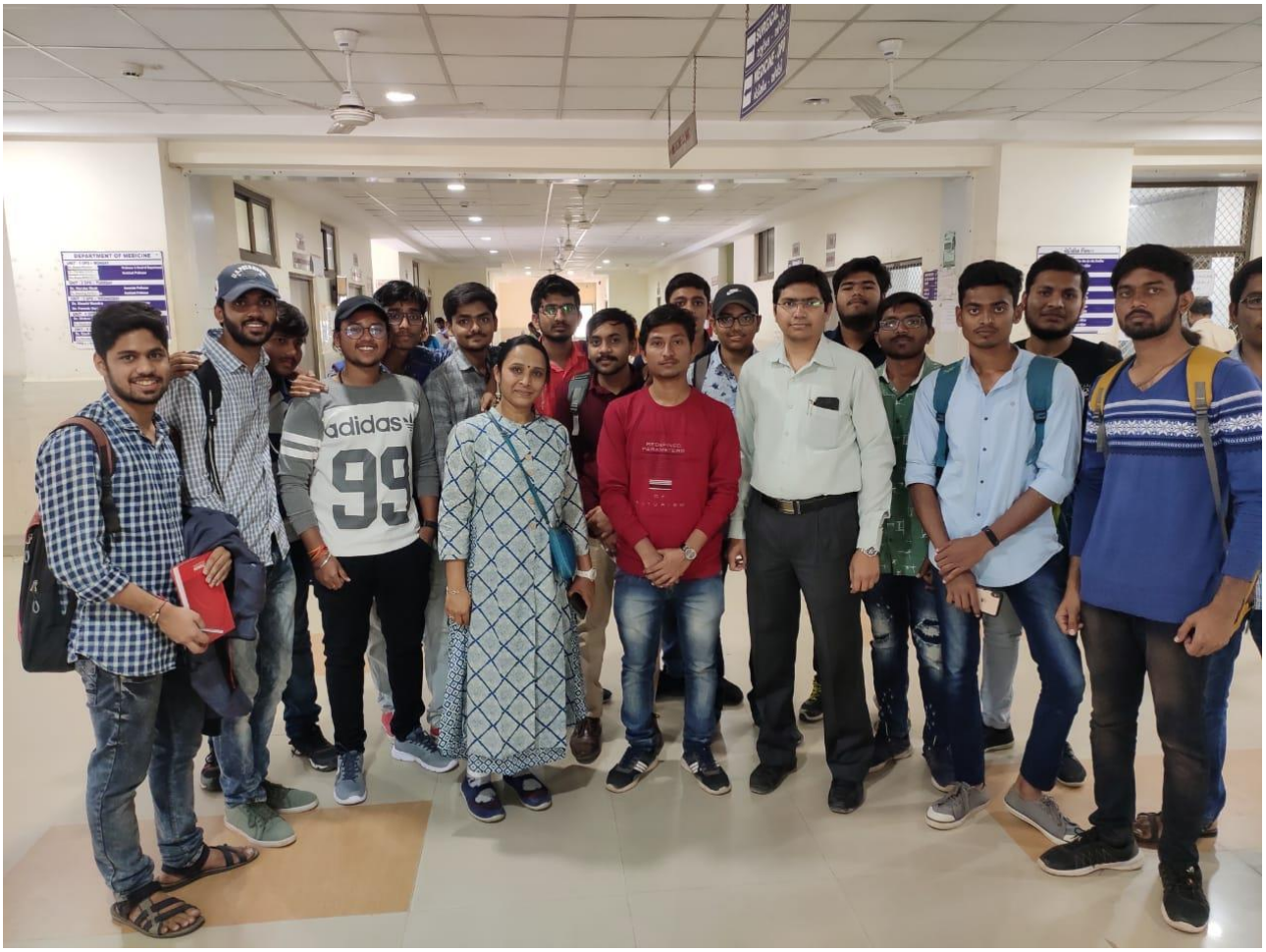
Detail of Hospital Visit are as below:-

Name:- Gujarat Medical Education & Research society (GMERS), Gandhinagar

Date Of Visit:- 25th FEB 2020

Faculty Name:- Chirag Panchal , Aarti Bokade

Description of the Visit



Total of 17 students with two Faculties visited the GMERS Hospital, Gandhinagar on 25th FEB. All of us were gathered at OPD section of the hospital around 2:00 P.M. The visit was started from the General Medical store in the OPD section , In OPD section we saw the following Instrument:-

- Electrocardiogram (ECG) machine
- Different types of electrode such as limb electrode, Suction Cup electrode.
- Sphygometer

After that we visited central sterile service department(CSSD) which include the instrument used to sterile and clean the medical and surgical supplies and equipment.

- Autoclave
- ETO- Ethelin oxide
- Plasma Sterlization

We visited Operation Theatre (O.T.) followed by CSSD, O.T. contains following instrument:-

- Shadowless Light
- Supply line of O_2 ,N_2, H_2O
- Anesthesia Machine
- High Frequency Electrode
- Sterile Instruments
- Emergency Oxygen Supply
- Operating Table
- Control Panel

After O.T. we went to Radiology Department where we saw X-RAY machine with different resolutions 300ma, 600ma, 800ma.

The two types of X-RAY machines were:-

- Remote X-ray machine &
- Fixed X-ray machine.

The room also has an isolation chamber for blocking the harmful rays in surrounding.

Other instrument in Radiology Department is CT scan (Computed tomography), which has different resolutions (16 & 32).

Also it has seprate Insulated cabin for radiologist.

Lead insulators are attached in the doors.

MEDICAL INSTRUMENT IN:-

GENERAL MEDICAL STORE

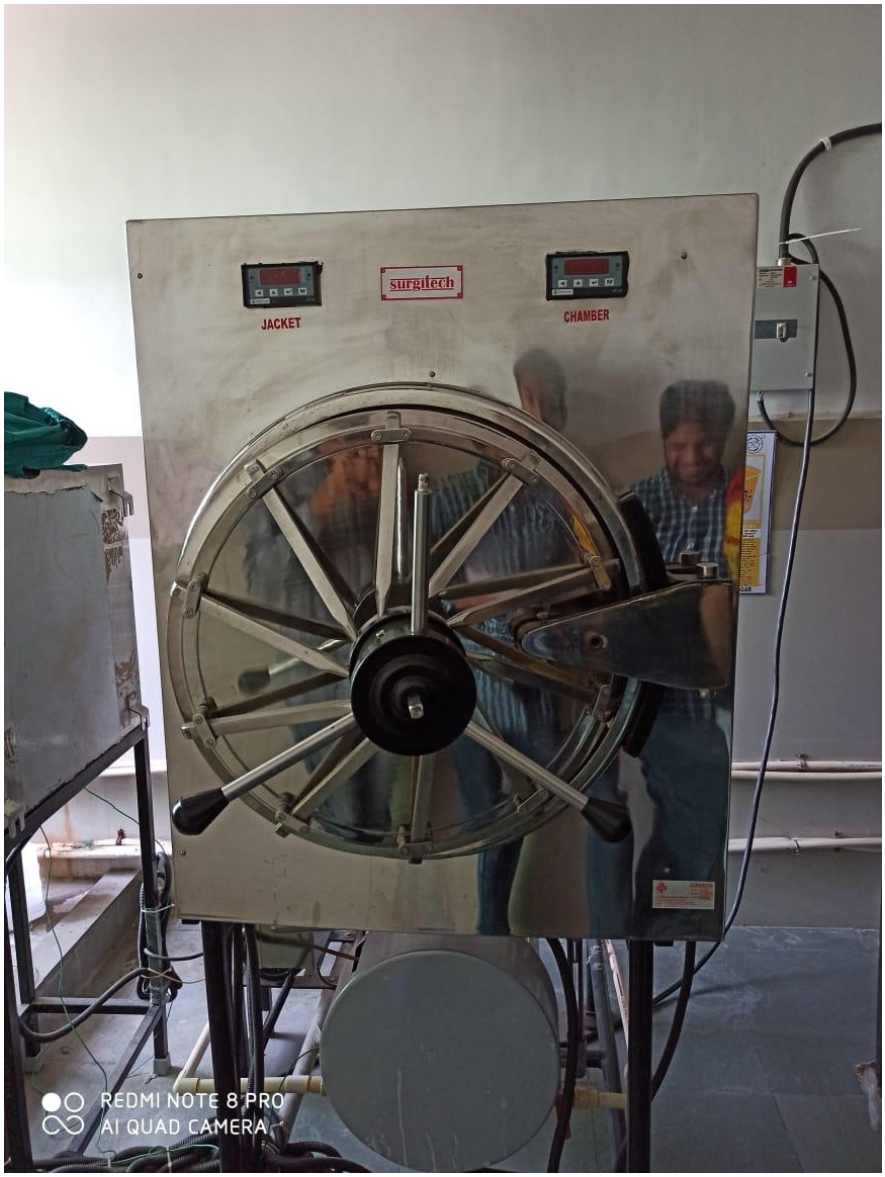
1. **Electrocardiogram (ECG) Machine**
   Hospital is having a 12 lead ECG machine which includes 4 limb electrodes, 2 ground electrode, 6 Suction cups electrodes , this electrodes captures the heartbeat signal of the patients which gives real time memographich output.

2. **Sphygometer**
   It is non-contact instrument which is used to measure the blood pressure of the patient. The output is of analog type and can be visualized in a scale which is measured according to the rise and fall of mercury level.

3. **SpO_2**
   SpO_2 stands for Saturation peripheral oxygen. It is an electronic device which is used to measure the pulse rate and amount of oxygen % in body.
   In this , this can be clipped in the fingertip of a patient and reading can be visualized in a screen.

CENTRAL STERILE SERVICE DEPARTMENT

- **AUTOCLAVE**
  An autocalve is used to sterilize the cloth of a doctor and a patient. Firstly those clothes are normally washed and then it is sterilized by this machine.
  Inside an autocalve hot steam is being produced and those after washed clothes are treated with the hot steam to remove the bacteria, germs etc.
  The clothes are packed in a plastic bag with the help of sealing machine and then it is put inside an chamber of machine.



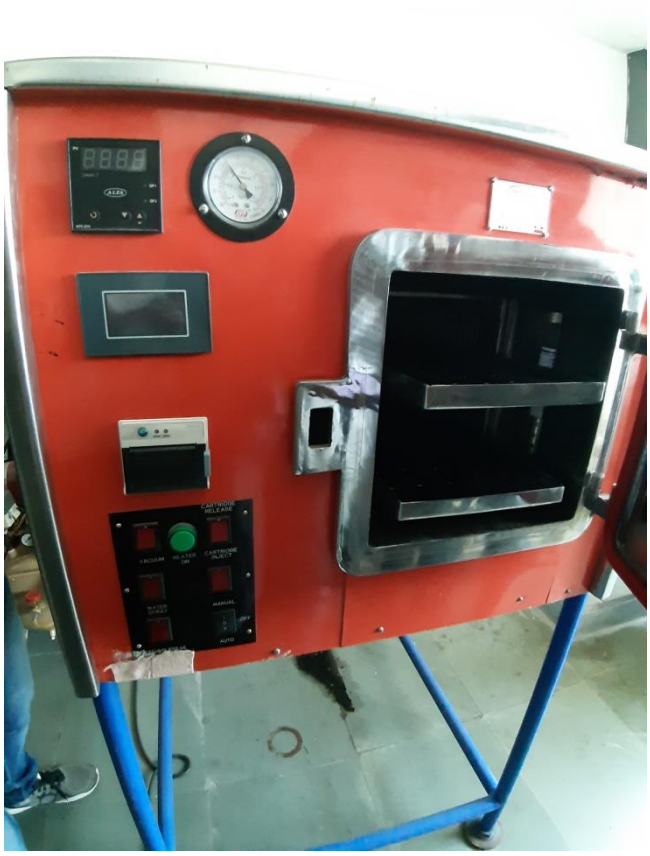
- **ETO (Ethelin oxide)**

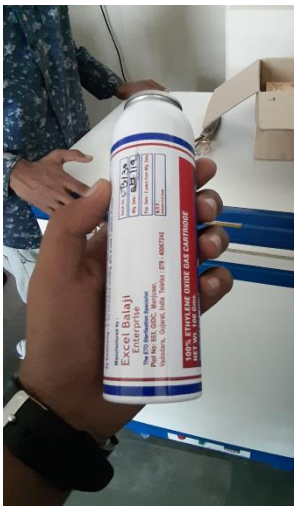
  Like an autoclave ETO is also a sterilize equipment which is used to sterilize the surgical components such as needles, trays which are moisture or heat sensitive which cannot be sterilized by the steam.

  In this equipment an ETO is used along with the steam at lower temperature to sterilize the components.

  Amount of gas concentration inside the machine chamber is directly proportional to the sterilization time.

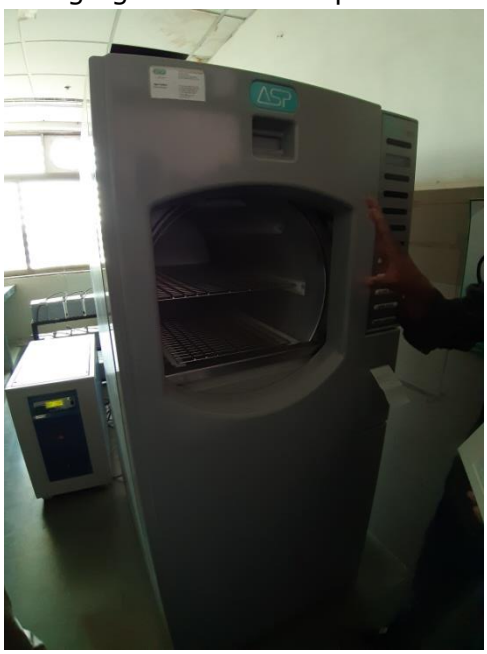
  Generally it is 8hours long process to sterilize the components.





- **PLASMA STERILIZATION**

It is also an sterilization device which uses a hydrogen peroxide (H_2O_2) liquid as an disinfecting agent at low temperature.



First the H_2O_2 is inserted into sterilizer where it is heated at high temperature and is converted to gas and after that this gas is surrounded by an strong electromagnetic field as a result it becomes a plasma.
This plasma is then dispersed in a sterilizer chamber which oxidizes the germs and micro-organism on a load as result it gets killed.

OPERATION THEATRE EQUIPMENTS

Surgical Lamp Light

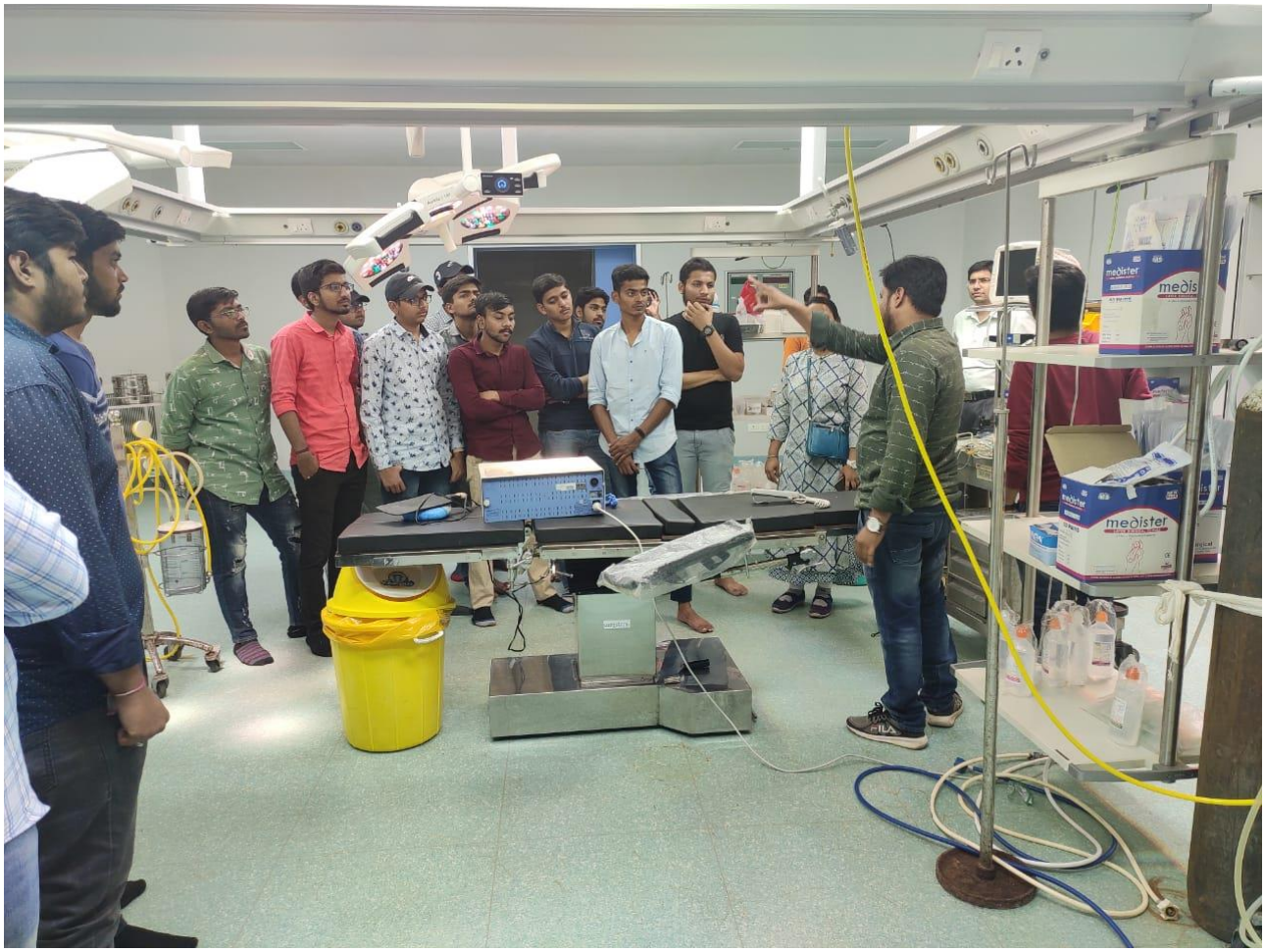
The lights were wall mounted as well as stand type, which is fixed at positions around the patients bed. This are shadowless light (i.e., no shadows are formed due to this light) so that the interference of shadow during surgery is minimised.

Surgical Bed

It is for patients to sit and lie. This beds are integrated with highly advanced adjustable setting and features, this also offers flexibility.
The movement of the bed is done with the help of stepper motor by interfacing it with microcontroller.

Anaesthesia Machine

This machine is used for the multitask. It supplies an accurate amount of gas mixture of anesthetizing and other life sustaining gas such as O_2, N_2 etc to patients. This machine is also integrated with a panel which displays a real time data of patient during surgery such as O_2 %, N_2 % , heart beat, pulse rate etc.



Surgical Diathermy

This diathermy uses a high frequency electric current to produce a heat deep inside a targeted tissue. It does not apply heat directly to the body, i.e., waves are generated by the machine allows the body to generate the heat from within the target body.

During surgery and operations the cutting of target tissue has become easier using this high frequency diathermy.

Sterilizer Machine

This machine is used to sterilize the surgical component which have been used during surgery and still has a further use in the same ongoing surgery.

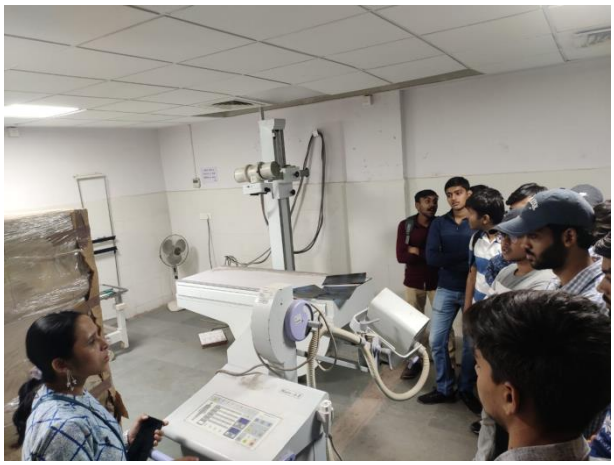
Control Panel

The operation theatre has central control panel which has various features in it. It counts the total time taken for completing any operation/ surgery, Has a emergency calling system, Temperature and humidity control, light control, Medical gas alarm.

RADIOLOGY DEPARTMENT

X-Ray

There were 2 type of xray machine 1) mounted type 2) remote type
If any patient is not in condition to move then remote (portable) type of xray machine is used, these comes with different resolution or can say comes with different radiation adjustment for xray impact (e.g. 300mA, 600mA, 800mA), there was smart(preset) panel to adjust machine parameter automatically by the size of patient(e.g. s,l,xl,xxl), there predefine values of voltage, mA, etc. by size of patient. There were also isolation chamber for the member who came with the patient, also the room is isolated for the radiologist who perform this task.

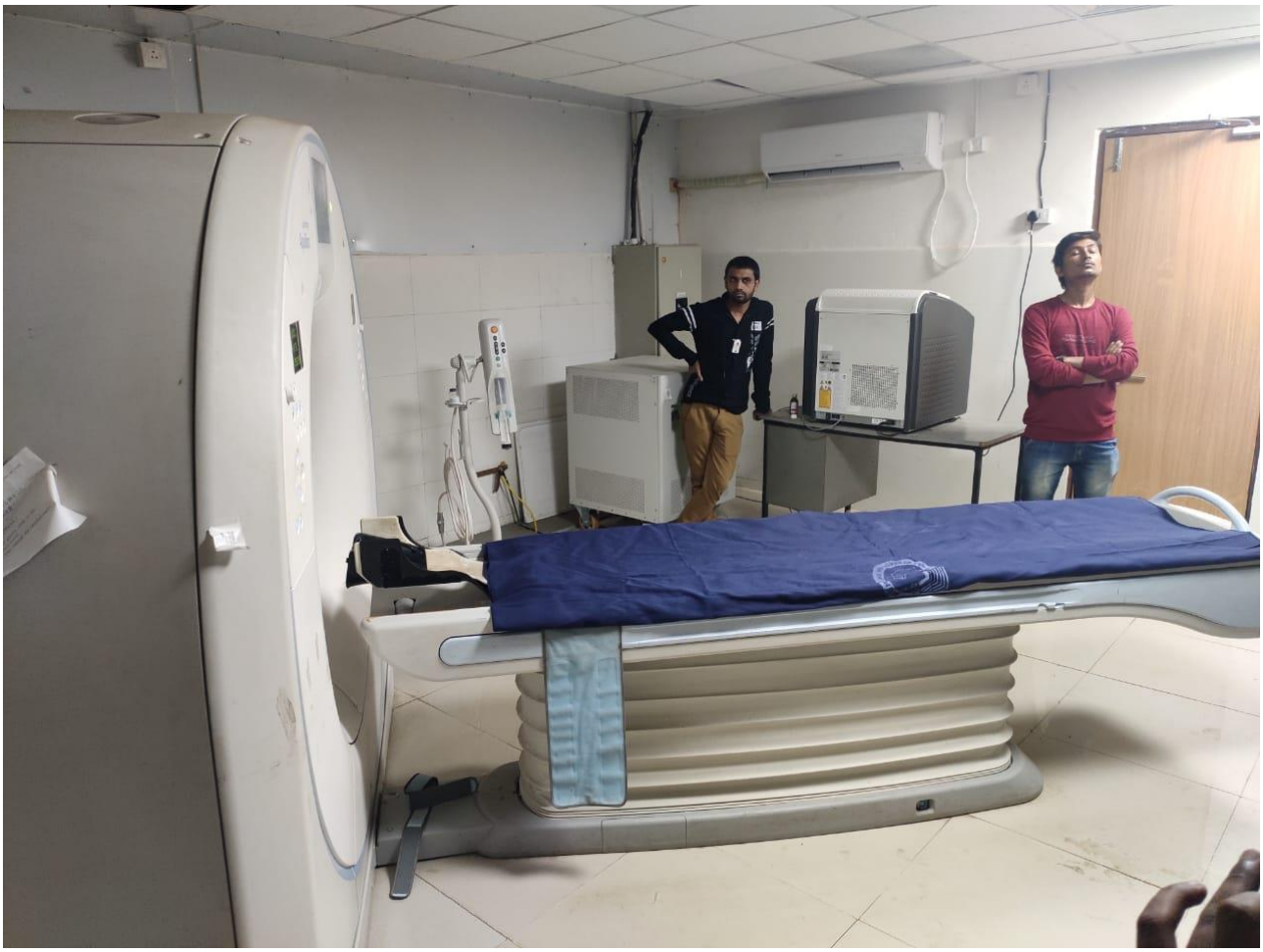


Computed Tomography (CT Scan)

The CT scan machine is generally used for diagnosing the disease and detecting the inner bone injuries. This image processing technique is also used to detect the severe disease such as cancer and tumor.

A patient is allow to lie on the table and the table slowly moves towards the scanner i.e., circular ring of machine where the source of X-ray is rotating inside the circular ring (scanner). Each rotation produces a 16 slices of a body. The whole procedure takes 20-60 mins.

Detector on the exit side captures the snapshot produced by X-ray sources and this snapshots are sent to a radiologist where it uses a complex software to reconstruct this all snapshots according to that the final examination is done.



We also saw a live 12 lead ECG machine demo about how electrode it captures the signal and how the real time data can be visualized in screen and also can be print out.