

BIOMEDICAL INSTRUMENTATION

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Biomedical Engineering

- **Biomedical Engineering** is the **application of engineering principles and design concepts to medicine and biology**
- The biomedical engineering provides **electrical, electronic, electro-optical, and computer engineering support to clinical and biomedical applications.**
- Biomedical Engineering **improves the field of healthcare diagnosis, monitoring and therapy.**

Biomedical Instruments

Biomedical Instruments

- ❖ Instruments and equipments are essential for the functioning of any medical laboratory. There should be no confusion with these two terms- equipment and instruments. All instruments are equipment but all equipment is not instruments.
- ❖ Laboratory equipment refers to various tools used by a laboratory worker in a laboratory.
- ❖ Laboratory equipment is generally used either to perform an experiment or to take measurement and gather data.

Biomedical Instruments

▪ Classification of Biomedical Equipments

1. **Diagnostic equipment**
2. **Therapeutic equipment**
3. **Clinical equipment**
4. **Laboratory equipment**
5. **Research equipment**

Clinical Instrumentation

Basically devoted to the area of

- Diagnosis
- Patient care
- Treatment of Patients (Therapeutic use)

RESEARCH INSTRUMENTATION

It is used primarily in the search for new knowledge related to various systems that compose the human organism.

Some instruments can be used in both areas.

■ **Measurement in biomedical instrumentation** can be divided in to two

1. **VIVO**

- Measurement is made on or **within the human body**
- Eg . Device inserted in to the blood stream to measure PH of blood

2. **VITRO**

- **Measurement is performed outside of the body.**
- Eg . Measurement of blood PH from blood samples.

Biomedical Instruments

- These are:
 - i. Colorimeter
 - ii. Spectrophotometer
 - iii. Spectro flurometer
 - iv. Flame photometer
 - v. Centrifuge
 - vi. Analytic balance
 - vii. Filtration
 - viii. Distillation plant

Biomedical Instruments

- ix. Electrophoresis
- x. Chromatography
- xi. Auto analyzer
- xii. Blood gas analyzer
- xiii. Cell counter
- xiv. pH-meter
- xv. Flow cytometer
- xvi. Immuno fluorescence