2BM603: Diagnostic Techniques & Instrumentation [3 0 2 3 1]

Learning Outcomes:
After successful completion of the course, student will be able to understand:

- Understand and describe the physical and medical principles used as a basis for biomedical instrumentation.
- Understand the position of biomedical instrumentation in modern hospital care.
- Explain and describe different diagnostic measurement methods for different humane variables and their necessary instrumentation.
- Understanding of the patient safety.
- To assist the students with an academic environment aware of excellence guidelines and lifelong learning needed for a successful professional carrier

SYLLABUS

Unit No.	Topics	Lectures (Hours)
1	**Blood Flow Meters:** Electromagnetic Blood flow meters, Ultrasonic Blood Flow meters, NMR Blood Flow meter and Laser Doppler Blood Flow meter.	5
2	**Cardiac Output Measurement:** Indicator dilution Method, Dye dilution Method, Thermal dilution Techniques, Measurement of Continuous Cardiac Output Derived from the Aortic Pressure Waveform, Impedance Technique, Ultrasound method, Cardiac Arrhythmias, Ambulatory monitoring Instruments, Phonocardiogram, Plethysmography.	8
3	**Foetal Monitoring Instruments:** Cardiotacograph, Foetal heart rate measurements, Foetal scalp pH monitoring, Labour activity monitoring.	7
4	**Patient Monitoring Systems:** Concepts, Measurement of heart rate, Blood pressure, Temperature, Respiration rate, Apnea detectors, computerized patient monitoring system.	6
5	**Pulmonary Function Analyzer:** Natural Process of Breathing, O2 and CO2 Transport, Regulation of Breathing, Respiratory gas analyzers, Pulmonary function analyzers, Pulmonary function Measurement, Spirometery, Pneumo tachometer, Measurement of volume.	8
6	**Audiometer:** Audiometers and Hearing Aids: Mechanism of Hearing, Measurement of sound, Basic Audiometer, Pure Tone Audiometer, Speech Audiometer, Evoked Response Audiometery System, Calibration of Audiometers, Hearing Aids.	5
7	**Biomedical Telemetry:** Wireless Telemetry, Single channel telemetry, Multichannel telemetry, Multi-patient telemetry, Transmission of Physiological signal over telephone lines, Telemetry systems for ECG, Temperature, Respiration data, Obstetrical telemetry, Implantable telemetry systems for ECG, Blood pressure and Blood flow.	6

Term Work and Practical shall be based on the above syllabus.

Text Books:

1. Handbook of Biomedical Instrumentation by R. S. Khandpur.
   Pub: Tata McGraw -

Reference Books:

1. Biomedical Electronics and Instrumentation.
   By S. K. Venkata Ram. Pub: Galgotia Publication Pvt. Ltd., New Delhi.
2. Medical Instrumentation. Application and Design.
   By John Webster. Pub: John Wiley and Sons. Inc., New York.
3. Biomedical Instrumentation and Measurements.
   By Leslie Cromwell, Fred J. Weibell. Pub: Erich A. Pfeiffer.