

**SARDAR PATEL UNIVERSITY**  
**Programme: B.Sc (Physics)**  
**Semester: III**  
**Syllabus with effect from: June-2012**

<b>Paper Code: US03EPHY01</b>	<b>Total Credit: 3</b>
<b>Title Of Paper: Biomedical Instrumentation</b>	

Unit	Description in detail	Weighting (%)
I	<b>Fundamentals of Medical Instrumentation</b> Sources of biomedical signals, Basic medical instrumentation system, Performance requirement of medical instrumentation systems, General constraints in design of medical instrumentation systems, Basic of diagnostic radiology, Nature and properties of X-rays, Diagnostic ultrasound, Physics of ultrasonic waves, characteristic impedance, wavelength and frequency, velocity of propagation, absorption of ultrasonic energy, Beam width	
II	<b>Physiological Transducers</b> Introduction, Classification of transducers, Performance characteristics of transducers, static characteristics, dynamic characteristics, other characteristics <b>Displacement, position, and motion transducer</b> Potentiometric transducer, variable capacitance, linear variable, differential transformer (LVDT), linear or angular encoders, Piezo-electric transducers, other displacement sensors	
III	<b>Pressure Transducers</b> LVDT pressure transducer, strain gauge pressure transducers, unbounded and bonded strain gauges <b>Transducers for body temperature measurement</b> Thermocouples, electrical resistance thermometer, thermistors, silicon diode, chemical thermometry	
IV	<b>Photoelectric Transducers</b> Photovoltaic or barrier layer cells, Photo emissive cells, silicon diode detectors <b>Optical fiber sensors</b> Advantages of optic fiber sensors, types of optical fiber sensors, Photometric sensors, Physical sensors, Chemical sensors, Biosensors, Smart sensors	

**Basic Text & Reference Books :-**

- Handbook of Biomedical Instrumentation(2<sup>nd</sup> Edition)  
R S Khandpur, Tata McGraw Hill Publications
- Instrumentation Measurement and Analysis  
B C Nakra and K K Chaudhary, Tata McGraw Hill, New Delhi
- Biomedical Instrumentation  
R S Khandpur, Tata McGraw Hill, New Delhi

