

SARDAR PATEL UNIVERSITY
Programme & Subject: M.Sc (Electronics)
Semester: IV
Syllabus with Effect from: June - 2014

Paper Code: PS04CELE03	Total Credit: 4
Title Of Paper: Sensor Technology	

Unit	Description in detail	Weightage (%)
I	Importance of Sensors, Types of Sensors- Physical and Chemical, Sensor materials. Sensor parameters- Resolution and noise, Errors in Measurements. Gas Sensors: Importance, Classification, Oxygen Sensors, Electrochemical Sensors, Catalytic Gas Sensors, Semiconductor Gas Sensors, Material and Mechanism of Sensing, Ceramic Sensors, Thick film Sensors, Thin Film Sensors, Resistive gas sensors, FET Sensors, Humidity, Sensors, Sensor Arrays.	25%
II	Fiber Optic Sensors (FOSs), Basic Concepts, Architecture of Fiber Optics Sensors (FOSs), Applications- Temperature, Liquid Level, Fluid Flow and Microbend Sensor. Seismic Sensors, Micro Electro Mechanical Sensors (MEMs) Resonating Quartz Sensors, Piezoelectricity, Resonance and Quartz properties, Electronic equipments for Quartz Sensors, Surface Acoustic Wave Sensors (SAW), SAW Sensors Operation- Chemical and Physical Sensors, Magnetic Field Sensors, Mechanical Sensors.	25%
III	Biosensors - Introduction and Definition, Receptor : Molecular Recognition Element, Immobilization methods, Electrochemical Sensing principles, Ion-Selective membrane electrode, Ion Selective field effect transistors, Optical biosensors, Introduction & sensing applications in environmental, food and clinical analysis, defense.	25%
IV	Silicon Micromachining - Introduction, IC Technologies and Micromachining methods, Sensor Interfaces - System Architectures, Requirements & Specifications, Interface Design, General Purpose Interface Board. Smart Sensor - Introduction, Primary Sensors, Excitation, Amplification, Filters, Converters, Compensation - Nonlinearity, Approximation and regression, Noise and Interface, Response Time, Drift, Cross- sensitivity, Information Coding/Processing, Data Communication, Standards for Smart Sensor Interface, The Automation.	25%

Basic Text & Reference Books:-

- **Sensors for Domestic Applications**
Alnaldo D'Amico and Giorgio Sbeveglieri, World Scientific Co. (USA)
- **Advance in Biosensors**
A.P.F. Turner, Jai Press Ltd., N.Delhi (INDIA)
- **Sensors and Transducers(Second Edition)**
D. Patranabis, Prentice/Hall of India Private Limited, N.Delhi (INDIA)
- **Biosensors - An Introduction Beian Eggins**
Wiley Teuinee
- **Biosensors Principles & Applications**
Loic J. Blum and Pierre R. Coulet, Marcel Dekker, Inc. (USA)

