

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E. Bio-Medical Engineering

Semester: I

Subject Name: **Transducer Design**

Sr.No	Course content
1.	Review of fundamentals of Transducers for measurement of parameters.
2.	Biosensor architecture and Classification; medically significant measurands, functional specifications of medical sensors.
3.	Biosensor characteristics: linearity, repeatability, hysteresis, drift; sensor models in the time & frequency domains.
4.	Biosensor for physical measurands: strain, force, pressure, acceleration, flow, volume, temperature and biopotentials.
5.	Biosensor for measurement of chemicals: potentiometric sensors, ion selective electrodes, ISFETS; Amperometric sensors, Clarke electrode; biosensors, catalytic biosensors, immunosensors.
6.	Sensor materials for construction, fabrication techniques for various sensors
7.	Application case studies for various sensors. Latest trends in sensors,
8.	Nano sensors, bio sensors, MEMS.
9.	Fundamentals of MEMS, Intelligent and network sensors; intelligent instrumentation
10.	systems; case studies on smart sensors, MEMS sensors, intelligent sensors, network sensors and
11.	Intelligent instrumentation systems; Future trends: neurosensors, smart sensors.

Reference Books:

1. H.K P Neubert, "Instrument Transducers", Oxford University Press, 1963
2. E. O. Doebelin, 'Measurement System Application and Design- McGrawhill International- Fourth Edition
3. C.s Rangan, G.R Sarma and V.S V Mani, "Instrumentation Devices and Systems", Tata McGrawhill Publishing Company Ltd, New Delhi (1983).
4. Chapman, 'Smart Sensors', ISA Handbook
5. Electrical Transducers Nomenclature & Terminology. 1975, ISA
6. Solomon, 'Sensors Handbook'
7. Brayan Eggins, 'Bio-sensors'
8. Bela G Liptak, 'Instrument Engineers Handbook, vol 1,2,3,' 3rd Edition, (CRC Press) (2002)
9. IEEE Sensor Journal.
10. Science Direct.