GUJARAT TECHNOLOGICAL UNIVERSITY

M.E – Instrumentation and Control Engineering

(Applied Instrumentation)

Semester: II

Subject Name: **Micro Electro Mechanical System**

Sr. No.	Course content
1.	Introduction What Are MEMS? Transducers, and actuators
2.	Materials and Fabrication Techniques: Materials, Substrates, Additive Materials, Fabrication Techniques, Deposition, Lithography Etching, Surface Micromachining, Wafer Bonding, Thick-Film Screen Printing,, Electroplating LIGA , Porous Silicon ,Electrochemical Etch Stop ,Focused Ion Beam Etching and Deposition
3.	MEMS Simulation and Design Tools: Simulation and Design Tools , Behavioral Modeling Simulation Tools , Finite Element Simulation Tools
4.	Mechanical Sensor Packaging: Standard IC Packages, Ceramic Packages, Plastic Packages, Metal Packages, Packaging Processes, Electrical Interconnects, Methods of Die Attachment, Sealing Techniques MEMS Mechanical Sensor Packaging, Protection of the Sensor from Environmental Effects Protecting the Environment from the Sensor, Mechanical Isolation of Sensor Chips
5.	Mechanical Transduction Techniques: Piezoresistivity , Piezoelectricity , Capacitive Techniques , Optical Techniques , Intensity , Phase Wavelength ,Spatial Position , Frequency , Polarization ,Resonant Techniques , Vibration Excitation and Detection Mechanisms, Resonator Design Characteristics ,Actuation Techniques , Electrostatic Piezoelectric, Thermal , Magnetic ,Smart Sensors
6.	MEMS applications: MEMS as Secondary Storage in Computer System, Optical Applications, Biomedical Application

Reference Books:

1. MEMS Mechanical Sensors, by Stephen Beeby, Graham Ensell, Michael Kraft Neil White, Publication: Artech House, Inc.
2. MEMS and MOEMS Technology and Application, by P Rai Choudhury, PHI Publication.
3. Current literature from journals and magazines.