

GUJARAT TECHNOLOGICAL UNIVERSITY
M.E. SEMESTER-II
MECHATRONICS ENGINEERING

Subject Name: **Fundamentals of Micro Mechatronics Systems (Elective II)**
Subject Code: **1724703**

Sr. No.	Course content	Total Hrs.
1.	Introduction to MEMS and Micro Systems: Microsystems and Microelectronics – Miniaturization – Micro sensors: Chemical Sensors- Optical Sensors- Pressure Sensors- Thermal Sensors – Micro actuators and Micro motors.	10
2.	Microsystem Materials: Molecular Theory and Intermolecular Forces – Silicon Piezo Resistors– Electrochemistry – Substrates and Wafers – Silicon Compounds – Polymers – Packaging Materials.	08
3.	Microsystem Fabrication Process: Photolithography – Ion Implantation – Diffusion –Oxidation – Chemical Vapor Deposition – Etching – Applications of MEMS in Automatic-Telecom and Other Industries.	06
4.	Introductory concepts in modeling: Theory of elasticity, Solution Procedures in linear theory of elasticity, Theory of laminated composites, Micromechanical analysis of a laminae, wave propagation in structures	06
5.	Modeling of Smart sensors and Actuators: Introduction, Constitutive modeling, Finite Element modeling, Modeling of magnetostrictive sensors and actuators, Modeling of Micro Electro Mechanical systems, Active Control Techniques	10

Text Books

1. Tai,Ran Hsu, “MEMS & Microsystems Design & Manufacture”, Tata Mc Graw Hill,2002.
2. Smart Materials Systems and MEMS: Design and Development Methodologies, Vijay K Varadan, K.J.Vinoy and S.Gopalakrishnan, John Wiley and sons.

Reference Books

1. The MEMS Hand book, Mohamed Gad-el-Hak, CRC Press, New York, London.