

SYLLABUS

ANNA UNIVERSITY, CHENNAI

For B.E., OPEN ELECTIVE FOR ALL BRANCHES

CEC340

MEMS DESIGN

L T P C

2 0 2 3

UNIT I: ESSENTIAL ELECTRIC AND MECHANICAL CONCEPTS **6**

Conductivity of semiconductors, Crystal planes and orientations, stress and strain, flexural beam bending analysis under simple loading conditions, Dynamic system, resonant frequency and quality factor.

UNIT II: ELECTRO STATIC SENSING AND ACTUATION **6**

Parallel plate capacitor, Applications of parallel plate capacitors- inertial sensor, pressure sensor, flow sensor, tactile sensor, parallel plate actuators, interdigitated finger capacitors, applications of comb drive devices.

UNIT III: THERMAL SENSING AND ACTUATION **6**

Fundamentals of thermal transfer, Sensors and actuators based on thermal expansion, Thermal couples, Thermal resistors, Applications- Infrared sensors, flow sensors, Inertial sensors, other sensors.

UNIT IV: PIEZOELECTRIC SENSING AND ACTUATION **6**

Mathematical description of piezoelectric effects, Cantilever piezoelectric actuator model, properties of piezoelectric materials – Quartz, PZT, PVDF, ZnO, Applications – Acoustic sensors, Tactile sensors.

UNIT V: MAGNETIC SENSING AND ACTUATION **6**

Concepts and principles- magnetization and nomenclatures, principles of micromagnetic actuators, fabrication of micro magnetic components- deposition, design and fabrication of magnetic coil, MEMS magnetic actuators.

30 PERIODS

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