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 SESNING 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, Themal 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

CONTENTS

UNIT I

UNIT II

UNIT III

UNIT IV

UNIT V