

SENSOR TECHNOLOGY
(Open Elective – I)

Course Code	20EC2501A	Year	III	Semester	I
Course Category	OE-1	Branch	Offered by EC	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Nil
Continuous Internal Evaluation:	30	Semester End Evaluation:	70	Total Marks:	100

Course Outcomes	
Upon successful completion of the course, the student will be able to	
CO1	Understand the concept of sensors and its characteristics. (L2)
CO2	Select the physical principles of sensing based on sensor signals and systems (L3)
CO3	Identify the sensor interfacing with various electronics circuits (L3)
CO4	Utilize the practical approach in design of technology based on different sensors.(L3)
CO5	List various sensor materials and technology used in designing sensors.(L4)

Mapping of course outcomes with Program outcomes (CO/ PO/PSO Matrix)														
Note: 1- Weak correlation 2-Medium correlation 3-Strong correlation														
* - Average value indicates course correlation strength with mapped PO														
COs	P O1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	P O 12	PSO 1	PSO 2
CO1	2											2		
CO2	3												3	
CO3	2				2								2	
CO4	2				2								2	
CO5		2												2
Average	3	2			2							2	3	2

Syllabus		
Unit No.	Contents	Mapped CO
I	Sensors Fundamentals and Characteristics Sensors, Signals and Systems; Sensor Classification; Units of Measurements; Sensor Characteristics	CO1,CO2
II	Physical Principles of Sensing Electric Charges, Fields, and Potentials; Capacitance; Magnetism; Induction; Resistance; Piezoelectric Effect; Hall Effect; Temperature and Thermal Properties of Material; Heat Transfer; Light; Dynamic Models of Sensor Elements	CO1,CO2
III	Interface Electronic Circuits Input Characteristics of Interface Circuits, Amplifiers, Excitation Circuits, Analog to Digital Converters, Direct Digitization and Processing, Bridge Circuits, Data Transmission, Batteries for Low Power Sensors	CO1,CO3

IV	Sensors in Different Application Area Occupancy and Motion Detectors; Position, Displacement, and Level; Velocity and Acceleration; Force, Strain, and Tactile Sensors; Pressure Sensors, Temperature Sensors	CO1,CO4
V	Sensor Materials and Technologies Materials, Surface Processing, Nano-Technology	CO1,CO5

Learning Resources	
Text Books	
1. J. Fraden, Handbook of Modern Sensors:Physical, Designs, and Applications, AIP Press, Springer	
2. D. Patranabis, Sensors and Transducers, PHI Publication, New Delhi	
Reference Books	
1. Mechatronics- Ganesh S. Hegde, Published by University Science Press (An imprint of Laxmi Publication Private Limited).	
e- Resources & other digital material	
1. http://www.infocobuild.com/education/audio-video-courses/electronics/IndustrialInstrumentation-IIT-Kharagpur/lecture-34.html	