

20EC 2501A - SENSOR TECHNOLOGIES

Offering Branch	ECE		
Course Category:	Open Elective -I	Credits:	3
Course Type:	Theory	Lecture-Tutorial-Practical:	3-0-0
Prerequisites:	NIL	Continuous 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.	K2
CO2	Select the physical principles of sensing based on sensor signals and systems	K3
CO3	Identify the sensor interfacing with various electronics circuits	K3
CO4	Utilize the practical approach in design of technology based on different sensors.	K3
CO5	List various sensor materials and technology used in designing sensors.	K4

Contribution of Course Outcomes towards achievement of Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2											2		
CO2	3												3	
CO3	2				2								2	
CO4	2				2								2	
CO5		2												2
Avg.	3	2			2							2	3	2

1- Low

2-Medium

3-High

Course Content

UNIT-1	Sensors Fundamentals and Characteristics Sensors, Signals and Systems; Sensor Classification; Units of Measurements; Sensor Characteristics	CO1, CO2
UNIT-2	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
UNIT-3	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
UNIT-4	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
UNIT-5	Sensor Materials and Technologies Materials, Surface Processing, Nano-Technology	CO1, CO5

Learning Resources

Text books:	<ol style="list-style-type: none"> J. Fraden, Handbook of Modern Sensors:Physical, Designs, and Applications, AIP Press, Springer. D. Patranabis, Sensors and Transducers, PHI Publication, New Delhi
Reference books	<ol style="list-style-type: none"> 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>