

## SENSOR TECHNOLOGY

<b>Course Code</b>	20EC2501A	<b>Year</b>	III	<b>Semester</b>	I
<b>Course Category</b>	Open Elective-I	<b>Branch</b>	Common to all	<b>Course Type</b>	Theory
<b>Credits</b>	3	<b>L-T-P</b>	3-0-0	<b>Prerequisites</b>	Nil
<b>Continuous Internal Evaluation:</b>	30	<b>Semester End Evaluation:</b>	70	<b>Total Marks:</b>	100

### Course Outcomes

Upon successful completion of the course, the student will be able to

<b>CO1</b>	<b>Understand</b> the concept of sensors and its characteristics. (L2)
<b>CO2</b>	<b>Select</b> the physical principles of sensing based on sensor signals and systems (L3)
<b>CO3</b>	<b>Identify</b> the sensor interfacing with various electronics circuits (L3)
<b>CO4</b>	<b>Utilize</b> the practical approach in design of technology based on different sensors.(L3)
<b>CO5</b>	<b>List</b> 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	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

### Syllabus

Unit No.	Contents	Mapped CO
I	<b>Sensors Fundamentals and Characteristics</b> Sensors, Signals and Systems; Sensor Classification; Units of Measurements; Sensor Characteristics	CO1,CO2
II	<b>Physical Principles of Sensing</b> 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	<b>Interface Electronic Circuits</b> 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	<b>Sensors in Different Application Area</b> Occupancy and Motion Detectors; Position, Displacement, and Level; Velocity and Acceleration; Force, Strain, and Tactile Sensors; Pressure Sensors, Temperature Sensors	CO1,CO4
V	<b>Sensor Materials and Technologies</b> Materials, Surface Processing, Nano-Technology	CO1,CO5

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