

**EC721OE: ELECTRONIC SENSORS (OE - II)****B.Tech. IV Year I Semester**

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<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**Course Objectives:**

1. To teach the characterization of sensors.
2. to provide knowledge on working of Electromechanical, Thermal, Magnetic and radiation sensors
3. To provide basic Understanding of Electro analytic and smart sensors
4. provide different applications of sensors.

**Course Outcomes:** Upon completing this course, the student will be able to

1. Learn about sensor Principle, Classification and Characterization.
2. Explore the working of Electromechanical, Thermal, Magnetic radiation and Electro analytic sensors.
3. Understand the basic concepts of Smart Sensors.
4. Design a system with sensors.

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	1	1	-	-	-	-	1	-	-	1
CO2	1	1	2	2	-	-	-	-	1	-	-	1
CO3	1	1	1	1	-	-	-	-	1	-	-	1
CO4	2	2	3	2	-	-	-	-	1	-	-	1

**UNIT – I: Sensors / Transducers:** Principles, Classification, Parameters, Characteristics, Environmental Parameters (EP), Characterization Electromechanical Sensors: Introduction, Resistive Potentiometer, Strain Gauge, Resistance Strain Gauge, Semiconductor Strain Gauges -Inductive Sensors: Sensitivity and Linearity of the Sensor – Types-Capacitive Sensors: Electrostatic Transducer, Force/Stress Sensors Using Quartz Resonators, Ultrasonic Sensors

**UNIT – II: Thermal Sensors:** Introduction ,Gas thermometric Sensors ,Thermal Expansion Type Thermometric Sensors ,Acoustic Temperature Sensor ,Dielectric Constant and Refractive Index thermo sensors ,Helium Low Temperature Thermometer ,Nuclear Thermometer ,Magnetic Thermometer ,Resistance Change Type Thermometric Sensors, Thermo emf Sensors, Junction Semiconductor Types, Thermal Radiation Sensors, Quartz Crystal Thermoelectric Sensors, NQR Thermometry, Spectroscopic Thermometry, Noise Thermometry, Heat Flux Sensors

**UNIT- III: Magnetic sensors:** Introduction, Sensors and the Principles Behind, Magneto-resistive Sensors, Anisotropic Magneto resistive Sensing, Semiconductor Magneto resistors, Hall Effect and Sensors, Inductance and Eddy Current Sensors, Angular/Rotary Movement Transducers, Synchros.

**UNIT – IV: Radiation Sensors:** Introduction, Basic Characteristics, Types of Photo resistors/ Photo detectors, Xray and Nuclear Radiation Sensors, Fibre Optic Sensors Electro analytical Sensors: The Electrochemical Cell, The Cell Potential - Standard Hydrogen Electrode (SHE), Liquid Junction and Other Potentials, Polarization, Concentration Polarization, Reference Electrodes, Sensor Electrodes, Electro ceramics in Gas Media.

**UNIT - V Smart Sensors:** Introduction, Primary Sensors, Excitation, Amplification, Filters, Converters, Compensation, Information Coding/Processing - Data Communication, Standards for Smart Sensor Interface, the Automation Sensors –Applications: Introduction, On-board Automobile Sensors (Automotive Sensors), Home Appliance Sensors, Aerospace Sensors, Sensors for Manufacturing – Sensors for environmental Monitoring