

Module No.	Unit No.	Topics	Hrs.
1.0		Introduction	03
	1.1	Classification of Sensors : The sensors are classified with criteria like primary physical quantity to be sensed , transduction principle, material and technology used and application	
	1.2	Criteria to choose a Sensor: Accuracy, Environmental condition, Range, Calibration, Resolution , Cost and Repeatability	
	1.3	Digital sensors : Principle and its advantage over analog sensors	
	1.4	Smart Sensors: Low-power, Self –diagnostic and Self- calibration	
2.0		Types of Sensors	09
	2.1	Temperature Sensors : RTD, Thermocouple and Thermistors sensor	
	2.2	Proximity Sensors : Inductive (LVDT), Capacitive, Photoelectric and Ultrasonic sensors	
	2.3	Chemical Sensors : Gas , Smoke, Conductivity and pH sensor	
	2.4	Other Sensors : Optical, Infrared (IR), Sound, Motion , Pressure , Level , Moisture, Humidity, Laser , Image and GPS sensor	
3.0		MEMS Sensors and Actuators	06
	3.1	MEMS SENSORS: General design methodology, techniques for sensing, Pressure sensor , Mass Flow sensor , Acceleration sensor , Angular Rate sensor and Gyroscopes, Micro machined microphones, Chemical sensors, Taguchi Gas sensor, Combustible Gas sensors	
	3.2	MEMS ACTUATORS: Techniques for actuation, Digital Micro mirror Device, Micro Machined Valves	
4.0		Wireless Sensing Technologies	05
	4.1	Bluetooth: Concepts of Pico net, Scatter net, Link types, Network connection establishments	
	4.2	ZigBee: components, architecture, network topologies	
	4.3	Ultra Wide Band (UWB), Near Field Communication (NFC) and RFID: technical requirements, components and characteristics	
	4.4	WLAN (WiFi) : WLAN Equipment, WLAN topologies , IEEE 802.11 Architecture	
5.0		Data Acquisition and Signal Conditioning	08
	5.1	Fundamentals of Data Acquisition: Analog and Digital data acquisition system with different configurations, Data loggers, Noise and interference	
	5.2	Signal Conditioning : Wheatstone Bridge, Flash ADC, R2R DAC	
	5.3	Utilization of Signal conditioning circuits for Temperature, Pressure, Optical, Strain gauges, Displacement and piezoelectric Transducers	
6.0		Sensor Applications	08
	6.1	Onboard Automobile sensing system, Home appliances sensors, Aerospace Sensors, Sensors for Environmental Monitoring, Biomedical Sensing Applications	
	6.2	Radio sensors for industrial applications, Radio Astronomy, Remote Sensing, Ground Penetrating Radars, Underwater sensing, LIDAR	
		Total	39

Textbooks:

1. D.V.S. Murthy, “Transducers and Instrumentation”, PHI Learning, 2nd Edition, 2013.
2. D. Patranabis – Sensor and Transducers (2e) Prentice Hall, New Delhi, 2003
3. Antti V. Raisanen, Arto Lehto, “Radio Engineering for Wireless Communication and Sensor Applications”, Artech House mobile communications series, USA, 2003.