

## Basics behind Smart City

### Course Objectives:

- To discuss need of sensors, their classification, advantages and disadvantages. To discuss working of different types of sensors.
- To discuss recent trends in sensor technology and their selection.
- To make students familiar with the constructions and working principle of different types of sensors
- To make students aware about and measuring instruments and understands the various sensors.

### Unit I:

**Sensor Fundamentals:** Definition- basic principle- characteristics- types of sensors.

**Mechanical and electromechanical sensor:** Potentiometers, strain gauge, Resistive temperature detector, thermistors, light dependent resistors, Resistive gas sensors, LVDT, proximity sensors

### Unit II:

**Radiation sensor:** Photo voltaic cells, photodiodes, photo emissive cell, photo conductive cells, photo transistor

Fibre optic sensor & its types

### Unit III:

**Flow sensor:** Ultrasonic Flow meter, turbine flow meter, electromagnetic flow meter

Pressure sensor:

Mercury pressure sensor, Piezoresistive sensors

### Unit IV:

**Self-generating temperature sensor:** Thermocouples- piezoelectric sensor, pyro electric sensors, electrochemical sensors, Magnetic Thermometer, biosensors.

### Unit V:

**Smart sensor:** Components of smart sensor, general architecture of smart sensor, industrial application of smart sensor.

### Recommended Books:

1. Sensor & transducers, D. Patranabis, 2nd edition, PHI
2. Measurement systems: application & design, E.A.Doebelin, McGraw Hill
3. Ramon Pallas & John G. Webster, "Sensors and Signal Conditioning", John Wiley & Sons, 2nd Ed., 2001.
4. Webster John G., "Instrumentation and Sensors Handbook", CRC Press, 1st Ed., 1999.
5. Jacob Fraden, "Handbook of Modern Sensors: Physics, Designs and Applications", Springer, 3rd Ed., 2004.