PEI5I101 INSTRUMENTATION DEVICES AND SYSTEMS–II

Module –1 (10 Hrs)

Pressure measurement: Manometer for use of pressure measurement, Hall effect transducer, Low pressure measurements.
Flow Measurement: Basics of flow measurement; differential pressure flow meters- Pitot tube, Orifice plate, Venturi tube; Rotameter, turbine type flow meter, electromagnetic flow meter. Doppler shift flow meter. (Bentley: Sections 12.1 to 12.3.2 and 12.5.1)
Temperature measurement: Temperature scale, Change in dimensions-Bimetals, liquid-in-glass thermometers, Filled system thermometers.

Module-2: (10 Hrs)

Miscellaneous Measurements:
Level measurements using floats, hydrostatic pressure gage and capacitive type; principles of ultrasonic and gamma ray type level indicators. Humidity sensor: capacitive type. pH and liquid conductivity measurements: basic principles, Bolometer and Viscosity Measurement. (Ghosh: Sections 12.1, 12.3.3, 12.4, 13.3 and 13.5; Bentley: Section 8.9)
Acceleration Measurement: Piezoelectric transducers: basic principle, equivalent circuit, frequency response, charge amplifier; acceleration measurement: basic principle and frequency response; piezoelectric accelerometer. (Bentley: Section 8.7, Ghosh: Section 9.1)

Module-3: (12 Hrs)

Optical sensing:
LED and photo resistors and photodiodes; Radiation pyrometer: Planck's law, Stefan Boltzmann's law, broad band and narrow band pyrometer; optical fibre and fibre optic sensing. (Johnson: Chapter 6, Bentley: Sections 15.2, 15.3.2, 15.5, 15.6)
Programmable Logic Controllers:
Discrete state process control and its characteristics; input and output devices; Event sequence description with examples; Relay ladder logic and its construction; Programmable Logic Controllers (PLCs): functional description, PLC software functions; programs examples. (Johnson: Chapter 8)

Text Books:

1. *Measurement Systems Application and Design- E.O. Doeblin (4/e), McGraw-Hill,*
2. *International, NY.*
3. *Principles of Measurement Systems- J.P. Bentley (3/e), Pearson Education, N Delhi,*
4. *Introduction to Measurement and Instrumentation- A.K. Ghosh(3/e), PHI Learning.*
5. *Process Control Instrumentation Technology- C.D. Johnson (8/e), PHI Learning,*

Reference Books:

1. *Transducers and Instrumentation- D.V.S. Murthy (2/e), PHI Learning, New Delhi, 2009.*
2. *2 Industrial instrumentation, D patronabis,----------*
3. *Modern Control Technology Components and Systems- C.T. Kilian (3/e), Clengage Learning, New Delhi, 2006.*