

EE 515: INSTRUMENTATION & CONTROL IN ENERGY SYSTEMS (3-0-0: 3)

Basic measurement concepts, Measurement errors, Transducer classification, Static and dynamic characteristics of transducers.

Measuring of temperature, pressure, liquid level, Measurement of velocity and flow, heat flux.

Characterization of combustors, Flue gas analyzers, Exhaust gas analyzers.

Solar energy measurement requirements, Solar radiation measuring instruments, Energy auditing instruments.

General spectroscopy, Mass spectroscopy.

Laser interferometer developments, Characterization of electrical power systems, Instruments for monitoring electrical parameters, Analysis of power system measurements.

Analog signal conditioning, A/D and D/A converters, Digital data processing and display, Computer data processing and control.

Feed back control system, Stability and transient analysis of control systems, Application of PID controllers, General purpose control devices and controller design.

Air pollution sampling and measurement of particulates, SO_x, NO_x, CO, O₃, hydrocarbons, Waste water sampling, Determination of organic and in-organic substances, Physical characteristic and bacteriological measurements, Solid waste measurements and disposal.

Measurement of phase difference using X-OR and SR Flip-Flop Methods, Photo Interrupter sensor, Sample and Hold Circuit, Clipping circuit, Opto-coupler, Photo Interrupter sensor, Voltage to frequency converter.

Text Books & References

1. John P Bentley, "Principles of Measurement Systems", Pearson Education.
2. David A Bell, "Electronics Instrumentation and Measurements", Oxford Higher Education.
3. H S Kalsi, "Electronic Instrumentation", McGraw-Hill Education (India) Private limited.
4. Helfrick A D, Cooper W D, "Modern Electronic Instrumentation and Measure Techniques", Prentice Hall India.
5. Shawhney A K, "A Course In Electrical and Electronics Measurements and Instrumentation", Dhanpat Rai.
6. Rangan C S, Sarma G R, Mani V S V, "Instrumentation Devices And Systems", Tata McGraw-Hill.