

AMAC-8 INSTRUMENTATION FOR THERMAL SYSTEMS

UNIT-1 MEASUREMENT CHARACTERISTICS

- 1.1 Instruments-
- 1.2 Classification and Characteristics
- 1.3 Static and dynamic, Systematic and random errors, Statistical analysis,
- 1.4 Uncertainty, Experimental planning and selection of measuring instruments.

UNIT-2 MEASUREMENT OF PHYSICAL QUANTITIES

- 3.1 Measurement of Temperature- Thermistor, Resistance Temperature Detector,
- 3.2 Thermocouples, Pressure- Manometer, Bourdon gauge,
- 3.3 Diaphragm gauge, electrical methods, In cylinder pressure transducer, Flow
- 3.4 Venturimeter, Rotameter, Ultrasonic flow meter, Vortex flow meter,
- 3.5 Thermal mass flow meter, Turbine flow meter.

UNIT-3 ADVANCED MEASUREMENTS

- 3.1 Interferometer, Laser Doppler Anemometer,
- 3.2 Hot wire Anemometer, Particle Image Velocimetry.
- 3.3 Gas Analysers – Flame Ionisation Detector,
- 3.4 Non-Dispersive Infrared Analyser,
- 3.5 Chemiluminescent detector, Smoke meters, and Gas chromatography.

UNIT-4 CONTROL SYSTEMS

- 4.1 Open & closed loop control systems, Response, Transfer function,
- 4.2 Types of feedback, feedback Control system characteristics,
- 4.3 Control system parameters,
- 4.4 Servo motors, Stepper motors, Servo Amplifiers, Continuous control modes.

UNIT-5 DATA ACQUISITION SYSTEM

- 5.1 Data logging and acquisition - Sensors for error reduction, elements of computer interfacing,
- 5.2 Timers and Counters, Analog to Digital & Digital to Analog conversion.

Reference books:

1. Holman, J.P., Experimental methods for Engineers, Tata McGraw-Hill, 7th Ed.2001.
2. Barney G.C, Intelligent Instrumentation, Second Edition, Prentice Hall of India, 1988.
3. Bolton.W, Industrial Control & Instrumentation, Universities Press, Second Edition, 2001.
4. Doblin E.O, Measurement System Application and Design, Second Edition, McGraw Hill, 1978.