GUJARAT TECHNOLOGICAL UNIVERSITY

M.E - Instrumentation and Control Engineering

(Applied Instrumentation)

Semester: II

Subject Name: **Industrial Measurement (Interdisciplinary)**

Sr.No	Course content
1.	**Basic concept and qualities of measurement** Measurement and its aim, the functional element of an instrument, performance characteristics, statistical analysis.
2.	**Displacement, force, torque and speed measurement** Measurement of displacement, measurement of force, measurement of torque, measurement of speed.
3.	**Dimension measurement** Thickness measurement, laser-based length measurement, camera based width measurement, laser diameter gauge.
4.	**Density, viscosity and pH measurement** Density measurement, viscosity measurement, pH measurement.
5.	**Level measurement** Method of liquid level measurement, direct method, hook type level indicator, sight glass, float type level indicator, displacer level detector, indirect method, hydro static pressure type, pressure gauge method, air bellows, air purge system, liquid purge system, electrical method, capacitance level indicator, radiation level detector, laser level sensor, microwave level switches, optical level detector, ultrasonic level detector, eddy current level measurement sensor servicing of level measuring instruments, selection of level sensors.
6.	**Flow measurement** Method of flow measurement, inferential flow measurement, quantity flow meter, mass flow meters, calibration of flow meters, selection of flow meters.
7.	**Pressure measurement** Pressure, method of pressure measurement, manometers, elastic pressure transducers, measurement of vacuum, force balance pressure gauges, electrical pressure transducers, pressure switches, calibration of pressure measuring instruments, maintenance and repair of measuring instruments.
8.	**Temperature measurement** Temperature, temperature scales, methods of temperature measurement, expansion thermometer, filled system thermometers, electrical temperature instruments, pyrometer, fiber optic temperature measurement system, ultrasonic thermometer, calibration of thermometer, temperature measurement consideration.

9.	**sensors and transducers** Sensors, transducers, primary sensing elements, electrical transducers, selection of transducers, transmission lines, final control elements.
10.	**Transmitters, telemetry system and recorders** Transmitter, Telemetry system, Recorders.

Reference Books:

1. Industrial Instrumentation and Control by S K Singh (Tata Mcgrow-Hill) , Third Edition
2. Industrial Instrumentation by K. Krishnaswamy and S. Vijaychitra, New Age International Publishers, Second Edition
3. Industrial Instrumentation by D. P. Eckman, CBS Publishers and Distributer