

	GURGAON INSTITUTE OF TECHNOLOGY & MANAGEMENT
	COURSE PLAN

Name of the Teacher :	VIVEK MALIK
Department: Mechanical	Session: 2017-18
Branch / Semester: Mechanical/ 6 th	Subject Name & Code: M&I (ME:310-F)

Books Referred:

1. Mechanical Measurements and Instrumentation by Er. R.K. Rajput
2. Mechanical Measurements: T.G. Beckwith, W.L. Buck and R.D. Marangoni Addison Wesley.
3. Instrumentation, Measurement and Analysis – B.C. Nakra and K.K. Chaudhary.
4. Mechanical Measurements by D. S. Kumar, Kataria & Sons

Lecture	Topics to be Covered
1.	Introduction, Significance of Measurement, Standards of Measurement
2.	Methods of Measurement, Modes of Measurement, Functional Elements of a Measurement System
3.	Classification of Instruments, Standards and Calibration, Application of Instruments
4.	Introduction, Measurement of Temperature, Temperature measuring instruments Classification
5.	Non Electrical Methods – Solid Rod Thermometer, Bimetallic Thermometer, Liquid-in-Glass thermometer
6.	Pressure Thermometer, Electrical Methods – Electrical Resistance Thermometers
7.	Semiconductor Resistance Sensors (Thermistors), Thermo–Electric Sensors
8.	Thermocouple Materials, Radiation Methods (Pyrometry), Total Radiation Pyrometer, Selective Radiation Pyrometer
9.	Introduction, Analog and Digital Transducers, Electromechanical; Potentiometric, Inductive Self Generating and Non-Self Generating Types
10.	Electromagnetic, Electrodynamic, Eddy Current, Magnetostrictive, Variable Inductance
11.	Mechano Electronic Transducers, Opto-Electrical Transducers, Photo Conductive Transducers, Photo Volatic Transducers

12.	Digital Transducers, Frequency Domain Transducer, Vibrating String Transducer, Binary codes, Digital Encoders.
13.	Linearly Variable Differential Transformer, Variable Capacitance, Piezo- Electric Transducer and Associated Circuits
14.	Unbonded and Bonded Resistance Strain Gauge. Strain Gauge Bridge circuits
15.	Single Double and Four Active Arm Bridge Arrangements, Temperature Compensation, Balancing and Calibration
16.	Introduction Amplifiers, Mechanical, Hydraulic, Pneumatic
17.	Optical, Electrical Amplifying elements, Compensators
18.	Differentiating and Integrating Elements
19.	Pressure & Flow Measurement, Introduction : Moderate Pressure Measurement, Monometers
20.	Elastic Transducer, Dynamic Effects of Connecting Tubing
21.	High Pressure Transducer, Low Pressure Measurement, Calibration and Testing, Quantity Meters
22.	Positive Displacement Meters, Flow Rate Meters, Variable Head Meters, Variable Area Meters
23.	Rotameters, Pitot-Static Tube Meter, Drag Force Flow Meter
24.	Turbine Flow Meter, Electronic Flow Meter, Electro Magnetic Flow meter. Hot-Wire Anemometer
25.	Introduction, Relative motion Measuring Devices, Electromechanical, Optical, Photo Electric
26.	Moire-Fringe, Pneumatic, Absolute Motion Devices, Seismic Devices, Spring Mass & Force Balance Type, Calibration, Hydraulic Load Cell
27.	Pneumatic Load Cell, Elastic Force Devices, Separation of Force Components, Electro Mechanical Methods, Strain Gage, Torque Transducer, Toque Meter
28.	Introduction, Accuracy, Precision, Resolution, Threshold, Sensitivity, Linearity, Hysteresis, Dead Band, Backlash, Drift
29.	Formulation of Differential Equations for Dynamic Performance- Zero Order, First Order and Second order systems

30.

Response of First and Second Order Systems to Step, Ramp, Impulse and Harmonic Functions