UEI302 SENSORS AND SIGNAL CONDITIONING

	L	T	P	Cr
	3	1	0	3.5

Introduction: Definition, Application and types of measurements, Instrument classification, Functional elements of an instrument, Input-output configuration of measuring instruments, Methods of correction for interfering and modifying inputs, Standards, Calibration, Introduction to Static characteristics and Dynamic characteristics, Selection of instruments, Loading effects.

Generalized Static Stiffness and Input Impedance: Generalized impedance and stiffness concepts, Static stiffness and static compliance, Impedance matching and maximum power transfer.

Error Analysis: Types of errors, Methods of error analysis, Uncertainty analysis, Statistical analysis, Gaussian error distribution, Chi-Square test, Correlation coefficient, Student's t-test, Method of least square, Curve fitting, Graphical analysis, General consideration in data analysis, Design of Experiment planning.

Sensors/Transducers: Definition, Types, Basic principle and applications of Resistive, Inductive, Capacitive, Piezoelectric and their Dynamic performance. Fiber optic sensors, Bio-chemical sensors, Hall-Effect, Photoemissive, Photo Diode/ Photo Transistor, Photovoltaic, LVDT, Strain Gauge Digital transducers: Principle, Construction, Encoders, Absolute and incremental encoders, Silicon micro transducers.

Signal Conditioning: Operational Amplifiers: application in instrumentation, Charge amplifier, Carrier amplifier, Introduction to active filters, Classification, Butterworth, Chebyshev, Couir filters, First order, Second order and higher order filters, Voltage to frequency and frequency to voltage converters.

COURSE LEARNING OUTCOME (CLO): The student will be able to
1. Understand the principles and applications of sensors and transducers
2. Analyze and design active filters
3. Understand the working of dc and ac bridges
4. Do signal conditioning of RTD and strain gauges

Text Books:
1. *Doebelin, E.O. & manic, D.N., Measurement Systems: Application & Design, McGraw Hill (2004)*
2. *Nakra, B.C. and Chaudhry, K.K., Instrumentation, Measurement and Analysis, TMH (2003).*

Reference Books:
1. *Murthy, D.V.S., Transducers and Instrumentation, Prentice Hall of India (2003).*
2. *Sawhney, A.K. and Sawhney, puneet, A Course in Electrical and Electronic Measurements and Instrumentation, Dhanpat Rai (2008).*

Evaluation Scheme:

Sr. No.	Evaluation Elements	Weightage (%)
1	MST	30
2	EST	45
3	Sessionals (May include	25

| | Assignments/Projects/Tutorials/Quizzes/Lab Evaluations) | |