Course Number and Name

BEE605 & Measurement and Instrumentation

Credits and Contact Hours

3 & 45

Course Coordinator's Name

Mr.Vijayaragavan

Text Books and References

Text Books:

1. Doebeline, E.O., "Measurement Systems – Application and Design", McGraw Hill Publishing compeney, 1990.
2. H.S. Kalsi, "Electronic instrumentation", Tata McGraw Hill Co., 1995.
3. Shawney A.K., "Electronic Instrumentation", Dhanpat Rai & Sons, New Delhi, 2008.
4. Moorthy.D.V.S, "Tranducers and Instrumentation", Prentice Hall of India Pvt Ltd 1995.

References:

1. Stout M.B., 'Basic electric Measurement, Prentice Hall of India. 1986
2. Dalley, J.W. Riely, W.F and Meconnel, K.G., "Instrumentation for Engineering Measurement", John Wiley & Sons, 1993 J.B Gupta, Measurements and Instrumentation".
3. http://nptel.iitg.ernet.in/courses/Elec_Engg/IIT%20Bombay/Electrical%20and%20Electronic%20Measurements.htm

Course Description

To make the student have a clear knowledge of the basic laws governing the operation of the instruments, relevant circuits and their working, Introduction to general instrument system, error, calibration etc.

Prerequisites	**Co-requisites**
Control System	Nil
required, elective, or selected elective (as per Table 5-1)	
Required	

Course Outcomes (COs)

CO1: Gain the knowledge of measuring various electrical and non electrical parameters.
CO2: Know the working and functions of Transducers and advanced sensors.
CO3: Gain the knowledge in digital measurement and data acquisition system.
CO4: Ability to measure frequency, phase with Oscilloscope.
CO5: Ability to measure strain, displacement, Velocity, Angular Velocity, temperature, Pressure Vacuum, and Flow

Student Outcomes (SOs) from Criterion 3 covered by this Course

COs/SOs	a	b	c	d	e	f	g	h	i	j	k	l
CO1	M	H	L	H	M	L	M	L	M	M	L	M
CO2	H	H	L	H	M	L	M	L	H	M	L	M
CO3	H	H	M	H	H	M	M	L	H	M	L	M
CO4	H	H	M	H	H	M	M	L	H	M	L	M

CO5	H	H	M	H	H	M	M	L	H	M	L	M

List of Topics Covered

UNIT I INTRODUCTION 9

Functional elements of measurement system – static characteristics – static calibration – accuracy, precision, resolution, linearity, dynamic, characteristics – performance characteristics of zero first, second order system – error in measurement.

UNIT II SENSORS AND TRANSDUCER 9

Basic requirement of sensors – classification of sensors – resistive, inductive and capacitive transducers –LVDT, piezoelectric, thermoelectric, optical and digital transducer – transducers application in force, torque, level, flow, pressure, speed, and temperature measurement – PH electrode – photoelectric transducer..

UNIT III SIGNAL CONDITIONING SYSTEM AND BRIDGE CIRCUIT 9

Bridges – instrumentation amplifier – operational amplifier – buffer amplifier – differential amplifier – active filter, V/F and F/V converters, PLL, sample and hold circuit, A/D and D/A converters, function generators, multiplexing and de-multiplexing system, data acquisition system.

UNIT IV ELECTRICAL AND ELECTRONICS MEASUREMENT AND TELEMETRY 9

Principle of ammeter and voltmeter – digital voltmeter – energy meter – wattmeter – current – voltage and position telemetry system – AC telemetry – wattmeter – current, voltage and position telemetry system – AC system

UNIT V INPUT – OUTPUT DEVICES AND DISPLAYS 9

Seven segment display – LED, LCD, mixie tube, alphanumeric display – CRT, CRO – Magnetic tape recorder – digital printer – X-Y recorder.