ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

Paper Code **ECS – 304**

Course Credits 4

Lectures/Week 3

Tutorial/week 1

Course Description

UNIT-I ELECTRONIC INSTRUMENTATION

Electronic instruments- working classification, their sensitivity; errors- its classification, sources or error; voltage, current and impedance measurement; electronic multimeter.

UNIT-II DIGITAL INSTRUMENTATION

Digital Instruments-classification, their applications;block diagram for analog-to digital conversion; Digital voltmeters(DVM)-successive approximation type, ramp type and integration dual slope type; ammeters; digital frequency meter.

UNIT-III ANALYZERS & RECORDERS

Spectrum Analyzer-its classification and application, waveform analyzer, harmonic distortion analyzer, fourier analyzer, cathode ray oscilloscope (CRO), recorders and their applications.

UNIT-IV PRECISION MEASUREMENT

Use of AC Bridges, measurement of R-L-C, measurement of frequency, dissipation factor of capacitance; [Maxwell's, Hay's, Andersons, wein frequency, De-Sauty Bridge, kelvin's bridge, wagner ground connections], sources of error,unbalance conditions.

UNIT-V COMMERCIAL MEASURING INSTRUMENTS

Q-meter- their classification and applications, digital multi-meter, digital storage oscilloscope(DSO)-its working, classification & applications; Transducers – strain gauge, variable R,L,C transducer, pressure & temperature transducers

Pre-requisite

course/paper: Analog concept of measurement & basics of Instrumentation

Text Book:

1.WD Cooper, &A.D Helfric "Modern Electronic Instrumentation and Measurement Techniques",PHI Learning Private Limited New Delhi,2011.

2. E.W. Golding et.al, "Electrical Measuremt and Measuring Instrument", Jobs Publications.

Reference Books:

1. A.K.Sawhney, "Electrical and Electronic Measurements and Instrumentation", Dhanpat Rai & Sons,1992.

2. R.K.Rajput, "Electrical and Electronic Measurements and Instrumentation", S.Chand &Company LTD.,2011.

3. Ashfaq Hussain, "Electrical machines", Dhanpat Rai & co. Pvt LTD.,2012.

Course Outcome:

CO1. Thorough understanding of electronic instruments-basis of their classification estimation of various types of errors in measurement, their probability and their minimization.

CO2. Understanding towards the basic principle of digital methods of measurement of electrical parameters& various types of DVMs.

CO3. Understanding towards the analysis of various waves using Spectrum analyzers ,wave analyzers & recorders.

CO4. An understanding of Null and balance methods of measurement and use of bridges for the measurement of passive elements and their affecting factors and an ability to design various A.C. bridges to measure the said quantities.

CO5. A thorough understanding of the fundamental concept and working knowledge of transducer, sensor, Q-meter & DSO .