**13EC3101-ELECTRONIC MEASUREMENTS AND INSTRUMENTATION**

**(ECE)**

**Lectures/Week:4Hrs Sessional Marks:40**

**End Exam Durastion:3Hrs End Exam.Marks:60**

**UNIT I**

Performance characteristics of instruments, Static characteristics, Accuracy, Resolution, Precision, Expected value, Error, Sensitivity. Errors in Measurement, Dynamic Characteristics-speed of response, Fidelity, Lag and Dynamic error. DC Voltimeters- DC Ammeters Multi range, Range extension, AC voltmeters- multi range, range extension, Ohmmeters - series type, shunt type, Multimeter for Voltage, Current and resistance measurements.

**UNIT II**

Fixed and variable signal Generators AF oscillators, Standard and AF sine and square wave signal generators, Function Generators, Square pulse, Random noise, sweep, Arbitrary waveform. Wave Analyzers, Harmonic Distortion Analyzers, Spectrum Analyzer

**UNIT III**

Oscilloscopes CRT features, vertical amplifiers, horizontal deflection system, sweep, trigger pulse, delay line, sync selector circuits, triggered sweep CRO, Dual beam CRO, Measurement of amplitude and frequency, Dual trace oscilloscope, sampling oscilloscope, storage oscilloscope, digital readout oscilloscope, digital storage oscilloscope, Lissajous method of frequency measurement, standard specifications of CRO, Frequency counter, Time and Period measurement

 **UNIT IV**

Wheat stone bridge AC Bridges Measurement of inductance- Maxwell’s bridge, Measurement of capacitance - Schering Bridge. Wien Bridge, Errors and precautions in using bridges. Q-meter

**UNIT V**

Transducers- active & passive transducers : Resistance, Capacitance, inductance; Strain gauges, LVDT, Piezo Electric transducers, Resistance Thermometers, Thermocouples, Thermistors, Sensistors. Measurement of physical parameters force, pressure, velocity, humidity, moisture, speed, proximity and displacement. Data acquisition systems.

**TEXTBOOKS :**

1. . Modern Electronic Instrumentation and Measurement Techniques – A.D. Helfrick and W.D. Cooper, PHI, 5th Edition, 2002

 2.Electronic instrumentation, second edition - H.S.Kalsi, Tata McGraw Hill, 2004.

**REFERENCES :**

1. Electronic Instrumentation & Measurements - David A. Bell, PHI, 2nd Edition, 2003.

2. Electronic Test Instruments, Analog and Digital Measurements - Robert A.Witte, Pearson Education, 2nd Ed., 2004.

3. Electronic Measurements & Instrumentations by K. Lal Kishore, Pearson Education - 2005.