PARVATHANENI BRAHMAYYA
Siddhartha College of Arts & Science, Vijayawada

Course Code: ELESET02   Offered to: B.Sc. (M.E.Cs)
Domain Subject: ELECTRONICS   Semester – V
Max. Marks: 100 (CCIA: 25+ SEE: 75)   Theory Hrs./Week: 3

Course 7B: ELECTRONIC INSTRUMENTATION
Type of the Course: Skill Enhancement Course (Elective: Theory), Credits: 04

I. Course Outcomes: Students at the successful completion of the course will be able to:

CO1: Design a system, component or process to meet desired needs in electrical engineering.
CO2: Measurement of R,L,C ,Voltage, Current, Power factor , Power, Energy
CO3: Ability to balance Bridges to find unknown values.
CO4: .Ability to measure frequency, phase with Oscilloscope, Digital voltmeters
CO5: Ability to measure strain, displacement, Velocity, Angular Velocity, temperature, Pressure ,Vacuum, and Flow.

UNIT-I   (09hrs)
Measurements:
Basic block diagram of measurement system, Accuracy and precision, resolution, sensitivity, linearity, Errors, systematic and random errors, standards &calibrations of an instrument. Applications of instrument

UNIT –II (09hrs)
Basic Measurement Instruments: DC measurement-ammeter, voltmeter, ohm meter, AC measurement, Digital voltmeter systems (integrating and non-integrating). Digital Multimeter; Block diagram principle of measurement of I, V, C. Accuracy and resolution of measurement. **Measurement of Impedance-** A.C. bridges, Measurement of Self Inductance (Anderson's bridge), Measurement of Capacitance (De Sauty bridge), Measurement of frequency (Wien's bridge).

UNIT-III   (09hrs)
Lock-in-amplifier: Basic Principles of phase locked loop (PLL), Phase detector (XOR& edge triggered), Voltage Controlled Oscillator (Basics, varactor), lock and capture.
Signal Generators: Function generator, Pulse Generator, (Qualitative only).

UNIT-IV   (09hrs)
Analytical instruments
Spectrophotometer, working with block diagram, features of spectrophotometer,
P_H meter - principle working with block diagram, features of P_H meter.
Temperature Transducers
Standards and calibration, Fluid expansion and metal expansion type transducers, like bimetallic strip, Thermometer, RTD, Thermo couple and their characteristics.

UNIT-V : (09hrs)
Direct digital control (DDC), Distributed control system (DCS),
PLC'S: Block diagram, hardware, PLC operation, basic logic program (ladder logic),
       Applications of PLC'S

TEXT BOOKS
1. Introduction to instrumentation and control By A.K.Ghosh
2. Sensors and transducers PHI 2Ed By D.Patranabis.
3. Instrument measurement analysis By Nakra and chaudhry.

Reference Books:
1. W.D. Cooper and A. D. Helfrick, Electronic Instrumentation and Measurement Techniques, Prentice Hall (2005).
2. E.O. Doebelin, Measurement Systems: Application and Design, McGraw Hill Book - fifth Edition (2003).
3. David A. Bell, Electronic Devices and Circuits, Oxford University Press (2015).

Course Delivery method: Face-to-face / Blended
Course has focus on: Foundation and **S**kill Development
Websites of Interest:
https://en.wikipedia.org/wiki/Measuring_instrument#Electricity.2C_electronics_and_electrical_engineering
Co-curricular Activities: Assignments, PPT's, Mini projects

P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE, VIJAYAWADA – 10
Model Question Paper
TITLE: ELECTRONIC INSTRUMENTATION

Course Code: SECELET04   Maximum Marks: 75M

Time: 3 Hours   Pass Minimum: 30M

SECTION-A

Answer any FIVE of the following: 5x5=25M

1. Define the terms (i)Accuracy (ii)Precision. (CO1)-(L1)
2. What is Digital multimeter? (CO2)-(L2)
3. Write a short note on lock in amplifier?(CO2)-(L1)
 4. Explain about thermo couple and characteristics.(CO4)-(L2)
5.Write short notes on Temperature Transducer. (CO4)-(L2)
6.Mention some applications of PLC.(CO5)-(L2)
7. Define the terms (i)Resolution (ii)Sensitivity.(CO1)-(L1)
8.Explain about ohm meter.(CO2)-(L1)

SECTION-B

Answer the following: 5x10=50M

9.a) Explain briefly about the block diagram of measurement system. (CO1)-(L1)

(or)

b) Define the following terms in brief (a)Systematic errors. (b) Random errors. : (CO1)-(L2)

10. a)Explain about Digital voltmeter systems in brief. (CO2)-(L1)

(or)

b) Discuss briefly about measurement of frequency(Wien bridge) . (CO2)-(L3)

11. a)Define principle and working characteristics of PLL. (CO3)-(L1)

(or)

b) Explain briefly about function generator. (CO3)-(L2)

12. a)Draw the block diagram of Spectrophotometer and explain. (CO3)-(L3)

(or)

b) Define principle and working characteristics of P_H meter. (CO3)-(L2)

13.a) Discuss briefly about Direct digital control. (CO4)-(L1)

(or)

b) Explain about the block diagram of PLC and it's operation.(CO4)-(L2)