RAGHU ENGINEERING COLLEGE

Autonomous

(Approved by AICTE, New Delhi, Accredited by NBA (CE,ECE, MECH, CSE), NAAC with 'A+' Grade & Permanently Affiliated to JNTU GV-Vizianagaram)

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Department of Electronics and Communications Engineering

I Year I Semester	**L**	**T**	**P**	**C**
Code: 20ES204	**0**	**0**	**3**	**1.5**

ELECTRICAL & ELECTRONICS ENGINEERING WORKSHOP
(Common to All branches of Engineering)

PART A: ELECTRICAL ENGINEERING LAB

Preamble: This course is an introductory workshop common for all with the objective of expanding the student's knowledge in basic electrical and electronics circuits on the basic components, measuring instruments and applications.

Pre-requisites Engineering Mathematics, Physics

Course Objectives

To impart knowledge on the fundamental laws & theorems of electrical circuits, functions of electrical machines and energy calculations.

Course Outcomes

CO1	Understand the Electrical circuit design concept; measurement of resistance, power, power factor; concept of wiring and operation of Electrical Machines and Transformer.	**L2**
CO2	Apply the theoretical concepts and operating principles to derive mathematical models for circuits, Electrical machines and measuring instruments; calculations for the measurement of resistance, power and power factor.	**L3**
CO3	Apply the theoretical concepts to obtain calculations for the measurement of resistance, power and power factor.	**L3**
CO4	Analyse various characteristics of electrical circuits, electrical machines and measuring instruments.	**L4**
CO5	Design suitable circuits and methodologies for the measurement of various electrical parameters; Household and commercial wiring.	**L5**

CO – PO & CO – PSO Mapping:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO 1	2	2	1	3		1		1	2	2		1	1	1
CO 2	2	2	1	3		1		1	2	2		1	1	1
CO 3	2	2	1	3		1		1	2	2		1	1	1
CO 4	2	2	1	3		1		1	2	2		1	1	1
CO5	2	2	2	3		1		1	2	2		1	1	1

1 – Weak, 2 – Moderate and 3 - Strong

Activities:

1.Familiarization of commonly used Electrical & Electronic Workshop Tools: Bread board, Solder, cables, relays, switches, connectors, fuses, Cutter, plier, screwdriver set, wire stripper, flux, knife/blade, soldering iron, de-soldering pump etc.

(Provide some exercises so that hardware tools and instruments are learned to be used by the students)

2.Familiarization of Measuring Instruments like Voltmeters, Ammeters, multimeter, LCR-Q meter, Power Supplies, CRO, DSO, Function Generator, Frequency counter.

(Provide some exercises so that measuring instruments are learned to be used by the students)

3. Components:

Familiarization/Identification of components (Resistors, Capacitors, Inductors, Diodes, transistors, IC's etc.) – Functionality, type, size, colour coding package, symbol, cost etc

Testing of components like Resistor, Capacitor, Diode, Transistor, ICs etc. - Compare values of components like resistors, inductors, capacitors etc with the measured values by using instruments

List of experiments:

1. Verification of KCL and KVL
2. Verification of Superposition theorem
3. Measurement of Resistance using V-I Method
4. Magnetization Characteristics of DC shunt Generator
5. Measurement of Power and Power factor using Single-phase wattmeter
6. Measurement of Earth Resistance using Megger
7. Calculation of Electrical Energy for Domestic Premises
8. Study and draw various electrical components with symbols.

Reference Books:

1. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition
2. Power System Engineering, P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti, Dhanpat Rai & Co, 2013
3. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition

NOTE: Minimum 6 experiments to be performed

PART B: ELECTRONICS ENGINEERING LAB

Course Objectives:

To impart knowledge on the principles of digital electronics and fundamentals of electron devices & its applications.

Course Outcomes:

1. Identify & testing of various electronic components.
2. Understand the usage of electronic measuring instruments.
3. Plot and discuss the characteristics of various electronic devices.
4. Explain the operation of a digital circuit.

CO – PO & CO – PSO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	2	2		3		1		1	2	2		1	1	1
CO 2	2	2		3		1		1	2	2		1	1	1
CO 3	2	2		3		1		1	2	2		1	1	1
CO 4	2	2		3		1		1	2	2		1	1	1

1 – Weak, 2 – Moderate and 3 – Strong

List of experiments:

1. Plot V-I characteristics of PN Junction diode A) Forward bias B) Reverse bias.
2. Plot V – I characteristics of Zener Diode and its application as voltage Regulator.
3. Implementation of half wave and full wave rectifiers
4. Plot Input & Output characteristics of BJT in CE and CB configurations
5. Frequency response of CE amplifier.
6. Simulation of RC coupled amplifier with the design supplied
7. Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gates using ICs.
8. Verification of Truth Tables of S-R, J-K& D flip flops using respective ICs

(Tools / Equipment Required: DC Power supplies, Multi meters, DC Ammeters, DC Voltmeters Voltmeters, CROs, all the required active devices)

Reference Books:

1. R. L. Boylestad & Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021.
2. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill, 2009
3. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education,2009.

NOTE: Minimum 6 experiments to be performed.
All the experiments shall be implemented using Hardware and Software.