**23EE11P1- Electrical & Electronics Engineering workshop**

 (Common to EEE,ECE,Civil & Mechanical)

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| **Course Category:** | Professional core | **Credits:** | 1.5 |
| **Course Type:** | Laboratory | **Lecture-Tutorial-Practical:** | 0-0-3 |
| **Pre-requisite:** | Basic knowledge of electrical and electronics concepts. | **Sessional Evaluation:****External Exam Evaluation:****Total Marks:** | 3070100 |

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| **Course Objectives:** | Students undergoing this course are expected to learn: |
| 1. To expose common electrical & electronic components and their ratings.
2. The usage of common electrical & electronic measuring instruments.
3. To analyse the electric circuits experimentally.
4. The basic characteristics of electrical machines and perform energy calculations.
5. To plot and discuss the characteristics of various electron devices.
6. The realization of logic gates and operation of a digital circuit.
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| **Course Outcomes:** | After completing the course the student will be able to |
| **CO1** | Get an exposure to common electrical & electronic components and their ratings. |
| **CO2** | Understand the usage of common electrical & electronic measuring instruments. |
| **CO3** | Analyse the electric circuits experimentally. |
| **CO4** | Enumerate the basic characteristics of electrical machines and perform energy calculations. |
| **CO5** | Plot and discuss the characteristics of various electron devices. |
| **CO6** | Describe the realization of logic gates and operation of a digital circuit. |
| **Course Content:** | 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

PART A: BASIC ELECTRICAL ENGINEERING LAB**List of experiments:**1. Verification of KCL and KVL
2. Verification of Superposition theorem
3. Measurement of Resistance using Wheat stone bridge
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

**Note:** Minimum Six Experiments to be performed.**PART B: BASIC ELECTRONICS ENGINEERING LAB****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, AC Voltmeters, CROs, all the required active devices.Note: Minimum Six Experiments to be performed. All the experiments shall be implemented using both Hardware and Software. |
| **REFERENCE BOOKS:** | PART A: BASIC ELECTRICAL ENGINEERING LABREFERENCES:1. Basic Electrical Engineering by D C Kulshreshtha, Tata McGraw Hill, First Edition 2019.
2. Basic Electrical Engineering by S. N. Singh, PHI Publishers, 2011
3. Fundamentals of Electrical Engineering by Rajendra Prasad, PHI publishers, Third Edition, 2014.

**PART B: BASIC ELECTRONICS ENGINEERING LAB****REFERENCES:**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.
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