**23A02101P- ELECTRICAL & ELECTRONICS ENGINEERING WORKSHOP**

 **(Common to All branches of Engineering)**

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| **Course Category:** | Engineering Science | **Credits:** | 1.5 |
| **Course Type:** | Practical | **Lecture-Tutorial-Practical:** | 0-0-3 |
| **Pre-requisite:** | Basicprinciplesinphysics | **Sessional Evaluation:****External Exam Evaluation:****Total Marks:** | 3070100 |
| **Course****Objectives** | This course will enable students: |
| To impart knowledge on the fundamental laws & theorems of electrical circuits, functions of electrical machines and energy calculations |
| **Course****Outcomes** | At the end of the course, the student will be able to: |
| **CO1** | Understand the Electrical circuit design concept; measurement of resistance, power, power factor; concept of wiring and operation of Electrical Machines and Transformer. |
| **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. |
| **CO3** | Apply the theoretical concepts to obtain calculations for the measurement of resistance, power and power factor. |
| **CO4** | Analyse various characteristics of electrical circuits, electrical machines and measuring instruments. |
| **CO5** | Design suitable circuits and methodologies for the measurement of various electrical parameters; Household and commercial wiring. |
| **Course Content** | **PART A: 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.
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| **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 Six Experiments to be performed |
|  | **PART B: ELECTRONICS ENGINEERING LAB** |
| **Course****Objectives** | This course will enable students to: |
| To impart knowledge on the principles of digital electronics and fundamentals of electron devices & its applications |
| **Course****Outcomes** | At the end of the course, the student will be able to  |
| **CO1** | Identify & testing of various electronic components. |
| **CO2** | Understand the usage of electronic measuring instruments.  |
| **CO3** | Plot and discuss the characteristics of various electron devices.  |
| **CO4** | Explain the operation of a digital circuit. |
| **Course Content** | **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. |
| **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 Six Experiments to be performed. All the experiments shall be implemented using both Hardware and Software. |

**PART-A**

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| Contribution of Course Outcomes towards achievement of Program Outcomes (3-High, 2-Medium, 1-Low) |
|  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| CO1 | 3 | 3 | 2 | 2 | 1 | - | - | 1 | - | 2 | - | 2 | 3 | 3 |
| CO2 | 3 | 3 | 2 | 2 | 1 | - | - | 1 | - | 2 | - | 2 | 3 | 3 |
| CO3 | 3 | 3 | 3 |  - | 1 |  - |  - | 1 |  - | 2 |  - |  2 | 3 | 3 |
| CO4 | 3 | 3 | 2 | - | 1 | - | - | 1 | - | 2 | - | 2 | 3 | 3 |
| CO5 | 3 | 3 | 2 |  - | 1 | - | - | 1 | - | 2 | - | 2 | 3 | 3 |

**PART-B**

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| Contribution of Course Outcomes towards achievement of Program Outcomes (3-High, 2-Medium, 1-Low) |
|  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| CO1 | **3** | **3** | **-** | **-** | **-** | **-** | **-** | **-** | **2** | **-** | **-** | **1** | **3** | **3** |
| CO2 | **3** | **3** | **-** | **-** | **-** | **-** | **-** | **-** | **2** | **-** | **-** | **1** | **3** | **3** |
| CO3 | **3** | **3** | **-** | **-** | **-** | **-** | **-** | **-** | **2** | **-** | **-** | **1** | **3** | **3** |
| CO4 | **3** | **3** | **-** | **-** | **-** | **-** | **-** | **-** | **2** | **-** | **-** | **1** | **3** | **3** |