

# SWARNIM STARTUP & INNOVATION UNIVERSITY

## SCHOOL OF ENGINEERING

### DEPARTMENT OF CE/EE

#### ELECTRICAL AND ELECTRONICS WORKSHOP

CODE: 22000005

D.E. 1<sup>st</sup> Year

#### Teaching & Evaluation Scheme:-

Teaching Scheme				Credits	Evaluation Scheme				
Theory	Tutorial	P	Total		Internal		External		Total
					Theory	Practical	Theory	Practical	
-	-	6	6	6	-	100	-	-	100

**Objectives:** -Students of Electrical and Computer Engineering allied programs will come across various types of electrical and electronic systems. Such systems require various power sources to make systems function. Such systems are built and interconnected using various components such as wires and cables, active and passive electrical/electronic components, and connectors. Electronic systems are built on printed circuit board (PCB) and breadboard. One need to use source instruments (power sources and signal sources), and appropriate measuring instruments to study behavior of a system. It is also require using various tools in assembling, interconnecting, and testing of such systems. This course deals with basic introduction of system components of electrical and electronic systems, and provides hands on practice in assembling, interconnecting, testing, and repairing such system by making use of various tools used in electrical and electronic workshop.

**Prerequisites:**-Various types of resistors, capacitors, inductors, diodes, transistors, wires, cables, connectors, batteries, switches, relays, etc

#### Course outline:-

Sr. No.	Course Contents	Number of Hours
1	<b>Electronic Components, Measuring Instruments and Tools:</b> Identify a particular component from the given group of passive electronic components, Identify the terminals of active electronic components , Use voltage source, Use test and measuring instruments, Use electronic workshop tools for building and wiring electronic circuits with necessary safety	8
2	<b>Building, Wiring, Soldering and Testing of Electronic Circuits:</b> Sketch the standard symbols of various active and passive electronic components, Draw the electronic circuits using standard symbols, Build/test and troubleshoot electronic circuits on breadboard Build/test electronic circuits on general purpose PCB.	8

<b>3</b>	<b>Electrical Tools, Cables and Switches:</b> Use various electrical tools and measuring instruments, Select different types of wires, cables, light sources and switches	<b>6</b>
<b>4</b>	<b>Earthing and Electrical Safety:</b> Undertaking pipe earthing, plate earthing, Electrical safety tools Electrical safety rules, I.E. rules for electrical hazards and accidents.	<b>6</b>

### **Learning Outcomes: -**

After completing this course students should be able to:

1. Measure voltage, current, frequency, phase difference, power, power factor for single and three-phase supply
2. Wire fan, tube light, two-way control (staircase wiring).
3. Wire instrument panel with various accessories following standard codes.
4. Wire MCB, ELCB for a given load circuit
5. Preparing the drawing for wiring a newly built room, without any electrical wiring along with a bill of materials with specifications; the room may be a class-room, an office, a shop, a clinic, a small workshop etc
6. Compare specification for different types of tools (electrical, mechanical, pneumatic, hydraulic), wires, cables (and tubing), switches, batteries, connectors and sockets, electronic components (active, and passive), PCB, fuses, for a given application
7. Draw electrical/electronic circuit diagram using IEEE standard symbols.
8. Identify and rectify open circuit, and short circuit faults in PCB/System
9. Solder and de-solder electronic components on different types of PCB
10. Test assembled electronic circuit for various parameters and faults
11. Identify and test electrical/electronic active and passive components
12. Use basic source and measuring instruments (power supply, function generator, CRO, DMM)
13. Identify various types of ports and connectors

### **Teaching & Learning Methodology:-**

1. The teaching is purely practical with complete syllabus to be taught in lab with real devices and equipment.
2. Students will be taught theory of respective devices and components and immediately will be demonstrated its application as part of practical work.
3. Students will be assigned a project under any of the above mentioned topics. This will enhance the understanding of the subject and its real world use and applications of devices that they will learn.
4. Soldering and Testing practical will be given more focused as these skills will greatly enhance their job prospectus.

### **Books Recommended:-**

1. Electronic Principles, Albert Malvino and David J Bates, McGrawHill(7th Edition)
2. Electronic Devices, Thomas L. Floyd, Pearson (7th Edition)
3. Electronic Devices and Circuits, David A. Bell, Oxford Press (5th Edition)
4. Integrated Electronics, Jacob Millman, Christos, Tata McGraw Hill (2nd Edition)

**E-Resources:-**

1. Google Scholar (IEEE access)

**Practical List:-**

<b>Sr. No.</b>	<b>Practical</b>
<b>1</b>	Measure voltage, current, frequency, phase difference, power, power factor for single and three-phase supply.
<b>2</b>	Use basic source of measuring instruments as power supply.
<b>3</b>	Use basic source of measuring instruments as function generator.
<b>4</b>	Use basic source of measuring instruments as CRO.
<b>5</b>	Use basic source of measuring instruments as DMM.
<b>6</b>	Identify and test electrical/electronic active and passive components
<b>7</b>	To implement given circuit on PCB for a given load.
<b>8</b>	Identify various types of ports and connectors.
<b>9</b>	To perform Soldering and de-soldering of various components.
<b>10</b>	To implement circuit using electrical switch.