COURSE TITLE	**ELECTRONIC WORKSHOP**
COURSE CODE	**01EC1103**
COURSE CREDITS	**2**

Objective:

1 The objective of this course is to provide foundational hands-on experience in identifying electronic components, reading circuit schematics and developing skills in PCB design, soldering, and circuit assembly. The course emphasizes practical know-how essential for electronics lab work and project development.

Course Outcomes: After completion of this course, student will be able to:

1 Apply color coding and measurement techniques to identify component values and operate basic electronic tools safely. (Bloom's Level: Apply)

2 Analyze electronic circuit requirements and select appropriate components, tools, and PCB design strategies using EDA tools. (Bloom's Level: Analyze)

3 Evaluate circuit assembly quality by testing connections, verifying functionality, and ensuring proper soldering and tool usage. (Bloom's Level: Evaluate)

4 Create functional electronic circuits on GPB or PCB by designing layouts and assembling components using standard prototyping practices. (Bloom's Level: Create)

Pre-requisite of course: Basic knowledge of electricity and circuits and familiarity with common electrical symbols and simple circuit concepts. No prior hands-on electronics experience is required.

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
0	0	4	0	0	0	50	50

Contents : Unit	Topics	Contact Hours
Total Hours		

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Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**Identification of Electronic Components** Classification of components: active, passive, electromechanical; Overview and types of resistors, capacitors, inductors – identification techniques, Diodes, Transistors, LEDs, switches, connectors, relays, etc.; Color coding for resistors and capacitors (3-, 4-, and 5-band resistors), Reading datasheets and standard electronic symbols; Basic cost analysis of electronic components and selection criteria for design applications	6
2	**Tools, Instruments and Safety** Introduction to electronic workshop tools: multimeter, soldering iron, desoldering pump, wire stripper, pliers, etc., Basic measurement: voltage, current, resistance using multimeter; Introduction to function generator and power supply, Introduction to oscilloscope (demonstration); ESD (Electrostatic Discharge) precautions and safety practices	6
3	**PCB – Basics and Design Principles** Types of PCB: single-layer, double-layer, multi-layer, PCB materials, copper thickness, vias, pads, traces, Understanding schematics and PCB layout terminology, Manual vs software-based PCB designing	8
4	**Introduction to PCB Designing Software** Introduction to EDA tools like KiCad, Eagle, Schematic capture and component placement, PCB routing and generating Gerber files, Schematic to PCB design exercise	8
5	**Soldering, Desoldering and Assembly** Soldering techniques: through-hole and SMD (basic), Good soldering vs cold solder joints; Desoldering tools and best practices, Component placement, orientation, and assembling a basic circuit, Basic troubleshooting & rework	8
6	**Open-Source Development Boards and IDE** Introduction to Anyone Open-Source Development Board, Overview of Integrated Development Environment (IDE) for the board, Libraries provided in the IDE and how to use them, Programming the development board – basic examples and exercises	8
7	**Troubleshooting** Identify faults in a pre-assembled circuit and fix them.	4
8	**Course Project** A project based on learning in EDC course and/or Programmable Development Board has to be assigned in a group of students. The team has to submit a comprehensive report, presentation and working-model for assessment.	8
Total Hours		**56**

Textbook :

1 Make: Electronics (3rd Edition), Charles Platt, Make: Community, LLC, 2021

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References:

1 Manufacturer Datasheets – For real-world understanding of components, Manufacturer Datasheets – For real-world understanding of components, ., ., .

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking / Creative**
5.00	10.00	40.00	20.00	15.00	10.00

Instructional Method:

1 Demonstration based learning
2 Power point presentations and visual aids
3 Hands-on demonstrations
4 Step-by-step guided lab work

Supplementary Resources:

1 Online platforms • Tinkercad Circuits (by Autodesk) • EasyEDA, KiCad, Multisim, Ultiboard, Eagle