w. e. f. Academic Year:	2024-25
Semester:	Ist Year
Category of the Course:	ESC

Pre-requisite:	NA
Rationale:	The Digital Fabrication Workshop equips students with essential hands-on skills required in the Electrical/Electronics and Computer hardware industries. With practical applications, students gain a comprehensive understanding of the Electrical hazards and electronics fabrication process. The course fosters to prepare students for more advanced studies and professional roles in engineering and technology.

Course Outcomes:

After Completion of the Course, Student will be able to:

No	Course Outcomes	RBT Level
01	Identify various electrical and electronic components, their symbols, and their functions	Remembering
02	Explain the operation and application of laboratory equipment and household wiring systems.	Understanding
03	Demonstrate proper soldering techniques and assembly of simple electronic circuits based on schematics.	Apply
04	Apply safety protocols and troubleshooting methods for electrical circuits and computer hardware.	Apply
05	Demonstrate computer system assembling and installation of Application software and System software	Apply

Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
				Theory		Tutorial / Practical		
L	T	PR	C	ESE (E)	PA / CA (M)	PA/CA (I)	ESE (V)	
00	00	02	01	00	00	20	80	100

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	**Introduction to Electrical and Electronics Components:** • Symbols: Understand the symbols used to represent various electrical and electronic components. • Types of Components: Explore resistors, inductors, capacitors, diodes, zener diodes, LEDs, photo diodes, transistors, and integrated circuits.	04	13
2.	**Laboratory Equipments:** • DC Power Supply, Function Generator, Multi-meter, LCR Meter, Wattmeter, Energy Meter, Clamp-On Meter, Digital Storage Oscilloscope (DSO). • Household Equipment and Wiring: Types of switches, types of cables, Tube light wiring, fan and fan regulator wiring, staircase wiring, godown wiring, panel layout and wiring, single line diagrams	04	14
3.	**Soldering Techniques:** • Types of Soldering (Through-Hole, Surface Mount) • Soldering Tools and Materials • Techniques for Soldering Electronic Components • Common Problems: Address issues like cold joints	04	14
4.	**Electronic Circuit Assembly and Testing:** • Reading and Understanding Circuit Schematics • Assembly of Simple Electronic Circuits • Testing and Troubleshooting Assembled Circuits	04	13

5.	**Safety and Protection:** • Electric shock, risks and precautions, safety, precaution during handling electric devices, first aid treatment for electric shock, Demonstration of CPR • Handling Electric Devices: Safety measures during handling • Earthing: Importance and methods • Fuses, MCB, ELCB: Protective devices	06	20
6.	**Computer Hardware Assembly:** • Components of a Computer System (CPU, RAM, HDD, Motherboard, etc.) • Assembling a computer: Step-by-Step Process Troubleshooting Common Hardware Issues • Understanding of Application Software and System Software and its installations.	04	13
7.	**Awareness/Demonstration On:** • Understand the basics of 3D printing technology, Types of 3D printers and Materials, Application of 3D printing in various Industries • Get Introduced Internet of Things (IoT) Concepts, Common IoT applications • Overview of Drone technology and Types of drones and their applications	04	13
	Total	**30**	**100**

Suggested Specification Table with marks (Practical):

Distribution of RBT level (in %)					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
20	20	60	00	00	00

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

References/Suggested Learning Resources:

(a) Books:

1. Make: Electronics by Charles Platt

2. The Beginner's Guide to 3D Printing by Samuel N. Bernier
3. Upgrading and Repairing PCs by Scott Mueller
4. Mr. S.Samaddar, Textbook of Electric Wiring, New Central Book Agency (P) Ltd., Calcutta.
5. Surjit Singh, Textbook of Electrical Design Estimating and Costing, Dhanpat Rai & Sons
6. Sengupta R., Textbook of Principles and Reliable Soldering Techniques, New Age International Ltd.
7. K. B. Bhatia, Textbook of Fundamentals of Maintenance of Electrical Equipments, Khanna Publishers.
8. Dr. S. K. Bhattacharya, Dr. S.Chatterji, Textbook of Projects in Electrical, Electronics,
9. Instrumentation and Computer Engineering, S. Chand Publishers., New Delhi.
10. National Electrical Code: Bureau of Indian Standards, Govt. Of India, 2011.
11. Operating Manuals of Various types of equipment

Suggested List of Practical/Experiments:

1. To study the symbols of various electrical and electronic equipment.
2. To understand the use of various laboratory equipments like DC power supply, Function Generator, Digital Storage Oscilloscope (DSO), Multi-meter, and Wattmeter.
3. To know about the different types of switches, indicators, and cables used in domestic wiring and panel wiring.
4. To design and verify the staircase wiring.
5. To design and verify the godown wiring.
6. To identify the components and pins of various electronic components like resistors, capacitors, diodes, LEDs, Transistors, etc.
7. Solder and de-solder electronic components on general-purpose board.
8. To demonstrate CPR as a first aid treatment for electric shock
9. To study the various protecting devices
10. To assemble-disassemble the computer system
11. To create a sample 3D model.

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