

COURSE CODE	COURSE NAME	L	T	P	CREDIT	YEAR OF INTRODUCTION
101908/C0922U	ELECTRICAL AND ELECTRONICS WORKSHOP	0	0	2	1	2021

1. Preamble

Electrical Workshop is intended to impart skills to plan and carry out simple electrical wiring. It is essential for the practicing engineers to identify the basic practices and safety measures in electrical wiring.

Electronics Workshop gives the basic introduction of electronic hardware systems and provides hands-on training with familiarization, identification, testing, assembling, dismantling, fabrication and repairing such systems by making use of the various tools and instruments available in the Electronics Workshop.

2. Prerequisite

Nil

3. Syllabus

Section 1 - ELECTRICAL ENGINEERING List of Exercises / Experiments

1. a) Demonstrate the precautionary steps adopted in case of Electrical shocks.
b) Identify different types of cables, wires, switches, fuses, fuse carriers, MCB, ELCB and MCCB with ratings.
2. Wiring of simple light circuit for controlling light/ fan point (PVC conduit wiring)
3. Wiring of light/fan circuit using Two-way switches. (Staircase wiring)
4. Wiring of Fluorescent lamps and light sockets (6A) with a power circuit for controlling power devices. (16A socket)
5. Wiring of power distribution arrangement using single phase MCB distribution board with ELCB, main switch and Energy meter.
6. a) Identify different types of batteries with their specifications.
b) Demonstrate the Pipe and Plate Earthing Schemes using Charts/Site Visit.

Section 2 - ELECTRONICS ENGINEERING List of Exercises / Experiments (Minimum of 7 mandatory)

1. Familiarization/Identification of electronic components with specification (Functionality, type, size, colour coding, package, symbol, cost etc. Active, Passive, Electrical, Electronic, Electro-mechanical, Wires, Cables, Connectors, Fuses, Switches, Relays, Crystals, Displays, Fasteners, Heat sink etc.)
2. Drawing of electronic circuit diagrams using BIS/IEEE symbols and introduction to EDA tools, Interpret data sheets of discrete components and IC's, Estimation and costing.

3. Familiarization/Application of testing instruments and commonly used tools. [Multimeter, Function generator, Power supply, DSO etc.] [Soldering iron, Desoldering pump, Pliers, Cutters, Wire strippers, Screw drivers, Tweezers, Crimping tool, Hot air soldering and de-soldering station etc.]
4. Testing of electronic components [Resistor, Capacitor, Diode, Transistor using multimeter].
5. Inter-connection methods and soldering practice. [Bread board, Wrapping, Crimping, Soldering - types - selection of materials and safety precautions, soldering practice in connectors and general purpose PCB, Crimping.]
6. Printed circuit boards (PCB) [Types, Single sided, Double sided, PTH, Processing methods, Design and fabrication of a single sided PCB for a simple circuit with manual etching (Ferric chloride) and drilling.]
7. Assembling electronic circuits using SMT (Surface Mount Technology) stations.
8. Assembling an electronic circuit/system on general purpose PCB, test and show the functioning (Any Two circuits).
 - a. Fixed voltage power supply with transformer, rectifier diode, capacitor filter, zener/IC regulator.
 - b. Square wave generation using IC 555 timer in IC base.
 - c. Sine wave generation using IC 741 OP-AMP in IC base.
 - d. RC coupled amplifier with transistor BC107.

4. Text Books

1. D P Kothari and I J Nagrath, "*Basic Electrical Engineering*", Tata McGraw Hill, 2010.
2. D C Kulshreshtha, "*Basic Electrical Engineering*", Tata McGraw Hill, 2010.
3. M.S.Sukhija and T.K.Nagsarkar, *Basic Electrical and Electronics Engineering*, Oxford University Press, 2012.
4. Mitchel Schultz, "*Grob's Basic Electronics*", 12th edition, McGraw-hill education, 2015.
5. George Kennedy, Bernard Davis, S. R. M Prasanna, "*Kennedy's Electronic Communication Systems*", 6th edition, McGraw Hill Education (India) Private Limited, 2017.

5. Reference Books (Minimum 5)

1. Del Toro V, "*Electrical Engineering Fundamentals*", Pearson Education.
2. T. K. Nagsarkar, M. S. Sukhija, "*Basic Electrical Engineering*", Oxford Higher Education.
3. Hayt W H, Kemmerly J E, and Durbin S M, "*Engineering Circuit Analysis*", Tata McGraw-Hill

4. Hughes, “*Electrical and Electronic Technology*”, Pearson Education.
5. V. N. Mittle and Arvind Mittal, “*Basic Electrical Engineering*,” Second Edition, McGraw Hill.
6. Parker and Smith, “*Problems in Electrical Engineering*”, CBS Publishers and Distributors.
7. S. B. Lal Saksena and Kaustuv Dasgupta, “*Fundamentals of Electrical Engineering*”, Cambridge University Press.
8. K.B. Raina, Dr. S.K. Bhattacharya, “*Electrical Engineering Materials & Electronic Components*”, 10th edition, S.K. Kataria & Sons, 2021.
9. Thomas H. Jones, “*Electronic Components Handbook*”, Reston Publishing Company, 2008.
10. Charles A. Harper, “*Handbook of Components for Electronics*”, Laxmi Enterprise, 2020.

6. Course Outcomes

After the completion of the course the student will be able to

C01: Demonstrate safety measures against electric shocks

C02: Identify the tools used for electrical wiring, electrical accessories, wires, cables, batteries and standard symbols

C03: Develop the connection diagram, identify the suitable accessories and materials necessary for wiring simple lighting circuits for domestic buildings

C04: Identify and test various electronic components

C05: Draw circuit schematics with EDA tools

C06: Assemble and test electronic circuits on boards

C07: Work in a team with good interpersonal skills

7. Mapping of Course Outcomes with Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01						3						1
C02	2									1		
C03	2			1		1		1	2	2		2
C04	3											2
C05	3				2							2
C06	3				2							1
C07									3	2		2

8. Assessment Pattern

Total marks allotted for the course is 100 marks. CIE shall be conducted for 100 marks. CIE should be done for the work done by the student and also viva voce based on the work done on each practical session.

9. Mark Distribution

Total	CIE		
100	Attendance	Classwork/ Assessment/Viva Voce	Final Examination
	20	50	30

10. End Semester Examination Pattern

There is no End Semester Examination.
