Faculty of Engineering & Technology
Diploma Engineering (DE)
(W. E. F.: 2023-24)

Document ID: SUTEFETD-01

Name of Faculty	:	Faculty of Engineering & Technology
Name of Program	:	Diploma Engineering
Course Code	:	2DEE02
Course Title	:	Electrical and Electronics Workshop
Type of Course	:	Basic Engineering (BE)
Year of Introduction	:	2023-24

Prerequisite	:	-
Course Objective	:	This course aims to provide Basic Electrical and Electronics Engineering concepts. The main objective is to make the students able to understand, design and prepare electrical and electronics circuits using basic concepts.
Course Outcomes	:	At the end of this course, students will be able to:
	CO1	To Understand basic terminologies of Electronic Materials.
	CO2	To Classify cables, connectors and switches based on their application.
	CO3	Classify Resistor, Inductor, Capacitor, Diodes and ICs based on their application.
	CO4	To Measure signal parameters of basic electrical and electronics circuits.
	CO5	Assemble and test electronic circuits on boards.

Teaching and Examination Scheme

Teaching Scheme (Contact Hours)			Credits	Examination Marks				
				Theory Marks		Practical Marks		Total Marks
L	**T**	**P**	**C**	**SEE**	**CIA**	**SEE**	**CIA**	
2	0	2	3	70	30	30	20	150

Legends: ***L****-Lecture;* ***T****–Tutorial/Teacher Guided Theory Practice;* ***P*** *– Practical,* ***C*** *– Credit,* ***SEE*** *– Semester End Examination,* ***CIA*** *- Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.))*

Course Content

Unit No.	Topics	Teaching Hours	Weightage	Mapping with CO
1	**Electronic Materials** Definition, properties and difference of conductor, insulator and semiconductor and its energy band diagram. Atomic structure of semiconductor, covalent bonds intrinsic and extrinsic semiconductor. P-type and N-type semiconductor their formation and properties, majority and minority carriers.	5	15%	CO1

2	**Cables, Connectors And Switches** CABLES: General specifications of cables, Types of cables, SWG, Single core, Multi core, Single strand, Multi strand and their types, Armored cable, Shielded wires, Coaxial cables, Twisted pair, Flat ribbon cable, Teflon coated wires, Fiber cables , optical Fiber Cable. CONNECTORS: General specifications of connectors- contact resistance, breakdown voltage, insulation resistance ,Constructional diagram, applications of BNC, D series, Audio, Video, printer, edge, FRC, RJ 45 connectors. Constructional diagram and applications of Phone Plug & Jacks. SWITCHES: Toggle switch- SPDT, DPDT,TPDT, Centre off, Without Centre off, Rotary switch types depending on their poles and positions Rocker switch, Push button latch and non latch, Tactile switch, Micro switch, Limit switch, DIP switch, Thumb wheel switch- BCD, Decimal, Membrane switch.	7	20%	CO2
3	**Electrical And Electronics Components** RESISTORS: Resistors, classification of resistors, Materials used for resistors, maximum power rating, tolerance, temperature co-efficient, Carbon film resistors, standard Wire wound resistors, Colour Coding, LDR. CAPACITORS: Materials used for capacitors, working voltage, Capacitive reactance. Coding of capacitors Fixed Capacitor types: Disc, Ceramic capacitor, Aluminium electrolytic, Variable capacitor types: Air Gang, PVC gang capacitor, Trimmer mica capacitor. INDUCTORS: Air core, iron core, ferrite core inductor, frequency range Inductors-A.F. ,R.F., I.F., toroidal Inductor. DIODES: Use of diodes and Special Diodes: Zener diode, Tunnel diode, Varactor diode, LED, photo diode, Schottky diode, PIN diode. ICs: Monolithic IC, thick & thin film IC, Hybrid IC, Linear IC, Digital IC , IC packages-SIP, TO 5 ,Flat , DIP, Pin Identification, Device pattern Identification.	7	20%	CO2 CO3

4	**Measuring Instruments** Different types of Voltmeters, Ammeters, Watt meters, multimeter, LCR-Q meter, CRO, DSO, Function Generator. Checking of continuity, measurement of AC-DC voltage and resistance using Analog multimeter & Digital multimeter. Measurement of AC-DC voltage and resistance using CRO, Measurement of time and frequency of AC voltage using CRO. Testing of various component-resistor, capacitor, inductor, transformer and diodes with the help of Analog multimeter, Digital multimeter and CRO. Measurement of voltage, time and frequency of different types of wave with the help of CRO and Function generator.	6	20%	CO4
5	**Mini Project** Fabrication of PCB, component mounting, Soldering, testing & troubleshooting of circuits on PCB.	5	25%	CO5

Suggested Distribution of Theory Marks Using Bloom's Taxonomy						
Level	Remembrance	Understanding	Application	Analyse	Evaluate	Create
Weightage	**40**	**20**	**20**	**10**	**0**	**0**

NOTE: This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Suggested List of Experiments/Tutorials

Sr. No.	Name of Experiment/Tutorial	Teaching Hours
1	Draw symbols of various electrical & electronic components.	2
2	Identify different types of cables.	2
3	Identify different types of connectors & Discover their application.	2
4	Identify different types of Switches and discover its usage.	2
5	Identify resistors, inductors and capacitors.	2
6	Measurement of various electrical quantities in a circuit using Digital Multimeter.	2
7	Test resistor, capacitor, inductor, P-N junction Diode using CRO & Multimeter.	2
8	Study Front panel controls of Cathode Ray Oscilloscope (CRO).	2
9	Mini project 1 Create schematic, layout and fabricate PCB for given electronic circuit.	4
10	Mini project 2 Build extension board with three 5-pin socket, three switches, fuse and	4

	indicating lamp. (This is for guideline only; faculty can allot other required electrical wiring related project).	

Major Equipment/ Instruments and Software Required

Sr. No.	Name of Major Equipment/ Instruments and Software
1	Voltmeter, Ammeter, Multimeter, Watt meter.
2	Function Generator
3	Cathode Ray Oscilloscope
4	D.C. Power supplies
5	Different Cables and Connectors

Suggested Learning Websites

Sr. No.	Name of Website
1	http://www.electronics-tutorials.com/
2	http://library.thinkquest.org/16497/projects/index.html
3	http://www.circuitstoday.com/simple-electronics-projects-and-circuits
4	www.nptel.ac.in

Reference Books

Sr. No.	Name of Reference Books
1	Grover & Jamwal, "Electronic Components and Materials", Dhanpat Rai & Sons
2	Raina K. B., Bhattacharya S. K., Juneja T., "Electrical engineering materials and electronic components", TTTI Chandigarh.
3	Thomas H.Jones, "Electronic Components Handbook", Reston Publishing
4	Sedha R.S., "Text book of Applied Electronics", S. Chand.
5	John Cadick, "Cables and Wiring", Cengage Learning, 1998 ISBN: 7622072670.