		GANPAT	UNIVER	SITY			
	FAC	ULTY OF DI	PLOMA EN	NGINEERING			
Programme	Diploma in B	iomedical Engineerin	ng				
Semester	I		Version	1.0.0.0			
Effective from .	Academic Year	2025-26	Effective for	the batch Admitted in	JULY 2025		
Course code							

Cours e Type	Course Learning Scheme				Assessment Scheme													
	Code		al Con Week	tact				Theory				Practic	al			Based o	on SL	Tota Mari
	CL TL LL SLH NLH Credits FA- SA- TH TH			FA- SA- PR PR	TOTAL		L	SLA		TYANI NO								
								MAX	MAX	MAX	MIN	MAX	MAX	MAX	MIN	MAX	MIN	
DSC	1ES1117	2	-		2	5	40	60	100	40	30	20	20	20	8	17		

Abbreviation:	CL- Classroom Learning	TL - Tutorial Learning	LL - Laboratory Learning
	SLH - Self Learning Hours	NLH - Notional Learning Hours	SLA - Self Learning Assessment
	FA - Formative Assessment (To	erm work +Mid Sem Exam +Attendance)	SA - Summative Assessment

II. PRE-REQUISITES

Basic understanding of Class 10 level science and mathematics, particularly fundamental concepts of electricity and safe handling of electronic tools.

III. INDUSTRY / EMPLOYER EXPECTED OUTCOMES

Students should be able to identify, test, and use basic electronic components and instruments confidently.

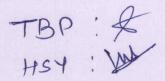
IV. COURSE LEARNING OUTCOMES

At the end of the course, students will be able to achieve the following course learning outcomes:

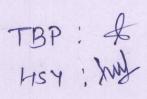
- CO1. Identify various electronic components like resistors, capacitors, inductors, switches, and relays.
- CO2. Interpret the colour codes, symbols, and values written on electronic components.
- CO3. Measure and test electronic components using tools such as mustimeters, CROs, and function generators.

CO4. Assemble simple electronic circuits and explain their basic functions in real-world applications.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT: Marks Hours Learning Content mapped with Name of Unit **Theory Learning** Theory Learning outcomes (TLO's) outcomes (TLO's) aligned to CO's & CO's TLO 1.1: Define resistor 1.1 Concept and function of resistor. 09 06 Unit -1 1.2 Classification of resistors (fixed, Resistors and its role in circuits. variable, special). 1.3 Resistor specifications: power TLO 1.2: Classify different types of resistors. rating, tolerance, temperature coefficient. 1.4 Construction and application of TLO 1.3: Interpret resistor carbon film and wire-wound specifications (power, tolerance, etc.). resistors. 1.5 Color coding system. 1.6 LDR construction, characteristic TLO 1.4: Identify and explain resistor color coding. curve, and application in medical equipment. TLO 1.5: Describe LDR construction, working, and application.

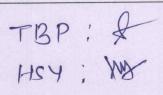


Unit-2 Capacitors	TLO 2.1: Classify different types of capacitors.	2.1 Classification and function of capacitors.	09	06
	TLO 2.2: Explain	2.2 Construction and materials of disc, ceramic, electrolytic		
	construction and materials used in capacitors.	capacitors. 2.3 Fixed and variable capacitors: air		
	TLO 2.3: Interpret capacitor specifications.	gang, PVC gang, mica, trimmer.2.4 Capacitor specifications: voltage rating, tolerance.2.5 Coding systems: numeric, color		
	TLO 2.4: Identify and decode capacitor values using codes.	bands, printed values. 2.6 Concept of capacitive reactance.		
	TLO 2.5: Describe capacitive reactance.			
Unit-3 Inductors	TLO 3.1: State Faraday's laws of electromagnetic induction.	3.1 Faraday's laws, induced emf.3.2 Definitions of self-inductance, mutual inductance, coefficient of coupling.	09	06
	TLO 3.2: Define self and mutual inductance.	3.3 Q-factor and inductive reactance.3.4 Construction and applications of air core, iron core, ferrite core,		
	TLO 3.3: Explain inductor specifications and reactance.	toroidal inductors. 3.5 Frequency range inductors: AF, RF, IF.		
	TLO 3.4: Identify types of inductors and their applications.	3.6 Use in medical equipment and measurements.		
Unit-4 Cables	TLO 4.1: Define and explain cable specifications.	4.1 General specifications: impedance, flexibility, current capacity.	09	06
	TLO 4.2: Identify and compare different types of cables.	4.2 Construction and application of: coaxial, 600E telephone cable, PASP, Alpeth sheathed, FRC, twin-core, twisted & shielded,		
	TLO 4.3: State applications of various cables.	optical fiber.		
Unit-5 Connectors	TLO 5.1: Define connector specifications.	5.1 Contact resistance, breakdown voltage, insulation resistance.5.2 Constructional diagrams and	06	06
	TLO 5.2: Identify various connector types and their structure.	identification. 5.3 Applications in circuits and systems.		
	TLO 5.3: Explain applications of BNC and D-series connectors.			
Unit-6 Fuses	TLO 6.1: Define fuse and its importance in circuits.	6.1 Function and importance of fuse.6.2 Types: glass, ceramic, shunt, resettable.	06	06
	TLO 6.2: Classify types of fuses.	6.3 High Rupturing Capacity (HRC) fuse and Metal Oxide Varistor (MOV).		



Unit-7 Switches	TLO 6.3: Explain working of glass, ceramic, resettable, MOV and HRC fuses. TLO 7.1: Explain switch characteristics and ratings. TLO 7.2: Classify types of	7.1 Voltage rating, current rating, contact resistance, bounce time.7.2 Classification and application-based selection.	06	05
	switches. TLO 7.3: Describe construction and working of toggle, rotary, push-to-on/off, rocker switches.	7.3 Diagrams and working of each switch type.		
Unit-8 Relays	TLO 8.1: Define relay and its difference from switch. TLO 8.2: Describe working of general-purpose, reed, and solid-state relays. TLO 8.3: Identify NO and NC contacts.	 8.1 Concept and need for relay. 8.2 Construction and working of different relays. 8.3 Identification of Normally Open (NO) and Normally Closed (NC) contacts. 	06	04

Sr. No.	Practical/Laboratory Learning Outcome (LLO)	Practical Titles	Relevant COs	
1	LLO 1.1: Measure AC/DC voltages using a digital multimeter (DMM).	Test AC/DC voltage sources with Digital Multimeter (DMM).	CO1	
2	LLO 2.1: Identify, calculate, and test different types of resistors.	Identify, find value and test different types of resistors.	CO1	
3	LLO 3.1: Identify, calculate, and test different types of capacitors. Identify, find value and test different types of capacitors.			
4	LLO 4.1: Identify, calculate, and test different types of inductors.	Identify, find value and test different types of inductors.	CO2	
5	LLO 5.1: Connect resistor, capacitor, and inductor in series and parallel and observe results.	Make use of resistor, capacitor, inductor in series and parallel connection.	CO2	
6	LLO 6.1: Identify and test various types of cables and state their application.	Identify different types of cables & test them; discover their applications.	CO3	
7	LLO 7.1: Identify and explain the use of different types of connectors.	Identify different types of connectors & discover their applications.	CO3	
8	LLO 8.1: Identify and test different types of fuses.	Identify different types of fuses & test them.	CO3	
9	LLO 9.1: Identify and explain the function of different switches.	Identify different types of switches and discover their usage.	CO3	
10	LLO 10.1: Identify and describe different types of relays and their functions.	Identify different types of relays and discover their usage.	CO3	
11	LLO 11.1: Operate CRO and function generator and become familiar with controls.	Operate CRO & Function Generator to understand external controls.	CO4	



	LLO 12.1: Measure amplitude and frequency of sine waves using CRO and function generator.	Measure amplitude & frequencies of sine waveform using CRO & Function Generator.	CO4
13	LLO 13.1: Measure amplitude and frequency of square waves using CRO and function generator.	Measure amplitude & frequencies of square waveform using CRO & Function Generator.	CO4

VII. SUGGESTED MICRO PROJECT / ASSIGNMENTS / ACTIVITIES FOR SELF LEARNING / SKILL DEVELOPMENT (SELF LEARNING)

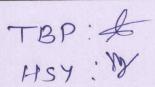
- Collect and display various electronic components with labels and specifications.
- Download and summarize datasheets of five commonly used electronic components.
- Create a resistor and capacitor colour code reference chart with practice examples.
- Prepare a guide or video on testing electronic components using a multi-meter.
- Make a presentation on types of connectors or cables used in electronic circuits.
- Design and assemble a basic RC or RL circuit and explain its working.
- Create a comparison report between relays and switches with examples.
- Demonstrate the use of CRO and function generator through a video or poster.
- Develop a quiz or worksheet on identifying component values from codes.

Mini projects

- LED Blinker Circuit using resistor, switch, and battery.
- Series and Parallel Connection Demo using resistors and a multimeter.
- Capacitor Charging and Discharging Setup with a small bulb to show delay effect.

VIII.	LIST OF INSTRUMENTS / EQUIPMENT / TRAINER BOARD
1	Digital Multimeter (DMM) and DC Power Supply
2	Cathode Ray Oscilloscope (CRO) and Function Generator
3	Electronic Component Trainer Kit (Resistor, Capacitor, Inductor testing)
4	Cable, Connector, Fuse, and Switch Demonstration Board
5	Relay and Switch Operation Trainer Board
6	Breadboard with sample components and circuit assembly tools
7	Color Code Charts, Datasheets, and Basic Tool Kit (wire stripper, cutter, plier)

Sr.No.	Title	Author	Publication
1	Basic Electronics	Debashis	De Pearson
2	Electronic Components Handbook	Thomas H. Jones	Reston Publishing Co
3	Electronic Components and Materials	Dhir	Tata McGraw Hill
4	Handbook of components for electronics	Charles A. Harper	Laxmi Enterprise



X. LI	NK OF LEARNING WEB RESOURCE
1	https://nptel.ac.in/courses/122106025
2	https://nptel.ac.in/courses/108108157
3	https://onlinecourses.nptel.ac.in/noc21_ee55/preview
4	https://onlinecourses.nptel.ac.in/noc25_ee20/preview

Unit	Unit Title	Unit Title Aligned COs	Learning Hours	R- Level	U- Level	A- Level	Total Marks
1	Resistors	CO1	6	3	3	3	9
2	Capacitors	CO2	6	3	3	3	9
3	Inductors	CO2	6	3	3	3	9
4	Cables	CO3	6	3	3	3	9
5	Connectors	CO3	6	2	2	2	6
6	Fuses	CO3	6	2	2	2	6
7	Switches	CO3	5	2	2	2	6
8.	Relays	CO3	4	2	2	2	6
		Grand Total	45	20	20	20	60

Course outcome (Cos)		Pı	ogramı	Programme Specific Outcomes (PSOs)						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	2	0	0	1	0	1	2	1	1
CO2	3	2	0	0	0	0	1	2	1	1
CO3	2	2	0	3	0	0	1	3	2	2
CO4	2	3	2	3	1	2	1	3	2	3
CO5	1	1	2	2	1	3	2	2	1	2
Legends: - 3	- High	2-M	oderate	Medium	1-S	light/Lov	v = 0	-None		

TBP: \$
HSY: W