

GANPAT UNIVERSITY			
FACULTY OF DIPLOMA ENGINEERING			
Programme	Diploma in Biomedical Engineering		
Semester	I	Version	1.0.0.0
Effective from Academic Year	2025-26	Effective for the batch Admitted in	JULY 2025
Course code	IES1117	Course Name	Electronics Components & Practice

I. TEACHING-LEARNING AND ASSESSMENT SCHEME																		
Course Type	Course Code	Learning Scheme						Assessment Scheme								Total Marks		
		Actual Contact Hrs./Week			SLH	NLH	Credits	Theory				Practical			Based on SL			
		CL	TL	LL				FA-TH	SA-TH	TOTAL		FA-PR	SA-PR	TOTAL	SLA			
		MAX	MAX	MAX				MAX	MAX	MAX	MIN	MAX	MAX	MAX	MIN		MAX	MIN
DSC	IES1117	2	-	6	2	10	5	40	60	100	40	30	20	50	20	20	8	170

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 (Term 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 multimeters, 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:

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

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


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	TLO 6.3: Explain working of glass, ceramic, resettable, MOV and HRC fuses.			
Unit-7 Switches	TLO 7.1: Explain switch characteristics and ratings. TLO 7.2: Classify types of switches. TLO 7.3: Describe construction and working of toggle, rotary, push-to-on/off, rocker switches.	7.1 Voltage rating, current rating, contact resistance, bounce time. 7.2 Classification and application-based selection. 7.3 Diagrams and working of each switch type.	06	05
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

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL

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.	CO2
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

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12	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)

IX. LIST OF REFERENCE BOOKS

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

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X. LINK 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


XI. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE

Unit	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

XII. COs AND POs AND PSOs MAPPING

Course outcome (Cos)	Programme Outcomes (POs)							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-Moderate/Medium 1-Slight/Low 0-None

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