

GANPAT UNIVERSITY

FACULTY OF DIPLOMA ENGINEERING

Programme	Diploma in Electrical Engineering				
Semester	III		Version	1.0.0.0	
Effective from Academic Year	2026-27		Effective for the batch Admitted in	JULY 2025	
Course code	1EE3103	Course Name	Electronic Devices and Circuits		

I. TEACHING-LEARNING AND ASSESSMENT SCHEME

Course Type	Course code	Course Title	Teaching & Learning Scheme								Examination Scheme								
			Credit				Actual Contact Hrs/week			SLH	Total Learning Hrs/Week	TH			PR			SLA	Total
			CL	TL	LL	Total	CL	TL	LL			CE	SEE	Total	CE	SEE	Total		
DSC	1EE3103	Electronic Devices and Circuits	3	0	1	3	3	0	2	1	6	40	60	100	30	20	50	20	170

Abbreviation:	CL- Classroom Learning	TL - Tutorial Learning	LL - Laboratory Learning
	SLH - Self Learning Hours	SLA - Self Learning Assessment	SA - Summative Assessment
	CE – Continuous Evaluation	SEE – Semester End Examination	

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	MIN	MAX	MAX	MAX	MIN		MAX	MIN	
DSC	1EE3103	3	-	2	1	6	3	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 knowledge of Physics.

III. INDUSTRY / EMPLOYER EXPECTED OUTCOMES

The purpose of this course is to help the student to learn about the basic concepts related to electrical engineering.

IV. COURSE LEARNING OUTCOMES

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

- CO1. To make aware about analog electronics.
- CO2. To familiarize with the applications of solid-state devices.
- CO3. To understand basic electronic equipment and its function.

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 Basic of Semiconductor Diodes & Rectifier	TLO 1.1 Intrinsic and extrinsic semiconductor materials: P type, N type semiconductors. TLO 1.2 P-N junction diode TLO 1.3 Applications - Diode as rectifier, half wave, full wave and bridge	1.1 Intrinsic and extrinsic semiconductor materials. 1.2 Working of PN junction diodes 1.3 Working of half and full wave bridge rectifier along with sketches 1.4 Need for different types of filters (C, L, LC and π filters)	15	10

	<p>wave rectifier</p> <p>TLO 1.4 Need of Filters & different types of filters</p>			
<p>Unit-2 Transistor and amplifiers</p>	<p>TLO 2.1 the construction, symbols, and working principle of PNP and NPN transistors, Derive and relate the current gains α and β,</p> <p>TLO 2.2 Analyze the Common Emitter (CE) configuration and interpret its input and output characteristics</p> <p>TLO 2.3 different transistor biasing methods and justify their need for stability.</p> <p>TLO 2.4 the working of a transistor as a switch and identify its applications</p>	<p>2.1 Introduction of transistors, PNP and NPN transistors, conduction through transistors, leakage current, relationship between α and β.</p> <p>2.2 Transistor configuration & Characteristics for CE.</p> <p>2.3 Biasing methods of Transistor</p> <p>2.4 Transistor as a Switch: Working and application.</p>	15	11
<p>Unit-3 Other Semiconductor and Opto electronic devices</p>	<p>TLO 3.1 The construction, symbol, and working principle of MOSFET, DIAC, TRIAC, UJT, SCR, Photo diode, Photo transistor, LDR, LED, Zener diode</p> <p>TLO 3.2 The construction and working principle of Optical Fibre</p>	<p>3.1 Introduction and working principle of MOSFET, DIAC, TRIAC, UJT, SCR, Photo diode, Photo transistor, LDR, LED, Zener diode</p> <p>3.2 Optical fibre: Construction and working principle only.</p>	14	10
<p>Unit-4 Simple circuit using IC</p>	<p>TLO 4.1 The need of Integrated Circuits (ICs) and their advantages over discrete components</p> <p>TLO 4.2 Construction, symbol, and working principle and characteristics and specifications of IC 741 OPAMP</p> <p>TLO 4.3 The working principle of IC 555 timer</p> <p>TLO 4.4 Functional block diagram and applications of IC 555 timer</p>	<p>4.1 Need of I.C.</p> <p>4.2 Operational amplifier (OPAMP).</p> <p>4.3 Characteristic and specification of OPAMP-IC 741</p> <p>4.4 Block diagram of IC 555 timer</p> <p>4.5 IC 555 timer and applications</p>	08	07
<p>Unit-5 Regulated power supplies</p>	<p>TLO 5.1 The need, block diagram, and working of a regulated power supply</p> <p>TLO 5.2 working of transistorized series voltage regulator (basic and with feedback)</p> <p>TLO 5.3 working principle, block diagram, and advantages of Switch Mode</p>	<p>5.1 Regulated power supply, Shunt voltage regulator</p> <p>5.2 Transistorized series voltage regulator (basic and with feedback, without derivation)</p> <p>5.3 Switch mode power supply (SMPS)</p> <p>5.4 Uninterruptible power supply (UPS)</p>	08	07

	Power Supply (SMPS) TLO 5.4 working principle and applications of Uninterruptible Power Supply (UPS)			
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VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL			
Sr. No.	Practical/Laboratory Learning Outcome (LLO)	Practical Titles	Relevant COs
1	LLO 1.1 Identify and verify the specifications and applications of basic electronic components	Study of Different electronics components.	CO1
2	LLO 2.1 Plot and analyze the V–I characteristics of a PN junction diode and determine cut-in voltage	To obtain V-I Characteristics of PN junction diodes.	CO2
3	LLO 3.1 Operate CRO controls and measure voltage, time period, and frequency of signals	Study of Cathode Ray Oscilloscope-CRO.	CO3
4	LLO 4.1 Observe output waveform and analyze rectifier performance using CRO	Test Half wave rectifier using CRO.	CO2
5	LLO 5.1 Observe and compare full wave rectifier output waveform using CRO	Test Full wave rectifier using CRO.	CO2
6	LLO 6.1 Identify transistor terminals and explain basic operation of NPN and PNP transistors	To study NPN and PNP transistors.	CO2
7	LLO 7.1 Plot Zener V–I characteristics and verify voltage regulation	To Obtain V-I Characteristics of Zener Diode and Zener Voltage regulator characteristics.	CO1
8	LLO 8.1 Analyze operating characteristics of LED and LDR and identify their applications	Characteristics of LED and LDR.	CO1
9	LLO 9.1 Identify pin configuration and functional pins of IC 741	Identify the pins of IC 741.	CO3
10	LLO 10.1 Identify pin configuration and functional pins of IC 555 timer	Identify the pins of IC-555.	CO3
11	LLO 11.1 The block diagram, working, and applications of SMPS and UPS	To study SMPS and UPS.	CO3
12	LLO 12.1 Analyze and verify the operation of positive, negative, and biased clipper circuits using CRO waveforms	To verify performance of various Clipper circuits.	CO2
13	LLO 13.1 Analyze and verify the operation of positive and negative clamper circuits using CRO waveforms	To verify performance of various Clamper circuits.	CO2
14	LLO 14.1 Observe, compare, and analyze output waveforms of different filters (capacitor, inductor, LC, and π filters) using CRO	Compare output waveform of different Filters using CRO	CO3

15	LLO 15.1 Analyze and compare the performance of Common Base (CB) and Common Emitter (CE) transistor amplifiers by measuring voltage gain, current gain, and phase relationship	Test the performance of CB and CE transistor amplifier	CO2
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VII. SUGGESTED MICRO PROJECT / ASSIGNMENTS / ACTIVITIES FOR SELF LEARNING / SKILL DEVELOPMENT (SELF LEARNING)

- Testing of electronic components like diode, transistor, SCR, IC etc.
- Prepare charts for characteristics of various electronics components.
- Survey to collect data sheets for various electronics components used in different circuits.

Mini projects

- Build circuit of half wave rectifier without filter on General purpose board.
- Build circuit of half wave rectifier with filter on General purpose board.
- Build circuit of Full wave rectifier without filter on General purpose board.
- Build circuit of Full wave rectifier with filter on General purpose board.
- Prepare a chart of comparison of various types of rectifiers.
- Build circuit of common Emitter amplifier using BJT.
- Prepare a chart of CE transistors characteristics.
- Make a flasher circuit using Diac and Triac.
- Build circuit of seven segment LED display.
- Make a circuit of Burglar alarm using LDR.

VIII. LIST OF INSTRUMENTS / EQUIPMENT / TRAINER BOARD

1	Regulated power supply: Dual DC , 0-30V/1A & 5V /1A with resolution of 10mV, 2mA
2	Digital Storage Oscilloscope : 300 MHZ Bandwidth , 2GSa/s maximum real time sampling rate refresh rate upto 2000 wfams/s , RS232 & USB connectivity
3	C.R.O. : 30 MHz Bandwidth, 2 channel, 20 ns sampling time.
4	Function generator: 10 HZ to 10MHZ, 10 Vpp, rise & fall time=20ns, manual / external triggering
5	Different trainer kits of Electronics.
6	Digital Multimeter

IX. LIST OF REFERENCE BOOKS

Sr. No.	Title	Author	Publication
1	Electronics Fundamental and application	D Chattopadhyay.	New Age International Publishers
2	Principle of Electronics	V. K. Mehta.	S.Chand
3	Electronics Principles	Albert Malvino, David J. Bates	McGraw Hill Education
4	Electronics devices and circuits,	J.B.Gupta	S.K.kataria& Sons, 2013
5	Basic Electronics and linear circuits,	N.N. Bhargava, D.C. Kulshreshtha, S.C. Gupta	McGraw Hill Education

X. LINK OF LEARNING WEB RESOURCE

1	https://circuitmaker.com/
2	https://www.pspice.com/
3	https://www.electronics-tutorials.ws/
4	https://www.allaboutcircuits.com/
5	Electronic Workbench EWB
6	https://www.allaboutcircuits.com/
7	Electronicsclub.info

XI. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE

Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	Basics of Semiconductor and its Applications	CO1	10	05	05	05	15
2	Transistor and amplifiers Contents	CO2	11	06	05	04	15
3	Semiconductor and Opto electronic devices	CO2	10	04	04	06	14
4	Simple circuit using IC	CO3	07	02	03	03	08
5	Regulated power supplies	CO3	07	01	03	04	08
Grand Total			60	18	20	22	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	1	2	3	2	0	3	2	1
CO2	3	1	3	3	0	3	1	2	3	1
CO3	3	3	1	2	0	1	3	3	2	3
CO4	2	2	3	0	1	3	2	1	3	2
CO5	3	1	2	0	3	2	2	3	1	2

Legends: - 3- High 2-Moderate/Medium 1-Slight/Low 0-None