GANPAT UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

Programme	Bachelor of Technology	Branch/Spec.	Electronics and Communication Engineering
Semester	I	Version	1.0.0.0
Effective from Academic Year	2026-27	Effective from the batch admitted in	July 2026
Course Code	2ESC1102	Course Name	Basics of Electronics
Course Category	Engineering Science Courses (ESC)		

Teaching Scheme						Examination scheme (Marks)			
(Per week)	Lecture (DT)		Practical (Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	0	1	0	4	Theory	50	50	100
Hours	3	0	2	0	5	Practical	25	25	50

Pre-requisites:

Basic Mathematics, Electrical Fundamentals.

Course Outcomes

COs	Description
CO1	Understand diode and apply diode theory to design rectifiers, filters, regulators, and wave-shaping circuits.
CO2	Analyze and apply BJT and FET devices as amplifiers and switches based on their structure, characteristics, biasing, and configurations.
CO3	Analyze the operation and characteristics of BJTs in CE, CB, and CC configurations as amplifiers and switches.
CO4	Explain the working of special purpose semiconductor devices.

Theory Syllabus

Unit	Content	Hours
1	**Diode Theory and Applications** PN junction diode working and characteristics, Biasing forward and reverse, Diode approximations, diode load line, Half wave rectifier, Full wave rectifier, Bridge rectifier, PIV, DC voltage and currents, Ripple factor, Efficiency, Comparison of rectifiers, Capacitor filters, IC voltage regulator, Unregulated DC power supply, Clipping circuit, Clamping circuit, Voltage multipliers.	8
2	**Bipolar Junction Transistors** BJT Structure, Formation of PNP / NPN junctions, operation, Characteristics and parameters, Current voltage analysis, Transistor as an amplifier and as a Switch, CE, CB and CC configurations and characteristics.	12
3	**Field Effect Transistors (FET)** Junction field effect transistors(JFET) construction, JFET working, JFET Configurations, JFET characteristics, FET, Biasing in ohmic region and active region, Transconductance, Amplification and Switching, Comparison of BJT and FET, MOSFETs (D-type and E-type MOSFET)- structure, Characteristics, CS, CG, CD Configurations, CMOS introduction.	10
4	**BJT Amplifiers** Classification of Amplifiers, Amplifier operation, Transistor AC equivalent Circuits, Common-Emitter Amplifier, Common Collector Amplifier, Common- base Amplifier, Darlington circuits, Emitter follower, and comparison of transistor amplifier configuration: input resistance, output resistance, voltage gain and current gain, effect of bypass capacitor, multistage amplifiers.	8

5	**Special Purpose Devices** Light emitting diode (LED). Zener diode, Zener diode circuit for voltage regulation, Photo diode, Solar cell, PIN diode, Varactor, Schottky diode, Tunnel diode, surface mount diodes, Seven Segment display, Different types of thyristor SCR,DIAC,TRIAC,GTO,LASCR,MCT,UJT,PUT,IGBT	7
Practical and Self Learning Content		
Practical, assignments, quiz, industrial visit, field survey and tutorials are based on the above syllabus.		
Text Books		
1	Electronic Devices By Floyd (Pearson Education).	
Reference Books		
1	Electronic Devices by Robert Boylestad (Pearson Education).	
2	Integrated Electronics By Jacob Millman & Helkias (Tata McGraw-Hill Education).	
3	Electronic Principles By Albert Paul Malvino (McGraw-Hill).	
4	Fundamentals of Microelectronics by Behzad Razavi(WILEY),Third Edition	
ICT/MOOCs Reference		
1	https://archive.nptel.ac.in/courses/122/106/122106025/	
2	https://archive.nptel.ac.in/courses/117/102/117102061/	
3	https://www.youtube.com/watch?v=yQDfVJzEymI&list=PLyYrySVqmyVPzvVlPW-TTzHhNWg1J_0LU	
4	https://archive.nptel.ac.in/courses/122/106/122106025/	

Mapping of COs, POs, and PSOs														
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	2	2	2	2	2	0	0	0	2	2	2	2	2
CO2	3	3	3	3	3	3	0	0	0	3	3	3	3	3
CO3	3	3	3	3	3	3	0	0	0	3	3	3	3	3
CO4	3	3	3	3	3	3	0	0	0	3	3	3	3	3

Bloom's Taxonomy Level				
Unit	**Unit Title**	**Aligned COs**	**Learning Hours**	**BTL Level**
1	Diode Theory and Applications	CO1	8	Understand
2	Bipolar Junction Transistors	CO2	12	Apply, Analyze
3	Field Effect Transistors (FET)	CO3	10	Analyze
4	BJT Amplifier	CO4	8	Apply, Analyze
5	Special Purpose Devices	CO4	7	Understand, Apply

Note:

- Version 1.0.0.0 (First Digit= New syllabus/Revision in Full Syllabus, Second Digit=Revision in Teaching Scheme, Third Digit=Revision in Exam Scheme, Forth Digit= Content Revision)
- 1 Hour Lecture = 1 Credit, 1 Hour Tutorial = 1 Credit, 2 Hours Practical = 1 Credit, 2 Hours Internship/Project/Seminar = 1 Credit
- Bloom's Taxonomy Level (BTL): R: Remember, U: Understand, A: Apply, N: Analyze, E: Evaluate, and C: Create