GANPAT UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

Programme	Bachelor of Technology	Branch/Spec.	EC
		Version	2.0.0.0
Semester	II	Course Category	PCC
Course Code	2PCCEC1101	Course Name	Digital Electronics
Effective from Academic Year	2026-27	Effective for the batch Admitted in	July 2026

Teaching, Learning and Examination Scheme

Teaching & Learning Scheme							Examination scheme (Marks)					
Hours (per week)				Cr	SL	TSL	Theory			Practical		
L	TU	P	TTH				CE	SEE	Total	CE	SEE	Total
3	0	2	5	4	45	120	40	60	100	30	20	50

L: Lecture, TU: Tutorial, P: Practical, TTH: Total Teaching Hours/Week, Cr: Credit, SL: Min. Self Learning/Term Work Hours/Sem, TSL: Min. Total Teaching & Learning Hours/Sem, CE: Continuous Evaluation, SEE: Semester End Examination,

Pre-requisites

Basic Electronics

Course Outcomes

COs	Description
CO1	Understand the fundamentals of digital logic, including Boolean algebra, logic gates, logic simplification techniques and logic families.
CO2	Analyze and design combinational digital circuits.
CO3	Design and analyze combinational and sequential circuits.
CO4	Understand the applications and use cases of digital electronics in various fields, such as shift registers, counters, memory devices etc.

Theory Syllabus

Unit	Content	Hrs
1	**Number Systems and binary codes:** Digital Computer & Systems, Number Systems, Number Base conversions, Different Number systems & their relations, Complements and Binary codes.	05
2	**Logic Gates , Boolean Algebra and Simplification of Boolean Functions:** Digital Logic gates, Basic definitions, Axiomatic definition of Boolean Algebra, Basic Theorems & Properties, Boolean functions, Canonical & Standard forms, Logic operations, K-Map method, Two, Three, Four, Five & Six variable maps, Products of Sum & Sum of Products simplification, NAND, NOR & Other two-level Implementations, Don't care conditions, Quine–McCluskey Tabular Method.	07
3	**Digital Logic Families:** RTL, DTL circuits, I2L Logic, TTL, ECL, MOS & CMOS circuits & their characteristics.	03
4	**Combinational Logic Circuits:** Analysis Procedure, Design Procedure, Adder, Subtractors, Code Conversion, Binary Parallel Adder, Decimal Adder, Magnitude Comparator, Encoders, Decoders, Multiplexers, De-multiplexers.	12
5	**Sequential Logic Circuits:** Latch, Flip Flops, difference between latch and flip flop, Triggering of Flip flops, Analysis of clocked sequential circuits, State reduction & assignment, Flip Flop Excitation tables, Design of Sequential circuits, Design of counters, Design using state equations.	12
6	**Applications and use cases of digital electronics:** Registers, Shift registers, Ripple Counters, Synchronous Counters, and Memory.	06

Practical Content

Practical and Term work shall be based on the laboratory experiments as well as the field survey.

Text Books

1	Digital Logic and Computer Design by Morris Mano, Pearson Publication.
2	Digital Fundamentals by Floyd, Pearson Publication.

Reference Books

1	Digital Electronics Circuits & Systems by V. K. Puri, McGraw Hill Education.
2	Modern Digital Electronic by Y R. P. Jain, McGraw Hill Education.
3	Fundamental of Digital Circuits by A. Anandkumar, PHI publication.

ICT/MOOCs Reference	
1	https://nptel.ac.in/courses/117106086
2	https://nptel.ac.in/courses/108105132
3	
4	

Mapping of Cos, POs, and PSOs

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO1	3	2	2	2	1	0	0	0	0	1	2	2	2	0
CO2	3	1	2	1	0	0	0	0	0	0	2	3	3	1
CO3	3	1	2	1	0	0	0	0	0	1	2	3	2	1
CO4	3	3	2	2	1	0	0	0	0	0	2	3	3	0

Unit	Unit Title	Aligned COs	Learning Hours	BTL Level
1	Number Systems and binary codes	CO1	05	Understand
2	Logic Gates , Boolean Algebra and Simplification of Boolean Functions	CO1	07	Apply
3	Digital Logic Families	CO1	03	Remember
4	Combinational Logic Circuits	CO2	12	Analyse
5	Sequential Logic Circuits	CO3	12	Analyse
6	Applications and use cases of digital electronics	CO4	06	Create

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)
- L=Lecture, TU=Tutorial, P= Practical/Lab., TW= Term work, DT= Direct Teaching, Lab.= Laboratory work CE= Continuous Evaluation, SEE= Semester End Examination
- 1 Hour Lecture = 1 Credit, 1 Hour Tutorial = 1 Credit, 2 Hours Practical = 1 Credit, 2 Hours Internship/Project/Seminar = 1 Credit
- As per NCrF/NEP 2020, Minimum Self-Learning or Term Work Hours per Semester should be calculated in such a way that 1 Credit should have minimum 30 Hours of Teaching and Self Learning Engagement per semester