Semester: 1	
Programme : B.Sc.	
Course : COMPUTER FUNDAMENTALS AND DIGITAL DESIGN	
Paper code: B1CS230111T	**Credits: 4**
Hours/week : Theory: 4	
Category: Core/MDC/SEC/VAC : Minor	
Theory / Practical / Composite : Theory	
No of Modules : 2	

Course Overview: This introductory course provides a dual-focus foundation in **computer systems** and **digital electronics**.

Group A covers the essentials of computing: computer architecture, generations, functional units, I/O and storage devices, and bus structures. Students learn problem-solving techniques using algorithms and flowcharts, explore software classifications, and gain practical knowledge of networking concepts—including LAN/MAN/WAN, Internet protocols, DNS, communication media, and services like email and video conferencing.

Group B builds the logical and mathematical groundwork for digital systems. Topics include number systems (Binary, Octal, Decimal, Hexadecimal), code representations, binary arithmetic, logic gates, Boolean algebra, and simplification techniques using Karnaugh Maps. Students apply this knowledge to design and analyze combinational circuits such as adders, comparators, multiplexers, decoders, and encoders.

Course Outcome:

1. **Explain** the fundamental architecture of computer systems and **construct** algorithms and flowcharts for basic problem-solving.
2. **Classify** software types and **analyze** network architectures, internet protocols, and communication services.
3. **Convert** data across positional number systems (Binary, Octal, Decimal, Hex) and **perform** binary arithmetic operations.
4. **Simplify** Boolean expressions using Boolean laws and Karnaugh Maps to **analyze** logic gate configurations.
5. **Design** and **implement** combinational logic circuits such as Adders, Multiplexers, Encoders, and Decoders.

Prerequisites:

- None

SYLLABUS

UNIT/Module	CONTENT	HOURS or NUMBER OF CLASSES	CO Mapping	COGNITIVE LEVEL
	Group A			
I.	**Introduction to Computer:** Different Generations, Functional Units, Basic I/O devices, Storage devices, Bus Structure	5	**CO1**	**Understand, Apply (K2, K3)**
II.	**Introduction to Problem Solving:** Concept of Data and Information, Basic	8	**CO1**	**Understand, Apply**

	problem-solving using Flowchart and Algorithm			**(K2, K3)**
III.	**Software:** Types and Brief Ideas about Each of the Types	5	**CO2**	**Understand, Analyze (K2, K4)**
IV.	**Introduction to Networking:** Advantages of Networking; Basic Features, LAN, MAN and WAN; characteristic features. Intranet and Internet; Servers and Clients; Ports; Domain Name System (DNS); WWW, Browsers. Guided and Unguided media. Modem; E-mail, Voice and Video Conferencing.	8	**CO2**	**Understand, Analyze (K2, K4)**
Group B				
V.	**Number Systems and Codes:** Weighted and Non-Weighted Codes, Positional Number Systems like Binary, Octal, Decimal and Hexadecimal, Conversion of one number system to another, BCD.	4	**CO3**	**Apply (K3)**
VI.	**Binary Arithmetic:** Addition and Subtraction	3	**CO3**	**Apply (K3)**
VII.	**Logic Gates** AND, OR, NOT, NAND, NOR, XOR.	4	**CO4**	**Analyze (K4)**
VIII.	Boolean expression, Laws of Boolean Algebra, Simplification, Design of simple logic circuits, Sum of Product, Product of Sum, Simplification using Karnaugh Map, Applications	6	**CO4**	**Analyze (K4)**
IX.	**Combinational circuits –** Adder/ Subtractor, Comparator circuit	5	**CO5**	**Create (K6)**
X.	**Other Combinational Circuits –** Multiplexer, Decoder, Encoder.	4	**CO5**	**Create (K6)**

Text Books

1. Computer Fundamental- P.K Sinha, BPB Publications.
2. Digital Logic and Computer Design, M Morris Mano, Pearson education India.
3. Fundamentals of Computers, V. Rajaraman, PHI.
4. Data Communications and Networking, B Forouzan, Mc Graw Hill

Evaluation

Theory CIA: 25 Attendance: 5 Semester Exam: 70	

Paper Structure for Theory Semester Exam Module:
Answer 5 out of 7 of 7 marks each in Group A
Answer 5 out of 7 of 7 marks each in Group B

Course outcomes (COs) and Cognitive Level Mapping

COs	CO Description	Cognitive levels
CO1	**Explain** the fundamental architecture of computer systems and **construct** algorithms and flowcharts for basic problem-solving.	Understand, Apply (K2, K3)
CO2	**Classify** software types and **analyze** network architectures, internet protocols, and communication services.	Understand, Analyze (K2, K4)
CO3	**Convert** data across positional number systems (Binary, Octal, Decimal, Hex) and **perform** binary arithmetic operations.	Apply (K3)
CO4	**Simplify** Boolean expressions using Boolean laws and Karnaugh Maps to **analyze** logic gate configurations.	Analyze (K4)
CO5	**Design** and **implement** combinational logic circuits such as Adders, Multiplexers, Encoders, and Decoders.	Create (K6)