Name of Faculty	:	Faculty of Computer Science & Applications
Name of Program	:	Bachelor of Computer Application with Industry Collaboration
Course Code	:	1BCA04
Course Title	:	Introduction to Digital Logic Fundamentals
Type of Course	:	Professional Core
Year of Introduction	:	2023-24

Prerequisite	:	-
Course Objective	:	This program empowers students to enhance their proficiency in Microsoft Office, acquire knowledge on the proper utilization of Google Apps and understand the importance of computer security.
Course Outcomes	:	At the end of this course, students will be able to:
	CO 1	Understand Number System & Perform number conversions.
	CO 2	Identify the logic gates and their functionality.
	CO 3	Perform number conversions from one system to another system
	CO 4	Design basic electronic circuits (combinational circuits).
	CO 5	Perform a comparative analysis of the components of different memory units.

Teaching and Examination Scheme

Teaching Scheme (Contact Hours)			Credits	Examination Marks				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	SEE	CIA	SEE	CIA	
2	0	0	2	50	25	0	0	75

*Legends: **L**-Lecture; **T**–Tutorial/Teacher Guided Theory Practice; **P** – Practical, **C** – Credit, **SEE** – Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars /Presentations/MCQ Tests, etc.))*

Course Content

Unit No.	Topics	Teaching Hours	Weightage	Mapping with CO
1	**NUMBER SYSTEM AND CONVERSION :**Decimal Numbers, Binary Numbers, Hexadecimal Numbers, Octal Numbers, Conversions within Number systems	5	15%	CO 1 CO 3
2	**ARITHMETICS AND CODES:** Binary Arithmetic, 1's and 2's complements of Binary Numbers, Signed Numbers, Arithmetic Operations with Signed numbers, Digital Codes, Error Detection Codes.	7	10%	CO 3

3	**LOGIC GATES:** The Inverter, The AND gate, The OR gate, The NAND gate, NOR gate, The Exclusive-OR gate and Exclusive-NOR gate; Boolean Algebra and Logic Simplification – Boolean Operations and Expressions, Laws and Rules, De-Morgan's Theorems, Boolean Expressions and Truth Tables, The Karnaugh Map, SOP minimizations.	6	20%	CO 2
4	**COMBINATIONAL LOGIC ANALYSIS:** Basic combinational Logic Circuits, Implementing Combinational Logic, The Universal Property of NAND and NOR Gates. Functions of Combinational Logic - Basic Adder, Parallel Binary Adders, Comparators, Decoders, Encoders, Code Converters, Multiplexers, Parity Generator/Checkers.	8	20%	CO 2 CO 4
5	**LATCHES AND FLIP-FLOPS:** Latches, Edge Triggered Flip-Flops, Flip-Flop Operating characteristics, Flip-Flop Applications, Registers, Counters.	8	20%	CO 3
6	Memory Basics, The RAM, The ROM, Programmable ROMs, The Flash Memory, Memory Expansion, Special Types of Memories, Magnetic and Optical Storage.	6	15%	CO 4 CO 5

Suggested Distribution of Theory Marks Using Bloom's Taxonomy						
Level	Remembrance	Understanding	Application	Analyse	Evaluate	Create
Weightage	**40**	**30**	**30**	-	-	-

NOTE: This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Suggested List of Experiments/Tutorials

Sr. No.	Name of Experiment/Tutorial	Teaching Hours
1	**To study and verify the truth table of logic gates:** Identify various ICs and their specification. **a.** OR gate **b.** AND gate **c.** NAND gate **d.** NOR gate	4
2	**Realization of a Boolean function:** To simplify the given expression and to realize it using Basic gates and Universal gate	4
3	**Design and implementation using NAND gate:** To realize why NAND gate is known as the universal gate by implementation of: **a.** NOT using NAND **b.** AND using NAND **c.** OR using NAND **d.** XOR using NAND	4
4	**Adders and Subtractors:** To realize **a.** Half Adder and Full Adder **b.** Half Subtractor and Full Subtractor by using Basic gates and NAND gates	2
5	**Binary to grey generator:** To learn the importance of weighted and non weighted code To learn to generate gray code	2

6	**Multiplexer and Demultiplexer: a.** To design and set up a 4:1 Multiplexer (MUX) using only NAND gates. **b.** To design and set up a 1:4 Demultiplexer (DE-MUX) using only NAND gates.	4
7	**Realization of a Boolean function using Logisim Software:** To learn the use of Logisim software to design digital electronics circuits.	4
8	**Flipflop:** **a.** Truth Table verification of **1)** RS Flip Flop **2)** T type Flip Flop. **3)** D type Flip Flop. **4)** JK Flip Flop. **b.** Conversion of one type of Flip flop to another	4

Major Equipment/ Instruments and Software Required

Sr. No.	Name of Major Equipment/ Instruments and Software
1	IC trainer kit, Logic gate ICs, Patch chords, connecting wires.
2	Logisim Software

Suggested Learning Websites

Sr. No.	Name of Website
1	https://learn.sparkfun.com
2	https:// www.geeksforgeeks.org/

Reference Books

Sr. No.	Name of Reference Books
1	Floyd, Thomas L, "Digital Computer Fundamentals", 10th Edition, University Book Stall, 1997.
2	Malvino, Paul Albert and Leach, Donald P, "Digital Principles and Applications", 4th Edition, TMH, 2000.
3	Malvino, Paul Albert and Leach, Donald P, "Digital Computer Fundamentals", 3rd Edition, TMH, 1995.
4	Bartee, Thomas C, "Digital Computer Fundamentals", 6th Edition, TMH, 1995.