	Mahatma Gandhi University **Kottayam**

Programme	BCA (Honours)					
Course Name	**Digital Fundamentals**					
Type of Course	DSC					
Course Code	MG1DSCBCA101					
Course Level	100					
Course Summary	This course covers the fundamentals of digital electronics, including number systems, Boolean algebra, logic gates, combinational logic circuits, and sequential logic circuits. Students gain a comprehensive understanding of digital logic design principles and their applications Through theoretical concepts and practical examples.					
Semester	1	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		4	0	0	0	60
Pre-requisites, if any						

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Demonstrate comprehension of number systems.	U,A	2
2	Analyse working of logic gates, solve expressions using laws of Boolean algebra.	An,A	1,2
3	Illustrate the combinational logic circuits using multiplexers, demultiplexers and other circuits	U,An	1,3
4	Design sequential circuits using flip flops and registers	An,A	1,2

**Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*

COURSE CONTENT

Content for Classroom transactions (Units)

Module	Units	Course description	Hrs	CO No.
1	1.1	Number Systems, Introduction – Base or radix, Non-positional and Positional number system, Popular number systems (Decimal, Binary, Octal and Hexadecimal), Conversion-From one number system to another, Concept of binary addition and subtraction, 1's Complement, 2's complement.	8	1
	1.2	BCD numbers- concept and 8421 additions	2	1
2	2.1	Logic gates- AND, OR, NOT, NAND, NOR, XOR and XNOR. Truth tables and graphical representation.	5	2
	2.2	Basic laws of Boolean Algebra, Simplification of Expressions, DeMorgan's theorems,	5	2
	2.3	Dual expressions, Canonical expressions. Minterms and Maxterms, SOP and POS expressions	4	
	2.4	Simplification of expressions using K-MAP (up to 4 variables)	5	2
	2.5	Representation of simplified expressions using NAND/NOR Gates, Don't care conditions	4	2
3	3.1	Combinational Logic Circuits: Adders-Half adder, Full adder	7	3
	3.2	Encoders, Decoders (Diagram and working principle)	5	3
	3.3	Multiplexers, Demultiplexers (Diagram and working principle)	5	3
4	4.1	Sequential Logic Circuits: Flip flops- RS, JK, T, D, Triggering of flip flops, Concept of Registers	10	4

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** • ICT enabled Lectures • Interactive sessions • Class discussions
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)**

	CCA for Theory: 30 Marks 1. Written tests 2. Quiz 3. Assignments
	B. Semester End Examination **ESE for Theory: 70 Marks; Written Test (2 Hrs)** Part A: Very Short Answer Questions (Answer all) - (10*2=20 Marks) Part B: Short Answer Questions (5 out of 7 Questions) - (5*6=30 Marks) Part C: Essay Questions (2 out of 3 Questions) - (2*10=20 Marks)

REFERENCES

1. M Morris Mano. Digital Logic and Computer Design (4th Edition). Prentice Hall.
2. A. Anand Kumar (2018). Fundamentals of Digital Circuits (4th Edition). PHI Learning Pvt. Ltd.

SUGGESTED READINGS

1. Thomas C Bartee- Digital computer Fundamentals, Sixth Edition, TATA McGraw Hill Edition
2. Thomas L Floyd- Digital Fundamentals, Ninth edition, PEARSON Prentice Hall.
3. Malvino & Leach- Digital Principles and Applications, Sixth Edition, Tata McGraw Hill, 2006