MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL
(Formerly West Bengal University of Technology)
Syllabus of BCA
(Effective from 2023-24 Academic Sessions)

SEMESTER: I

DEFINITION OF CREDIT

1 HR LECTURE PER WEEK	1 CREDIT
1 HR TUTORIAL PER WEEK	1CREDIT
2 HR PRACTICAL PER WEEK	1 CREDIT

SUBJECT NUMBERING SCHEME:

CODE FOR THE DEPT. OFFERING SUBJECT	SUBJECT TYPE	SEM	SUBJECT CODE

C	CORE MAJOR

SUBJECT NAME: Digital Electronics **CREDIT: 3L + 2P**

SUBJECT CODE: BCAC101

COURSE OBJECTIVE:

The objective of the course "Digital Electronics" is to provide students with a comprehensive understanding of the principles, theory, and practical applications of digital circuits and systems. Throughout the course, students will explore the foundational concepts of digital electronics, enabling them to design, analyze, and troubleshoot digital circuits commonly used in various electronic devices and systems.

COURSE OUTCOME	
CO1	To gain basic knowledge of digital electronics circuits and its levels.
CO2	To understand and examine the structure of various number system and its conversation.
CO3	To learn about the basic requirements for a design application
CO4	To enable the students to understand, analyze and design various combinational and sequential circuits

CO5	To understand the logic functions, circuits, truth table and Boolean algebra expression

DETAILED SYLLABUS:

Module No:	NAME OF THE TOPIC	HOURS	MARKS
M1	Number Systems & Codes Decimal Number, Binary Number, Octal Number, Hexadecimal Number, Conversion – Decimal to Binary, Binary to Decimal, Octal to Binary, Binary to Octal, Hexadecimal to Binary, Binary to Hexadecimal, Octal to Binary to Hexadecimal, Hexadecimal to Binary to Octal; Floating Point Number Representation, Conversion of Floating Point Numbers, Binary Arithmetic, 1's and 2's Complement, 9's and 10's Complement, Complement Arithmetic, BCD, BCD addition, BCD subtraction, Weighted Binary codes, Non-weighted codes, Parity checker and generator, Alphanumeric codes.	5	10
M2	Logic Gates : OR, AND, NOT, NAND, NOR, Exclusive – OR, Exclusive – NOR, Mixed logic.	2	10
M3	Boolean Algebra: Boolean Logic Operations, Basic Law of Boolean Algebra, Demorgan's Theorem, Principle of Duality.	6	10
M4	Minimization Techniques Sum of Products, Product of Sums, Karnaugh Map [up to 4 variables].	4	10
M5	Multilevel Gate Network Implementation of Multilevel Gate Network, Conversion to NAND-NAND and NOR-NOR Gate Networks.	2	5
M6	Arithmetic Circuits Half Adder, Full Adder, Half Subtractor, Full Subtractor, Carry Look Ahead Adder, 4-Bit Parallel Adder	5	5
M7	Combinational Circuits Basic 2-input and 4-input multiplexer, Demultiplexur, Basic binary decoder, BCD to binary converters, Binary to Gray code converters, Gray code to binary converters, Encoder.	5	5
M8	Sequential Circuits Introduction to sequential circuit, Latch, SR Flip Flop, D Flip Flop, T Flip Flop, JK Flip Flop, Master Slave Flip Flop	8	5

M9	Basics of Counters Asynchronous [Ripple or serial] counter, Synchronous [parallel] counter	4	5
M10	Basics of Registers SISO, SIPO, PISO, PIPO, Universal Registers	4	5
	sub total	45	70
	Internal examination	3	30
	TOTAL	48	100

PRACTICAL:
SUBJECT NAME: Digital Electronics Lab **Credit: 2**
SUBJECT CODE: BCAC191

List of Practical's: -

1. Realization of basic gates using Universal logic gates.
2. Code conversion circuits- BCD to Excess-3
and vice- versa.3 Four-bit parity generator and
comparator circuits.
4. Construction of simple Decoder and Multiplexer circuits using logic gates.
5. Design of combinational circuit for BCD to decimal conversion to drive 7-segment display using multiplexer.
6. Construction of simple arithmetic Circuits-Adder, Subtractor.
7. Realization of RS-JK and D flip-flops using Universal logic gates.
8. Realization of Universal Register using JK flip-flops and logic gates.
9. Realization of Universal Register using multiplexer and flip-flops.
10. Realization of Asynchronous Up/Down counter.
11. Realization of Synchronous Up/Down counter.
12. Realization of Ring counter and Johnson's counter.
13. Construction of adder circuit using Shift Register and full Adder.

SUGGESTED READING:

1. "Digital Design" by M. Morris Mano and Michael D. Ciletti Publisher: Pearson India Education Services Pvt. Ltd.
2. "Digital Fundamentals" by Thomas L. Floyd and R. David Maki Publisher: Pearson India Education Services Pvt. Ltd.
3. "Digital Electronics: Principles, Devices and Applications" by Anil K. Maini Publisher: John Wiley & Sons (Asia) Pte. Ltd.
4. "Digital Electronics: A Practical Approach" by William Kleitz Publisher: Pearson India Education Services Pvt. Ltd.
5. "Digital Logic Design" by Brian Holdsworth and Clive Woods Publisher: Pearson India Education Services Pvt. Ltd.

6. "Digital Electronics: Principles and Applications" by Roger L. Tokheim Publisher: McGraw-Hill Education (India) Pvt. Ltd.
7. "Fundamentals of Digital Logic with VHDL Design" by Stephen Brown and Zvonko Vranesic Publisher: McGraw-Hill Education (India) Pvt. Ltd.
8. "Digital Electronics: A Primer" by Michael J. Ciletti Publisher: Pearson India Education Services Pvt. Ltd.
9. "Analog Circuits" by A.K. Maini, Khanna Book Publishing Co.
10. "Design of Analog Circuits" by A.V.N. Tilak, Khanna Book Publishing Co.