	National Institute of Technology Meghalaya An Institute of National Importance	**CURRICULUM**

Programme	**Bachelor of Technology in Computer Science and Engineering**	Year of Regulation	**2020-21**
Department	**Computer Science and Engineering**	Semester	**III**

Course Code	Course Name	Credit Structure				Marks Distribution			
		L	T	P	C	INT	MID	END	Total
CS 203	**Digital Logic Design**	**3**	**1**	**0**	**4**	**50**	**50**	**100**	**200**

Course Objectives		Course Outcomes		
	To introduce the concept of digital and binary systems, number representation and conversion between different representations in digital electronic circuits and to acquire the knowledge of digital logic levels and Boolean logic.		CO1	Have a thorough understanding of the fundamental concepts and techniques used in digital electronics.
			CO2	To understand and examine the structure of various number systems and its application in digital design.
			CO3	The ability to understand, analyse and design various combinational circuits.
	To make student be able to design and analyse combinational logic circuits and design and analyse sequential logic circuits.		CO4	The ability to understand, analyse and design various sequential circuits.
			CO5	Develop a digital logic and apply it to solve real life problems.
	To understand concept of Programmable Devices, RAM, ROM, PLA, PAL.			

No.	Cos	Mapping with Program Outcomes (POs)												Mapping with PSOs		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	CO1	**3**	**2**	**2**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**1**
2	CO2	**2**	**1**	**2**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**1**
3	CO3	**3**	**2**	**2**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**1**
4	CO4	**3**	**2**	**2**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**1**
5	CO5	**3**	**3**	**3**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**2**	**1**	**2**

SYLLABUS

No.	Content	Hours	COs
I	Number systems and codes: Addition, Subtraction, Multiplication and Division using Different Number Systems; Representation of Binary Number in Sign-Magnitude, Sign 1's Complement and Sign 2's Complement Notation; Rules for Addition and Subtraction with Complement Representation; BCD, EBCDIC, ASCII, Extended ASCII, Gray and other Codes.	**05**	**CO1,CO2**
II	Boolean algebra and switching functions : Basic Logic Operation and Logic Gates, Truth Table, Basic Postulates and Fundamental Theorems of Boolean Algebra, Standard Representations of Logic Functions- SOP and POS Forms, Simplification of Switching Functions-K-Map and Quine-Mccluskey Tabular Methods, Synthesis of Combinational Logic Circuits.	**07**	**CO1, CO5**
III	Combinational logic circuits using msi integrated circuits: Binary Parallel Adder, BCD Adder, Encoder Priority Encoder, Decoder, Multiplexer and Demultiplexer Circuits, Implementation of Boolean Functions using Decoder and Multiplexer, Arithmetic and Logic Units, BCD-To-Segment Decoder, Common Anode and Common Cathode, 7-Segment Displays, Random Access Memory, Read Only Memory and Erasable Programmable ROMs, Programmable Logic Arrays(PLA) and Programmable Array Logic(PAL).	**13**	**CO1, CO3**
IV	Introduction to flip-flops: Basic Concepts of Sequential Circuits, Cross Coupled SR Flip-Flop Using NAND or NOR Gates, JK Flip-Flop Rise Conditions, Clocked Flip-flops, D-Types and Toggle Flip-flops, Truth Tables and Excitation Tables for Flip-flop. Master Slave Configuration, Edge Triggered and Level Triggered Flip-flop, Elimination of Switch Bounce using Flip-flop, Flip-flop with Preset and Clear.	**10**	**CO1,CO4**
V	Sequential logic circuit design : Introduction to State Machine, Mealy and Moore Model, State Machine Notation, State Diagram, State Table, Transition Table, Table Excitation, Table and Equation, Basic Concepts of Counters and Register, Binary Counters, BCD Counters, Up Down Counter, Johnson Counter, Module-N Counter, Design of Counter using State Diagrams and Tables, Sequence Generators, Shift Left and Right Register, Registers with Parallel Load, Serial -in-Parallel-Out(SIPO) and Parallel-In-Serial-Out(PISO), Register Using Different Types of Flip-flop.	**12**	**CO1, CO4**
VI	Digital logic families : Digital IC Terminology, Transistor-Transistor Logic(TTL), Integrated Injection Logic(I2L), Emitter Coupled Logic (ECL), Metal Oxide Semiconductor(MOS) Logic, Complementary Metal oxide semiconductor (CMOS) Logic.	**03**	**CO1, CO5**
	Total Hours	**50**	

Essential Readings:

1. L. Thomas Floyd and R.P. Jain, "Digital Fundamentals", 11th ed., 2015, Pearson Education.
2. Kime Charies R and Morris Mano, "Logic and Computer Design Fundamentals", 4th ed., 2014, Pearson Education.
3. Morris Mano, "Digital Logic and Computer Design", 1st ed., 2004, Pearson Education.

Supplementary Readings:

1. R.P. Jain and M.H.S. Anand, "Digital Electronics Practice using Integrated Circuits", 1st ed., 2004, Tata McGraw Hill.
2. Samuel C. Lee, "Digital Circuits and Logic Design", 2009 edition, PHI (Prentice-Hall of India).
3. Stephen Brown and Zvonko Vranesic, "Fundamentals of Digital Logic with Verilog Design", 2nd ed., 2017, Tata McGraw Hill.