Course Code	IT110	**Course Name**	Digital System Design
Core/Elective/MLC:	Core	**L-T-P**	(3-0-2) 4
Pre-requisites:	Mathematical concepts and basic computer knowledge	**Contact Hours:**	8am to 5pm
Type of course: (Lecture/Tutorial/Seminar/Project)	Lecture	**Course Assessment Methods: (both continuous and semester end assessment)**	1 Mid Term: 25M (Theory – 20; Lab - 5) 2 End Term: 50M (Theory – 40; Lab - 10) 3 Continuous Lab Evaluation: 10M (Record + Observation) 4 Tests: 15M (5 + 10)

1Week	Introduction to Electrical and Electronic Circuits, Digital Systems and Applications, Number System, Binary Numbers, Octal and Hexadecimal Numbers, Arithmetic Operations.
2 Week	Conversion from Decimal to Other Bases, Decimal Codes, BCD Addition, Boolean Algebra.
3 Week	Standard Forms (Min-terms & Max-terms), Map Simplification (Two, Three and Four Variables), Map Manipulation, Digital Logic Gates.
4 Week	Introduction to Combinational Circuits: Design of Adders and Subtractors, Binary Ripple Carry Adder, Carry Look-ahead Adder.
5 Week	Binary Addition and Subtraction, Code Converters, BCD-to-Ecxess-3 Code Converter, BCD-to-Ecxess-3 Code Decoder.
6 Week	Definition of Encoder, Types of Encoders, Priority Encoder.
7 Week	Definition of Decoder, Types of Decoders, Decoder Expansion.
8 Week	Definition of Multiplexers, Implementing Boolean Functions using Multiplexer, Definition of Demultiplexer.
9 Week	Introduction to Sequential Circuits: Formal Definition, Circuit Diagram, Latches (SR, RS, JK, T, D).
10 Week	Flip Flops (SR, JK, T, D), Master-Slave and Edge-Triggered Flip-Flops.
11 Week	Flip-Flop Characteristic Tables, Flip-Flop Excitation Table, Sequential Circuit Table, State Table.
12 Week	Design of Sequential Circuits, Finding State Table with all Flip-Flops.
13 Week	State Diagrams with all Flip-Flop Definitions of Registers, Shift Registers and Definition of Counters.
14 Week	Synchronous and Asynchronous Counters, Up-Down Counter, Types of Counters.

Course Outcomes: After the completion of this course, the student will be able to:

- CO1: Understand the Principles of Electric & Electronic Circuits and Basics of Digital Logic Design
- CO2: Design Logic Circuits for Boolean Equations and Vice versa.
- CO3: Design and Implementation of Combinational Logic Function described by a truth table using AND/OR/INV Gates or MUX/DEMUX.
- CO4: Design and Implementation of Sequential Circuits (Latches, Flip Flops, Counters, Registers).
- CO5: Analysis of Synchronous and Asynchronous Sequential Circuits.

Text Books and References

M. Morris Mano: Logic and Computer Design Fundamentals.

M. Morris Mano and Michael D. Ciletti: Digital Design with VERILOG HDL.

B Holdsworth and R C Woods: Digital Logic Design , 4th Edition, Elsevier, 2003.