

# Digital Electronics

## Course Objectives:

- Understand the concepts of various components.
- Understand concepts that underpin the disciplines of analog and digital electronic logic circuits.
- Understand various Number systems and Boolean algebra, the Boolean expression using Boolean algebra and design it using logic gates.
- Understand Design and implementation of combinational circuits.
- Understand Design and develop sequential circuits.

## Detailed Syllabus

### Unit-1

Introduction:-Define digital and analog signals and systems, difference between analog and digital signals, Need of digitization and applications of digital systems Number System : Decimal, Binary, Octal, and Hexadecimal systems; Binary Arithmetic, BCD and Gray code. Boolean algebra and the 'Demerger's Theorems.

### Unit-2

Logic Gates: BUFFER, NOT, AND, OR, NAND, NOR, X-OR, and X\_NOR gates Combinational Logic Circuits: SOP and POS forms, reduction and inter conversion of forms, logic design using K maps.

### Unit-3

Adder & Subtract or circuits : Half adder, full adder, half subtract or, full subtract or; design of all these circuits. using discrete gates. Flip-Flops: RS flip-flop, J-K, D-, T-flip-flops; Racing problem and the Master-Slave J-K flip-flop.

### Unit-4

Sequential Logic Circuits: Design of asynchronous and synchronous up/down counters, Shift Registers:SIPO, SISO, PIPO, and PISO register Multiplexers, demultiplexers; decoders and encoders.

### Unit-5

Analog to digital and digital to analog converters: Basic terms and definitions, Conversion methods, Types of converters.