

Learning Outcomes:

The educational objectives of the course are to educate students to attain the following:

- Students will understand about the different types of weighted / non-weighted number system and their conversion methods.
- Analysis and designing of combinational & logical circuits.
- Implementation of digital circuit on breadboard as well as using software.
- This course will provide knowledge of fundamental digital system design.

SYLLABUS

Unit No.	Topics	Lectures (Hours)
	Introduction to the overview and importance of the course.	
1	NUMBER SYSTEMS, CODES, BINARY ARITHMETIC: Binary, Octal, Hexadecimal number systems, Conversion from any base to another base number system Binary, BCD, Excess-3, Gray, Alphanumeric, EBCDIC, Hollerith, ASCII codes, code conversion.	6
2	ALGEBRA AND LOGIC GATES: Boolean algebra, Boolean functions, Canonical and standard forms, Logic gates, truth tables, simplification of Boolean functions, Karnaugh map- two, three, four, five and six variable maps, product of sum and sum of products, simplification, don't care conditions, Tabulation method.	6
3	COMBINATION LOGIC: Concepts of combination and sequential circuits, Realization of circuits using gates- systems, implementing combinational logic; Arithmetic circuits, Half and full adder, subtractor, multiplier, code conversion, parity generator, parity checker, comparators, multiplexers, demultiplexers, encoders. Applications of MSI and LSI for binary parallel adder, decimal adder, magnitude comparator, decoders, multiplexers, ROMS and PLAS.	8
4	SEQUENTIAL LOGIC: Concept of synchronous and asynchronous operations, Flip-flops, triggering of flip-flops, excitation tables, and analysis clocked sequential circuits, Design of counters, design of sequential circuits.	6
5	REGISTERS AND COUNTERS: Registers – Serial in serial out, serial in parallel out, parallel in serial out and parallel in parallel out register, Shift registers, Bi-directional shift register, Serial transfer using shift register Ripple counters – Binary and BCD ripple counter Synchronous counters – Synchronous Binary down and up/down counter and decade counter. Timing sequences, Propagation delay in ripple counter.	6

- 6 D TO A AND A TO D CONVERSION: 6**
D to A conversion – Basics: Resolution and Conversion accuracy, R/2R ladder network DAC. A to D conversion – Basic operation, Digital ramp ADC, Successive approximation ADC, Dual slope integrating type ADC, voltage to frequency converter, Introduction to applications of DAC and ADC.
- 7 DIGITAL ICs: 3**
TTL series, Low power Schottky devices, TTL parameters; CMOS series- Advantages and types, parameters, characteristics, TTL to CMOS and CMOS to TTL interfacing.

Term Work and Practical shall be based on the above syllabus.

Text Books:

1. Digital Systems: Principles & Applications By: Ronald. J. Tocci and Neal. S. Widmer
2. Digital Fundamentals By: Thomas. L. Floyd

Reference Books:

1. Digital logic and Computer Design By: M. Morris and Mano
2. Principles of Digital Electronics By: Malvino and Leach
3. Fundamentals of Digital Circuits By: A. Anand Kumar