



Paper Code : DEL:204

Paper Name : Digital Electronics

Teaching Hours (Per Week)		Examination Scheme		
TH. (hours)	Pr. (hours)	Internal	External	Total
		Th. (marks)	Th. (marks)	
4		30	70	100 (marks)

Lectures = 68 Hours

Objective of the Digital Electronics:

Digital circuits, which are the basic building blocks of a computer, are introduced in this module to let the students know what activities it does behind the computing environment. This course portrays excellent ideas of the logic gates available and data processing to make students understand the concept better with the analogue and digital signals while computing.

UNIT 1 : DIGITAL LOGIC AND ARITHMETIC CIRCUITS 17 HOURS

Introduction to number systems – Binary to decimal conversion – Decimal to binary conversion – Octal numbers – Hexadecimal numbers – Excess-3 code – Gray code.

Logic gates – NOT, OR, AND – Universal NAND and NOR gates – EX-OR and EX-NOR gates – De-Morgan's Theorems – Universal building blocks (NOT, OR, AND) Binary addition and subtraction – 1's complement – 2's complement – Adders (half & full) – Subtractor (half & full).

UNIT 2 : COMBINATIONAL AND DATA PROCESSING CIRCUITS 8 HOURS

Boolean algebra – Sum of products method – Product of methods – Truth table of Karnaugh map – Pairs, Quads and Octet – Karnaugh map simplification – Digital Logic families and their parameters.

Multiplexer and demultiplexers – 4X1 Multiplexer – 8X1 Multiplexer – 16X1 Multiplexer – 1X4 De-multiplexer – 1X8 De-multiplexer – Decoder – BCD-to-decimal decoder – Encoder – Parity Checkers.

UNIT 3 : FLIP-FLOPS AND MEMORIES 9 HOURS

Flip-flops – Types of flip-flop – RS (NAND and NOR) flip-flop – Edge triggered D flip-flop – Edge triggered T flip-flop – Edge triggered JK flip-flop – Master-Slave flip-flop – Triggering, propagation delay time, setup time, hold time.

Memories – ROM, RAM, EPROM, EEPROM – Volatile and non-volatile – Static and dynamic RAM.

**UNIT 4 : REGISTERS AND DIGITAL COUNTERS****17 HOURS**

Registers – Introduction- Modes of operation of register (SISO, SIPO, PISO and PIPO). **Counters** – Asynchronous counter- Synchronous counter – Ripple counters – MOD-7 ripple counter – Decade counter – 4 bit down counter – Up/down counter.

UNIT 5 : ANALOGUE AND DIGITAL INTERFACE**17 HOURS**

Analogue to digital converters – Parallel Comparator A/D converter – Dual slope converter – Successive approximation method – Counter type converter.

Digital to analogue converters – Binary weighted D/A converter – R/2R ladder network converter – Bus standards – Introduction to microprocessor – 8-bit and 16 bit processor.

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RECOMMENDED BOOKS**Main Reading:**

1. Digital Principles and Applications, Donald P Leach, Malvino, McGraw Hill
2. Digital Electronics, Prof. C. Kumar and Selvakumar, N.V Publications

Supplementary Books

1. Modern Digital Electronics, Satish Jain, Tata McGraw Hill
2. Fundamentals of Digital Electronics and its Application, V.M. RAO and R.K. SRIVASTAVA
3. Analog and Digital Electronics, Bhupesh Bhatia, Sunil Paliwal, Balvir Singh, Navneet
4. Digital Electronics Demystified, Predko
5. Digital And Linear Integrated Circuits, A.P.Godse, U.A.Bakshi
6. Introduction to Digital Electronics (Essential Electronics), John Crowe and Barrie Hayes-Gil
7. Digital Electronics, D C Green
8. Digital Electronics: Principles, Devices and Applications, Anil K. Maini