

PET3I104 DIGITAL ELECTRONICS

University Level:

MODULE – I (12 Hours)

Number System: Introduction to various number systems and their Conversion. Arithmetic Operation using 1's and 2's Compliments, Signed Binary and Floating Point Number Representation Introduction to Binary codes and their applications. **(5 Hours)**

Boolean Algebra and Logic Gates: Boolean algebra and identities, Complete Logic set, logic gates and truth tables. Universal logic gates, Algebraic Reduction and realization using logic gates **(3 Hours)**

Combinational Logic Design: Specifying the Problem, Canonical Logic Forms, Extracting Canonical Forms, EX-OR Equivalence Operations, Logic Array, K-Maps: Two, Three and Four variable K-maps, NAND and NOR Logic Implementations. **(4 Hours)**

MODULE – II (14 Hours)

Logic Components: Concept of Digital Components, Binary Adders, Subtraction and Multiplication, An Equality Detector and comparator, Line Decoder, encoders, Multiplexers and De-multiplexers. **(5 Hours)**

Synchronous Sequential logic Design: sequential circuits, storage elements: Latches (SR, D), Storage elements: Flip-Flops inclusion of Master-Slave, characteristics equation and state diagram of each FFs and Conversion of Flip-Flops. Analysis of Clocked Sequential circuits and Mealy and Moore Models of Finite State Machines **(6 Hours)**

Binary Counters : Introduction, Principle and design of synchronous and asynchronous counters, Design of MOD-N counters, Ring counters. Decade counters, State Diagram of binary counters (4 hour)

MODULE – III (12 hours)

Shift resistors: Principle of 4-bit shift resistors. Shifting principle, Timing Diagram, SISO, SIPO, PISO and PIPO resistors. (4 hour)

Memory and Programmable Logic: Types of Memories, Memory Decoding, error detection and correction), RAM and ROMs. Programmable Logic Array, Programmable Array Logic, Sequential Programmable Devices. **(5 Hours)**

IC Logic Families: Properties DTL, RTL, TTL, I²L and CMOS and its gate level implementation. A/D converters and D/A converters **(4 Hours)**

College Level (20%)

Basic hardware description language: Introduction to Verilog/VHDL programming language, Verilog/VHDL program of logic gates, adders, Subtractors, Multiplexers, Comparators, Decoders flip-flops, counters, Shift resistors.

Text book:

1. *Digital Design, 3rd Edition, Moris M. Mano, Pearson Education.*
2. *Fundamentals of digital circuits, 8th edition, A. Anand Kumar, PHI*
3. *Digital Fundamentals, 5th Edition, T.L. Floyd and R.P. Jain, Pearson Education, New Delhi.*

Reference Book:

1. *Digital Systems – Principles and Applications, 10th Edition, Ronald J. Tocci, Neal S. Widemer and Gregory L. Moss, Pearson Education.*
2. *A First Course in Digital System Design: An Integrated Approach, India Edition, John P. Uyemura, PWS Publishing Company, a division of Thomson Learning Inc.*
3. *Digital Systems – Principles and Applications, 10th Edition, Ronald J. Tocci, Neal S. Widemer and Gregory L. Moss, Pearson Education.*

TENTATIVE
Likely to be Modified