

# PET4G001 DIGITAL ELECTRONIC CIRCUITS

## **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, I<sup>2</sup>L 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.*
- B.Tech(ETC/ECE) Syllabus for Admission batch 2015-16

#### **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.*