

**MODULE I                    NUMBER SYSTEM AND BOOLEAN ALGEBRA****9 Hours**

Review of number system, Binary codes –BCD, Gray code, Excess 3 code; Error detection and correction codes – Parity, Hamming codes.

Boolean postulates- laws, rules & theorems; Standard forms of Boolean expressions, conversions; Simplification using K-maps-3, 4 and 5 variables.

**MODULE II                    COMBINATIONAL LOGIC CIRCUITS****9 Hours**

Design of adders, subtractors, comparators, code converters, encoders, decoders, multiplexers and de-multiplexers. Function realization using multiplexers; Booth multiplier and Array Multiplier; Simulation of simple logic circuits.

**MODULE III                    SYNCHRONOUS SEQUENTIAL LOGIC CIRCUITS****9 Hours**

Latches-operation of SR and gated SR latch; Flip flops – Method of edge triggering, SR, JK, Master Slave JK, D, and T flip flops; Important signals of FF.

Design of Synchronous sequential circuits- Model Selection, State transition diagram, State synthesis table, Design equations, State reduction technique and Implementation; Binary counters-4 bit UP, DOWN and UP/DOWN counters; BCD counters, Ring counters, shift registers, Johnson counters.

**MODULE IV                    ASYNCHRONOUS SEQUENTIAL LOGIC CIRCUITS****9 Hours**

Synchronous Vs Asynchronous sequential circuits; Design of asynchronous sequential circuits-Design steps, State transition diagram, State table, FF transition table, K-map based Primitive table, State reduction techniques, state assignment and design equations; Races and hazards.

**MODULE V                    MEMORY DEVICES, PROGRAMMABLE LOGIC DEVICES AND LOGIC FAMILIES****9 Hours**

Memories: ROM, PROM, EPROM; Programmable Logic Devices – PLA, PAL, PLD. Logic families: TTL, ECL, CMOS; Case study on four bit accumulator.

**TOTAL: 45 HOURS****REFERENCES:**

1. M. Morris Mano, Digital Logic and Computer Design, Prentice Hall of India, 4th edition, 2013.
2. A.Anandkumar, "Fundamentals of digital circuits", 3<sup>rd</sup> Edition, PHI Learnings Pvt. Ltd, 2014.
3. Malvino and Leach, Digital Principles and Applications, Tata McGraw Hill, New Delhi, 7th edition, 2011.
4. Floyd, Digital Fundamentals, Pearson Education, 10th edition, 2011.
5. John F.Wakerly, Digital Design Principles and Practice, Pearson Education, 4th edition, 2008.
6. <http://nptel.ac.in/courses/117106086/>