Vidyalankar

S.E. Sem. IV [BIOM]

Logic Circuits

SYLLABUS

Time : 3 Hrs.

Theory : 100 Marks
Practical : 25 Marks
Term Work : 25 Marks

1. **Introduction :**
   Number system, Binary, Octal, Hexadecimal and other. Conversion from one system to another, Binary, BCD and Hexadecimal.

2. **Binary Code :**
   Weighted Reflective, Sequential, Gray, Error detecting codes, Odd, Even parity, Hamming Codes, Alphanumeric, Morse, Teletypewriter ASCII, EBCDIC codes, Converting Binary to Gray and Gray to Binary and XS3.

3. **Boolean Algebra Logic Gates :**
   AND, OR, NOT, XOR, XNOR, operation NAND, NOR use of the universal gate for performing different operation. Laws of Boolean algebra. De-Morgan's theorems, Relating a truth table to a Boolean expression, Multi level circuits.

4. **Combinational Circuits :**
   K-Maps and their use in specifying Boolean expressions, Minterm, Maxterm SOP and POS implementation. Implementation a logic function using universal gates. Variable entered maps for five and six variable functions Quine Mc-Clusky tabular techniques.

5. **Combination Logic Circuit Design :**
   Designing code converter circuits e.g., Binary to Gray, BCD to Seven Segments, Parity Generator, Binary Arithmetic circuits : Adders, Subtractors (Half and full) BCD adder-subtractor, carry Lookaheard adder, Serial adder, Multiplier Magnitude Comparators, Arithmetic Logic units.

6. **Use of Multiplexers in Logic Design :**
   Multiplexer (ULM) Shannon's theorem. ULM trees, De-multiplexers, designing using ROMs and ULMs. Hazards in combinational circuits.

7. **Sequential Logic Circuit :**
   Comparison of Combinational and Sequential Circuits, Multi-vibrators (Astable, Monostable and Bistable) Flip-Flops, SR, T, D, JK, Master Slave JK, Converting one Flip-Flop to another, Use of Denounce switch. Counter Modulus of a counter, Ripple counter, Up/Down Counter, Designing sequential counters using gate IC and counter IC by drawing state transition Diagram and state transition table. Ring counter, Johnson counter, twisted ring counter, Pseudo Random number generator, Unused states and locked conditions.

8. **Registers :**
   Serial input serial output, serial input parallel output. Left right shift register, use of register ICs for sequence generator and counter.

9. **Memories :**
   RAM, ROM the basic cell IC bipolar, CMOS RAM dynamic RAM cell. Magnetic core NVRAM, bubble memory, CCD, PAL, PLA.

10. Logic Families :

RTL, DTL, TTL, schotkey clamped TTL, Tristate gate ECL, IIL, MOS device CMOS Comparison of logic families, interfacing different families. TTL with CMOS, NMOS, TTL, ECL and TTL, IIL and TTL.

References :

1. "Modern Digital Electronics" *(R.P.Jain)* Tata McGraw Hill
2. "Digital Design" *(M.Morris Mono)* Prentice Hall International
3. "Digital Principal and Applications" (*Malvino & Leach)* Tata McGraw Hill, 1991.
4. "Digital Electronics" *(Malvino)* Tata McGraw Hill, 1997
5. "Digital Electronics" *(James Bignell & Robert Donovan)* Delmar, Thomas Learning, 2001.
6. "Introduction to Logic Design" *(Alan b. Marcovitz)* McGraw Hill International 2002.

❑ ❑ ❑ ❑ ❑ ❑