Digital Electronics

4th Semester Syllabus

Unit-1.0 Number System and Codes

1.1. Comparison of digital and analog systems
1.2. Number Systems: Binary Decimal, Octal and Hexadecimal and their conversions
1.3 Binary Addition Subtraction Multiplication and Division
1.4 1's and 2'scomplement of a number, Basic arithmetic operation using complement method
1.5 Different types of codes: 8421 BCD, Excess-3, Gray codes, ASCII

Unit-2.0Logic Gates and Boolean Algebra

2.1 Boolean algebra: Laws of Boolean algebra and DeMorgan's theorem
2.2 Types of logic gates: AND, OR and NOT. Universal Gates: NAND, NOR, EX-OR and EX-NOR. Truth table, symbol, implementation of basic gate using Universal gate
2.3 Max - term, Min - term, Sum of product (SOP) and Product of Sum(POS) expressions,
2.4 Simplification of Boolean functions using laws and theorems.
2.5 Simplification of Boolean functions using K- map method (up to 4 variables).

Unit-3.0 Combinational Circuits

3.1 Half Adder, Full Adder, Half subtractor, Full subtractor, parallel adder and subtractor, BCD adder'
3.2 Magnitude comparator (2 and 3 bit). IC 7485 (Pin diagram and truth table)
3.3 Encoders: 4- Input and 2-Output encoder, Octal to Binary and Binary to BCD Encoder , BCD to binary encoder. Multiplexer: 2:1, 4 : 1 and 8 : 1 multiplexer (IC 74151)
3.4 Decoders: 3-Line to 8-Line Decoder, 8-4-2-1 BCD to Decimal Decoder. De-multiplexer: 1:2, 1 : 4 and 1 : 8 demultiplexer.

Unit-4.0Sequential Circuits

4.1 Flip Flop - basic flip flop and latch, RS F/F, JK F/F, D F/F, T F/F, truth table, characteristic table and excitation table
4.2 Race around condition, Master-Slave JK flip flop
4.3 UP-DOWN counter (2 to 3 bit), IC7490 (Pin diagram and truth table)
4.4 Universal Shift Registers, IC 74194 (Pin diagram and truth table)

Unit-5.0Convertors and memories

5.1 Digital to analog converters: weighted resistor,R-2R Ladder network
5.2 Analog to digital converters: Successive approximation, Single and Dual slope converters
5.3 Different types of semiconductor memories: RAM ROM, EEPROM, UVEPROM, Static RAM, Dynamic RAM, Flash ROM and
non-volatile RAM