

EE321 DIGITAL ELECTRONIC CIRCUITS (Dept. Elective - I)

Course Description & Objectives:

As part of this course, students: To introduce the concepts and techniques associated with the number systems and codes. To minimize the logical expressions using Boolean postulates. To design various combinational and sequential circuits. To provide with an Sufficient Number of applications for the techniques and mathematics used in this course.

Course Outcomes:

- I Determine the philosophy of number systems and codes. Simplify the logic expressions using Boolean laws and postulates and minimize and design them by using logic gates.
- I Design of combinational logic circuits and sequential logic circuits.
- I Knowledge of the nomenclature and technology in the area of memory devices: ROM, RAM,
- I PROM and logic families like CMOS and TTL.

UNIT I - Number System :

Binary arithmetic (Addition, subtraction, multiplication, division), octal number system, hexadecimal number system, 1's and 2's complement. Signed numbers, EX-3, gray code alphanumeric code, EBCDIC, ASCII,, Error detection & correction, parity, 7- bit hamming

UNIT II - Logic gates and Minimization :

Basic gates, Universal gates, and their truth tables, postulates of Boolean algebra, De-Morgan's theorem Min term and Max term representation of logical function, Minimization using K-map- Don't care condition, Quinn Mc-clusky method for minimization.

UNIT III - Combinational Logic :

Half and full adders, parallel adder, subtractor, decoder (BCD to Seven segment), Encoder, Multiplexer, Demultiplexer, parity generation & checking, Look ahead carry generator.

UNIT IV - Sequential Logic :

Sequential circuits, flip-flops (SR,D,T, JK, Master-slave), timing specifications, asynchronous and synchronous counters-up/down counters. Registers , serial in serial out shift registers.

UNIT V - Memory and Logic Families :

Memory: RAM, ROM,PROM, EPROM and Flash memory, Introduction to Cache memory

Logic Families: Logic levels, propagation delay time, power dissipation fan-out and fan-in, noise margin, Comparison of logic families and their characteristics. TTL (NAND, NOT, TOTEMPOLE), CMOS (NOR,NOT and NAND) integrated circuits .

TEXTBOOKS :

1. ZVI KOHAVI, " Switching and Finite Automata Theory",2nd ed. TMH,2009
2. Morris Mano, "Digital Logic & computer Deisgn",1st ed,Pearson

REFERENCES :

1. John M. Yarbrough, "Digital Logic Applications and Design",1st ed.,Thomson Publications, 2006.
2. Fletcher, "An Engineering Approach To Digital Design" , 1st ed.,Prentice Hall of India. 2009.
3. R.P.Jain, Modern Digital Electronics, 3 ed., Tata McGraw–Hill publishing company limited, New Delhi, 2003.
4. Thomas. L.Floyd, "Digital fundamentals",9th ed, Prentice Hall,2005
5. John F walkerly, Digital Design Principles and Practices, 3rd ed., PHI/ Pearson Education, 2005.