ECE213:DIGITAL ELECTRONICS

L:3 T:0 P:0 Credits:3

Course Outcomes: Through this course students should be able to

CO1 :: remember basics of digital electronic logics and circuits

CO2 :: apply boolean algebra in minimizing the complex boolean expressions

CO3 :: distinguish between combinational logic system and sequential logic system

CO4 :: analyze the functionality of digital circuits under real and simulated environment.

CO5 :: understand digital system design using memory elements like PAL, PLD

CO6 :: develop PAL, FPGA logic for the combinational logic circuit like Multiplexer, Full adder

Unit I

Number Systems : Digital Systems, Data representation and coding, Logic circuits, Implementation of digital systems, Number Systems, Codes- Positional number system, Binary number system, Methods of base conversions, Binary arithmetic, Representation of signed numbers, Fixed numbers, Binary coded decimal codes, Gray codes, Error detection code, Parity check codes, octal number system, Hexadecimal number system, Error correction code, Hamming code, Octal arithmetic, Hexadecimal arithmetic, Floating point numbers

Unit II

Combinational Logic System : Truth table, Basic logic operation, Boolean Algebra, Basic postulates, Standard representation of logic functions -SOP forms, Simplification of switching functions - K-map, Synthesis of combinational logic circuits, Logic gates, Fundamental theorems of Boolean algebra, Standard representation of logic functions POS forms

Unit III

Introduction to Combinational Logic Circuits : Adders, Subtractors, Comparators, Multiplexers and Demultiplexers, Decoders, Encoders, Parity circuits

Introduction to Logic Families : Introduction to different logic families, Structure and operations of TTL, MOS and CMOS logic families

Unit IV

Introduction to Sequential Logic Circuits : Basic sequential circuits: SR-latch,D-latch,D flip-flop,JK flip- flop, T flip-flop, Conversion of basic flip-flops

Unit V

Sequential Logic Circuits Applications : Registers: Operation of all basic Shift Registers, Counters: Design of Asynchronous and Synchronous counters, Ring counter and Johnson ring counter

Unit VI

Memory : Read-only memory, read/write memory - SRAM and DRAM, PLAs and their applications, Sequential PLDs and their applications, Introduction to field programmable gate arrays, PALs and their applications

Converters : Analog to Digital Converter, Digital to Analog Converter

Text Books:

1. DIGITAL FUNDAMENTALS by THOMAS L. FLOYD , R. P JAIN, PEARSON

References:

1. DIGITAL DESIGN PRINCIPLES AND PRACTICES by JOHN F. WAKERLY, PEARSON

2. DIGITAL INTEGRATED ELECTRONICS by H. TAUB AND D. SCHILLING, MCGRAW HILL EDUCATION

3. DIGITAL LOGIC DESIGN by MORRIS MANO, PEARSON