ECE213:DIGITAL ELECTRONICS

L:3 T:1 P:0 Credits:4

Course Outcomes: Through this course students should be able to

CO1 :: Learn different number systems, codes, interconversion and binary arithmetic

CO2 :: Understand boolean algebra, function representation & implementation using logic gates

CO3 :: Apply the binary arithmetic concepts for designing combinational circuits

CO4 :: Distinguish between various flip-flops and understand edge triggering using MSFF

CO5 :: Develop different types of registers and counters using flip-flops

CO6 :: Analyze the memory designing and FPGA applications

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, Analog vs Digital, Number base conversions, Compliments, Binary Codes, Parity, Error Detection and Correction

Unit II

Boolean Algebra and Logic gates : Logic Gates, Truth Table, Boolean Algebra, Canonical and Standard form Representation, SOP and POS Simplification, Implementation of Boolean Functions, K-Map, Don't Care

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, Master-Slave Flip-Flop, Edge triggering

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, Shift Register, Bidirectional Shift Register, Universal Shift Register

Unit VI

Memory and Programmable Logic : 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

Text Books:

1. DIGITAL DESIGN by M. MORRIS MANO & MICHAEL D. CILETTI, PEARSON

References:

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