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EC8392 DIGITAL ELECTRONICS SYLLABUS

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OBJECTIVES:

- To present the Digital fundamentals, Boolean algebra and its applications in digital systems
- To familiarize with the design of various combinational digital circuits using logic gates
- To introduce the analysis and design procedures for synchronous and asynchronous sequential circuits
- To explain the various semiconductor memories and related technology
- To introduce the electronic circuits involved in the making of logic gates

UNIT I DIGITAL FUNDAMENTALS 9

Number Systems – Decimal, Binary, Octal, Hexadecimal, 1's and 2's complements, Codes – Binary, BCD, Excess 3, Gray, Alphanumeric codes, Boolean theorems, Logic gates, Universal gates, Sum of products and product of sums, Minterms and Maxterms, Karnaugh map Minimization and Quine-McCluskey method of minimization.

UNIT II COMBINATIONAL CIRCUIT DESIGN 9

Design of Half and Full Adders, Half and Full Subtractors, Binary Parallel Adder – Carry look ahead Adder, BCD Adder, Multiplexer, Demultiplexer, Magnitude Comparator, Decoder, Encoder, Priority Encoder.

UNIT III SYNCHRONOUS SEQUENTIAL CIRCUITS 9

Flip flops – SR, JK, T, D, Master/Slave FF – operation and excitation tables, Triggering of FF, Analysis and design of clocked sequential circuits – Design - Moore/Mealy models, state minimization, state assignment, circuit implementation – Design of Counters- Ripple Counters, Ring Counters, Shift registers, Universal Shift Register.

UNIT IV ASYNCHRONOUS SEQUENTIAL CIRCUITS 9

Stable and Unstable states, output specifications, cycles and races, state reduction, race free assignments, Hazards, Essential Hazards, Pulse mode sequential circuits, Design of Hazard free circuits.

UNIT V MEMORY DEVICES AND DIGITAL INTEGRATED CIRCUITS 9

Basic memory structure – ROM -PROM – EPROM – EEPROM –EAPROM, RAM – Static and dynamic RAM - Programmable Logic Devices – Programmable Logic Array (PLA) - Programmable Array Logic (PAL) – Field Programmable Gate Arrays (FPGA) – Implementation of combinational logic circuits using PLA, PAL. Digital integrated circuits: Logic levels, propagation delay, power dissipation, fan-out and fanin, noise margin, logic families and their characteristics-RTL, TTL, ECL, CMOS

TEXT BOOK:

1. M. Morris Mano and Michael D. Ciletti, —Digital DesignII, 5th Edition, Pearson, 2014.

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REFERENCES:

1. Charles H. Roth. —Fundamentals of Logic DesignII, 6th Edition, Thomson Learning, 2013.
2. Thomas L. Floyd, —Digital FundamentalsII, 10th Edition, Pearson Education Inc, 2011
3. S. Salivahanan and S. Arivazhagan—Digital ElectronicsII, 1st Edition, Vikas Publishing House pvt Ltd, 2012.
4. Anil K. Maini —Digital ElectronicsII, Wiley, 2014.
5. A. Anand Kumar —Fundamentals of Digital CircuitsII, 4th Edition, PHI Learning Private Limited, 2016.
6. Soumitra Kumar Mandal — Digital ElectronicsII, McGraw Hill Education Private Limited, 2016.