

**RAMAKRISHNA MISSION VIDYAMANDIRA**  
NEP Syllabus B.Sc. Computer Science

**Semester-I**

**Course Code: 1CMSSEC1**

**Credit: 3**

**Course Type: Skill Enhancement Course (SEC)**

**Course Outcome:**

- i) To differentiate between analog and digital electronic circuit components.
- ii) To be able to understand the design and implementation of various digital circuit components.
- iii) To understand the working of important digital circuit components like registers, clock generators and so on.
- iv) To understand the concepts of hardware.

**1CMSSEC1: Digital Electronics**

**Credit: 3**

**Marks: 75**

**Introduction to Digital Electronics:** Need of digital electronics, comparison with analog electronics; Classes of digital circuits – Combinational and Sequential. [3L]

**Combinational Circuits:** Logic Gates – Basic and Universal, Logic States, Truth Table; Logic Synthesis – Implementation of logic circuit using Algebraic method, Truth table and K-map, Circuit Design and Applications – Adders, Half & Full adder; Subtractors, Implementation using adders; Code converters, Comparators, Encoder, Decoder, Multiplexer & Demultiplexer. [13L]

**Sequential Circuits:** Latches and Flip-Flops, Study of Flip-Flops – Characteristic Functions, Preset and Clear, Enable functionality, Clocked Flip-Flops, Timing diagram; Types – SR, JK, Master-Slave, D and T, Sequential Design Procedures – Design with State Equation, Asynchronous and Synchronous circuits, Counters – Asynchronous, Ripple counter – UP, DOWN and UP/DOWN counter (Upto 4-bit), Modulo counters; Synchronous counter – UP, DOWN and UP/DOWN counter (Upto 4-bit), Modulo counters, Registers – Shift (Serial, Parallel and Serial/Parallel), Types of registers, Ring counter and Johnson's counter. [14L]

## 1CMSSEC1: Digital Electronics Laboratory

**Credit: 1**

**Marks: 25**

- a) Design basic gates using analog discrete components
- b) Study of various logic gates and verification of truth tables
- c) Universal gates – validation
- d) Design half and full adder
- e) Design half and full subtractor
- f) Adder IC (7483/74283) and its applications – 4/8 bit adder, adder/subtractor, code converter using adder ICs
- g) 1-bit comparator design and 4-bit comparator IC study
- h) Designing Encoder, Decoder, MUX and DeMUX
- i) Study of MUX and Decoder/DeMUX ICs
- j) Use of seven segment display unit with driver
- k) Study of various sequential circuits, Designing counter and register circuit, Study of functionalities and applications of IC 7476, IC 74194, IC 74193.

### **Text/Reference Books:**

1. Tokheim, Digital Principles, Schaum's Outline Series, Tata McGraw Hill.
  2. Flyod, Digital Fundamentals, Pearson.
  3. Raychaudhuri, Digital Circuits, Vol. 1&2, Platinum.
  4. Gothmann, Digital Electronics: An Introduction to Theory and Practice, PHI.
  5. Kumar, Fundamentals of Digital Circuits, PHI.
  6. Dueck, Digital Design, Cengage.
  7. Comer, Digital Logic and State Machine Design, Oxford.
  8. Salivahanan and Kumar, Digital Circuits and Design, Vikas.
  9. Fletcher, An Engineering Approach to Digital Design, Pearson.
  10. Wakerly, Digital Design: Principles and Practices, Pearson.
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