# Matrusri Engineering College

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An Autonomous Institution | Approved by AICTE, Affiliated to Osmania University

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Department of Computer Science and Engineering


## Assignment I

**Class/Branch: III SEM CSE B & D** **Date: 19.09.2025**

**Subject: Digital Logic Design** **Max Marks: 10**

**Syllabus: Unit I**

**Number System and Boolean Algebra**: Number Systems Decimal, Binary, Octal, Hexa-decimal, Base Conversion Methods, Complements of Numbers, Binary to Gray & Gray to Binary, Logic gates, realization using Gates, postulates & Theorems of Boolean Algebra, reduction of Boolean Expressions using Boolean Algebra.

**COURSE OUTCOMES (COs):**

| **After the completion of the course students will be able to** | |
|---|---|
| **CO1** | **Understand the design process of digital hardware, use Boolean algebra to minimize the logical expressions and optimize the implementation of logical functions.** |
| CO2 | Understand the number representation and design combinational circuits like adders, MUX etc. |
| CO3 | Design Combinational circuits using programmable logic devices. |
| CO4 | Analyse sequential circuits using flip-flops and design the registers & counters. |
| CO5 | Represent a sequential circuit using Finite State machine and apply state minimization techniques to design a FSM |

| **Q.No** | **Question** | **CO** | **BL** |
|---|---|---|---|
| **PART-A** | **Short Answer Question** | | |
| 1. | Explain the subtraction of two numbers using 2's complement and 1's complement method with an example. | CO1 | L2 |
| 2. | What are Universal Gates? Realize all the logic gates using NAND & NOR. | CO1 | L2 |
| **PART-B** | **Long Answer Question** | | |
| 3. | a) Convert the following into canonical form F = A'B+C<br>b) Apply Demorgans theorem to the expression<br>F = AB(CD+EF)((AB)'+(CD)') | CO1 | L4 |
| 4. | Simplify the following expressions using Boolean algebra<br>a) F = πM (1,3,5,7)<br>b) F = ∑m (0,1,3,4,7) | CO1 | L2 |
| 5. | Reduce the following Boolean expression to a minimum number of literals<br>a) F = XY+X'Z+YZ<br>b) F = [A+ (BC)']'+ (AB'+ABC) | CO1 | L3 |