# **CEN 215 PROJECT**

**Logic Circuis Design Using SSI and MSI Components**

**Using any needed number of 8x1 MUX in IC “74151” and any number of**

**other needed IC’s of your choice you practiced with at the lab before,**

**Design, using EWB and implement on lab board a simple 4 bit ALU that:**

**runs only four of the following Arithmetic instructions:**

* **INC A.**
* **DEC A.**
* **ADD A, B.**
* **SUB A, B.**
* **Mul A, 2.**
* **Div A, 2.**
* **Mul A, 4.**
* **Div A, 4.**

**Hint:**

* **A & B are both 4 binary bit operands not necessarily stored in a register.**
* **You can use IC “4008” in simulating your design on EWB to do the 4 bit addition or subtraction then use IC “7483” to do the same functions on your lab board.**
* **Mul A, 2 is equivalent to Shift left for A by one bit.**
* **Div A, 2 is equivalent to Shift right for A by one bit.**

**And runs only four of the following Logic instructions:**

* **COM A: One’s complement for A.**
* **COM B: One’s complement for B.**
* **COM2 A: Two’s complement for A.**
* **COM2 B: Two’s complement for B.**
* **Sll A.**
* **Srl A.**
* **EQ A, B : A = B.**
* **NE A, B : A ≠ B.**

**Note:**

**Integrated working EWB design for all the 8 instructions with 4 bits output is a must**

**Any enhancements (like adding numeric displays to show operands and/or results, writing comprehensive report or including some extra designs or information in the report), will give the student an extra credit.**