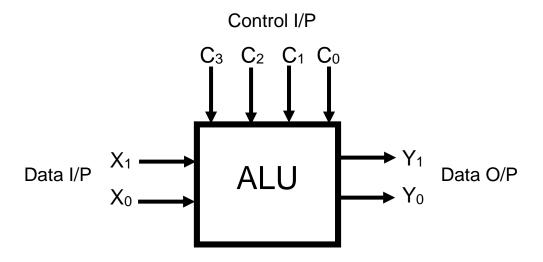## Module 1 : Combinational Logic Circuits

Assignment 4:

Design and test a 1-bit ALU using only logic gates (No MUX) as per the given specifications, supporting the following functions :

Logical : AND, OR, NAND, NOR, XOR, EQUIVALENCE.
Arithmetic : ADD, SUBTRACT.

Control I/P

C_3 C_2 C_1 C_0

Data I/P X_1 → | ALU | → Y_1 Data O/P

X_0 → → Y_0

➢ If $C_3 = 1$: Arithmetic or If $C_3 = 0$: Logical

➢ If $C_3 = 1$ and If $C_2 = 1$: ADD (Y_0 = Sum, Y_1 = Carry out) or

   If $C_2 = 0$: SUB (Y_0 = Sub, Y_1 = Borrow)

➢ If $C_3 = 0$ then $C_2\ C_1\ C_0$ = Logical operation (Output = Y_0)

(1 day)