ABSTRACT The 74LS181 is a 4-bit Arithmetic Logic Unit (ALU) integrated circuit used to perform arithmetic and logical operations in digital systems. This project demonstrates the working of the 74LS181 ALU by providing two 4-bit binary inputs and selecting different operations using control signals. The ALU performs arithmetic operations such as addition, subtraction, increment, and decrement, as well as logic operations such as AND, OR, XOR, and NOT. The operation performed by the ALU is controlled using four select lines (S0–S3) and a mode input (M). When the mode input is set to logic mode, the ALU executes logical operations, and when it is set to arithmetic mode, it executes arithmetic operations. The carry input and carry output are used for arithmetic calculations and cascading multiple ALUs to form higher-bit processors. This project helps in understanding the internal functioning of a CPU and the importance of ALUs in computer architecture. The 74LS181 ALU is widely used for educational purposes to demonstrate digital logic design, processor fundamentals, and arithmetic computation in hardware.