

1. **Principles of Computer Organization:** Software hardware interaction layers in computer architecture, central processing unit, machine language instructions, addressing modes, instruction types, instruction set selection, instruction cycle and execution cycle. [10]
2. **Processor and ALU Design:** Number system, computer arithmetic and ALU design, control unit, data path and control path design, microprogramming versus hardware control, RISC Vs CISC, pipelining in CPU design, superscalar processors. [10]
3. **Memory Organization:** Memory subsystem, storage technologies, memory array organization, memory hierarchy interleaving, cache and virtual memories and architectural aids to implement these. [10]
4. **Input-Output Organization:** Input-output devices and characteristics, input-output programming, bus interface, data transfer techniques, I/O interrupts, and channels. [10]