Computer Architecture

Unit	Course Topics	Hours
1	**Introduction to Computer Architecture:** Basic organization, instruction cycle, Von Neumann architecture, performance measures (MIPS, CPI, throughput)	**4L**
2	**Data Representation & Arithmetic:** Number systems, integer & floating-point representation (IEEE 754), addition, subtraction, multiplication, division, ALU design	**6L**
3	**Instruction Set Architecture (ISA):** Types of instructions, addressing modes, RISC vs CISC, instruction formats, stack, accumulator & register-based architectures	**6L**
4	**Processor Architecture:** CPU organization, control unit (hardwired & microprogrammed), pipelining, pipeline hazards, superscalar and VLIW architectures	**6L**
5	**Memory System:** Memory hierarchy, cache memory (mapping, replacement, write policies), virtual memory, main memory, secondary storage	**5L**
6	**I/O Organization:** I/O techniques (interrupts, DMA, polling), bus architecture, I/O devices, peripherals, data transfer modes	**4L**
7	**Advanced Computer Architectures:** Multiprocessors, multicores, parallel processing, GPU basics, SISD/MISD/SIMD/MIMD models	**4L**