Detailed Syllabus:
MCA203
Advanced Computer Architecture

Unit No.	Topics	No. of Hours	CO No.
I	Introduction - Feng's and Flynn's classification scheme – SISD, SIMD, MISD, MIMD, Multiprocessor and Multicomputer, UMA, NUMA, COMA, NORMA, memory models, parallel computer and its type. Applications of Parallel Computers. Cache Coherence Protocols – Snoopy and Directory Protocols.	10	1
II	System Interconnect Architecture – Static and Dynamic, Hypercube Interconnection network, multistage interconnection networks-architecture and routing, design consideration, throughput delay, bandwidth. Architecture and routing of 3 stage and 4 stage Banyan Network. Routing and Addition in Hypercube Interconnection network. Performance Metrics and Benchmarks.	10	2
III	Principle of pipelining-overlapped parallelism, Linear and non-linear pipelining, reservation table, calculation of MAL.Types of Instruction Pipeline. Arithmetic pipeline designs example –Floating point adder, pipelined multiplier.	10	3
IV	Advanced processor Technology – RISC, CISC, VLIW architectures, Hazard detection and resolution, functional organization of instruction in IBM 360/91. Numerical Problems based on CPI, IPC and MIPS.	10	4
V	Exploring parallelism in program - Parallel Algorithm for Matrix addition and subtraction. Bitonic sort, sorting on linear array processors or odd even sort, PRAM algorithm for addition of numbers or Parallel Reduction. Bernstein's condition, ISO efficiency concept.	10	5

BOOKS RECOMMENDED:

1 **Computer Architecture & Parallel Processing**, *Kai Hwang and F.A. Briggs*, McGraw Hill.
2 **Advanced Computer Architecture**, *Kai Hwang*, McGraw Hill.
3 **Parallel Computing**, *M.R. Bhujade*, New Age Publication.
4 **Parallel Computing Theory and Practice**, *Michael J. Quinn*, Tata McGraw Hill