5th Semester	RCS5D001	Advanced Computer Architecture	L-T-P 3-0-0	3 Credits

Objectives

 To understand the advance hardware and software issues of computer architecture

 To understand the multi-processor architecture & connection mechanism

 To understand multi-processor memory mangement

Module-I: **(10 Hours)**
Microprocessor and Microcontroller, RISC and CISC architectures, Parallelism, Pipeliningfundamentals, Arithmetic and Instruction pipelining, Pipeline Hazards, SuperscalarArchitecture, Super Pipelined Architecture, VLIW Architecture, SPARC and ARM processors.

Module-II: **(10 Hours)**
Basic Multiprocessor Architecture: Flynn's Classification, UMA, NUMA, Distributed MemoryArchitecture, Array Processor, Vector Processors.

Module-III: **(10 Hours)**
Interconnection Networks: Static Networks, Network Topologies, Dynamic Networks, Cloudcomputing.

Module IV   **(10 Hours)**
Memory Technology: Cache, Cache memory mapping policies, Cache updating schemes,Virtual memory, Page replacement techniques, I/O subsystems.

Outcomes

 Ability to analyze the abstraction of various advanced architecture of a computer

 Ability to analyze the multi-processor architecture & connection mechanism

 Ability to work out the tradeoffs involved in designing a modern computer system

Books:

[1]   John L. Hennessy and David A. Patterson, Computer Architecture: A Quantitative Approach, Morgan Kaufmann, 6th edition, 2017

[2]   Carl Hamacher, Zvonko Vranesic, SafwatZaky, Computer Organization, McGraw Hill, 5th Ed, 2014

[3]   Kai Hwang, Advanced Computer Architecture: Parallelism, Scalability, Programmability, McGraw-Hill, 3rd Ed, 2015

Digital Learning Resources:

Course Name: Advanced Computer Architecture
Course Link: https://nptel.ac.in/courses/106/103/106103206/
Course Instructor: Prof.John Jose, IIT, Guwahati

Course Name: High Performance Computer Architecture
Course Link: https://nptel.ac.in/courses/106/105/106105033/