

<b>Course Title</b>	<b>Advance Computer Architecture</b>
<b>Course Code</b>	<b>CP101</b>
<b>Course Credit</b>	Theory : 03
	Practical : 00
	Tutorial : 00
	Credits : 03

### Course Learning Outcomes

At the end of the course, students will be able to:

- **Understand** the advanced concepts of computer architecture.
- **Analyze** the major differences of various processor architectural characteristics
- **Understand** parallelism both in terms of a single processor and multiple processors
- Technical **understanding** of parallel hardware constructs.
- **Investigate** modern design structures of Pipelined and Multiprocessors systems
- **Demonstrate** the implementation of pipeline, super pipeline and superscalar architectures in high performance computers.
- **Compare** different types of scheduling and memory management schemes.

### Detailed Syllabus

Sr. No.	Name of chapter & details	Hours Allotted
<b>Section – I</b>		
1	<b>Processor and Memory hierarchy:</b> Advance processor technology, superscalar and vector processor, Memory hierarchy technology, Virtual memory technology.	<b>06</b>
2	<b>Bus, Cache, and Shared Memory:</b> backplane bus system, cache memory organization, Shared-memory organizations, sequential and weak consistency models.	<b>07</b>
3	<b>Pipelining and Superscalar techniques:</b> Liner pipeline processors, Nonlinear Pipeline processors, Instruction pipeline design, arithmetic pipeline design, superscalar and super-pipeline design.	<b>08</b>

**Section – II**

<b>4</b>	<b>Multiprocessors and Multi-computers:</b> Multiprocessors and Multicomputer, cache coherence and synchronization mechanisms, three generations of multicomputer, message-passing mechanisms.	<b>07</b>
<b>5</b>	<b>Multi-vector and SIMD Computers:</b> Vector processing principles, Multi-vector multiprocessors, compound vector processing, SIMD computer Organizations, the connection machine CM-5.	<b>08</b>
<b>6</b>	<b>Scalable, Multithreaded, and dataflow architectures:</b> Latency-hiding techniques, Principle of multithreading, Fine-grain multicomputer, scalable and multithreaded architectures, dataflow and hybrid architectures.	<b>06</b>

**Instructional Method and Pedagogy**

- Lectures will be conducted with the aid of multi-media projector, blackboard, OHP etc. Assignments based on course contents will be given to the students at the end of each unit/topic and will be evaluated at regular interval
- Minimum five experiments shall be there in the laboratory related to course contents
- Minimum six tutorials which includes solution of minimum five computer programs in each head

**Reference Books**

- Kai Hwang, Advanced computer architecture, TMH.
- John L. Hennessey and David A. Patterson, Computer Architecture: A Quantitative Approach, Morgan Kaufmann, Fourth Edition.
- J.P.Hayes, Computer Architecture and organization, MGH.
- V.Rajaraman & C.S.R.Murthy, Parallel computer, PHI Learning.
- Hwang and Briggs, Computer Architecture and Parallel Processing, MGH.