Sir Padampat Singhania University

Udaipur

Lesson Plan

Program	:	M.Tech	Semester	:	I
Session	:	2019-20	Subject Code	:	CS-555
Subject Name	:	Advanced Computer Architecture			
Credits	:	3 (L) + 0 (T) + 0 (P) = 0			

Prepared By :

Harish Tiwari

DEPARTMENT OF COMPUTER SCIENCE

- **Learning Objectives:**

The course entails some of the design concepts, subsystems, & new & specialized architectures (especially parallel architectures). The principal objective is to gain an understanding of selected architectural structures as they are likely to be encountered in real systems. The course also highlights some aspects of neuro-computing architecture.

S. N	Module Title	Contents in the Unit	No. of Lecture
1	Introduction to High Performance Computing	Overview : Introduction, overview of modern computer, Evolution of computer architecture	2
		Pipeline vs. Parallel Processing: Multiprocessor (UMA, NUMA and COMA model) and Distributed-Memory Multicomputer	2
		Parallel Architectures: Flynn's Classification, parallel vs Vector computers,	2
		System Attributes and performance parameters.	2
2	Pipeline Processing:	Pipeline parallelism profile/Performance of programs, Speedup performance laws.	2
		Design of arithmetic pipelines : Computer Arithmetic principles, Static arithmetic pipelines, multifunctional arithmetic pipelines	4
		Reservation analysis: Concept of reservation table, Collision vector and Collision free scheduling & collision hazards.	3
3	Instruction Processing Pipes:	Instruction & data hazard: instruction execution phases, mechanism for instruction pipelines,	2
		hazard detection & resolution, dynamic instruction scheduling	2
		Branch handling techniques: delayed jumps, delayed execution. RISC Philosophy.	2
4	Pipeline scheduling Theory:	Greedy pipeline scheduling algorithm,	2
		state diagram, modified state diagram,	2
		Latency cycles, optimal cycles,	2
		Scheduling of static & dynamic Pipelines.	2
5	Implementation of pipeline schedulers Interconnection Networks:	Interconnection network classification,	2
		Single stage/ Multistage Networks,	2
		crossbars, clos Networks,	1
		Benes Networks, Routing algorithms.	1
		Omega, Cub-connected & other networks.	1
		Introduction to neuro-computing architectures.	2

- **Total no. of Lectures: 40**

- **Text Book**

1. Computer Architecture: A Quantitative Approach. Hennessy J. L. & Patterson D. A. 3rd Ed. Morgan Kaufmann. 2002.
2. Advanced Computer Architecture. Hwang K. & Jotwani N. 2nd Ed. Tata McGraw-Hill. 2011.
3. Computer Organization and Architecture. Stallings W. Macmillan Publishing Company. 1990.

- **Evaluation Method: -**

There will be a continuous evaluation of students at all levels. Each credit will carry 50 marks. Hence a 3 credit course will have total of 150 marks. Each course component will be evaluated. This means that a course will be evaluated for lectures and there is no practical component

3 – 0 – 0 (a 3 credit course) will be evaluated for 150 (3 x 50) marks for lectures and there is no practical component for this subject so total of 150 (3 x 50) marks for the 3 credit course.

- **Theory**

Maximum duration for final examination should be 3 hours. The evaluation pattern for theory examination will be as follows:

Credit	Mid-term-I	Mid-term II	End-term	Total	Final Total
3	25	25	100	150	150

- **Practical**

There is no practical for this subject

Name(s) of the faculty: Signature of the HOD:

Harish Tiwari