## **LESSON PLAN**

Туре	Code	COMPUTER ARCHITECTURE	L-T-P	Credits	Marks	
CS	CC-10		3-1-0	4	100	
Topic Objective		Understand units of measure common to computer systems. Appreciate the evolution of computers. Understand the computer as a layered system. Be able to explain the von Neumann architecture and the function of basic computer components.				
Prerequisites		Knowledge of basic computer science concepts such as a and programming languages is essential. This forms the computer architecture is built.	lata struc ne founda	tures, algo ation upor	orithms, n which	
Lecture Scheme		Regular lectures (classroom /virtual class with Laptop/Desktop/Smartphone) with use of ICT, lectures are planned to be interactive with focus on problem solving activities.				

## **Evaluation Scheme**

Internal Assessment			Written Assessment	Total
Assignment(s)	Unit Test	Mid-Term	End-Term	
		(Written)		
0	0	30	45	100

## University Syllabus

Unit No	Topics	Hours	
Unit-1	Cache Memory: Computer Memory System, Cache Memory Principles, Elements		
	of Cache Design, Pentium-4 Cache Organization, ARM Cache Organization.		
	Internal Memory: Semiconductor Main Memory, Error Correction, Advanced		
	DRAM Organization		
Unit-2	External Memory: Magnetic Disk, RAID, Solid State Drivers, Optical Memory,	10	
	Magnetic Tape.		
	Input/ Output: External Devices, I/O Modules, Programmed I/O, Interrupt		
	Driven I/O, Direct Memory Access, I/O Channels and Processors, The External		
	Interface (Thunderbolt & InfinBand), IBM zEnterprise 196 I/O Structure.		
Unit-3	Instruction Sets Characteristics & Functions: Machine Instruction	10	
	Characteristics, Types of Operands, Intel x86 & ARM Data Types, Types of		
	Operations, Inter x86 & ARM Operation Types.		
	Instruction Sets Addressing Modes & Formats: Addressing Modes, x86 & ARM		
	Addressing Modes, Instruction Formats, x86 & ARM Instruction Formats,		
	Assembly Language.		
Unit-4	Processor Structure & Functions: Processor Organization, Register Organization,		
	Instruction Cycle, Instruction Pipelining, The x*^ Processor Family, The ARM		
	Processor.		
	Instruction-Level Parallelism & Superscalar Processors: Design Issues, Pentium-		
	4, ARM Cortex-A8.		
Unit-5	Parallel Processing: Multiple Processor Organization, Symmetric	10	
	Multiprocessors, Cache Coherence & MESI Protocol, Multi-threading & Chip		
	Multiprocessors, Clusters, Non-uniform Memory Access, Vector Computation.		

Multicore Computers: Hardware Performance Issues, Software Performance Issues, Multicore Organization, Intel x86 Multicore Organization, ARM11 MPCore, IBM zEnterprise 196 Mainframe.	
Total (Hours)	40

Text Books:

- 1. Computer Organization and Architecture by William Stallings
- 2. "Computer Architecture: A Quantitative Approach" by John L. Hennessy and David A. Patterson

Туре	CC-06	LESSON PLAN	L-T-P	Credits	Marks
Lecture No	Unit No	COMPUTER ARCHITECTURE	3-1-0	4	100
Lecture01	1	Topic: Cache Memory: Computer Memory System			
		Ref: https://www.geeksforgeeks.org/cache-memory-in-computer-organization/			
Lecture 02	1	Topic: Cache Memory Principles			
		Ref: https://www.geeksforgeeks.org/cache-memory-in-co	omputer	-organiza	ation/
Lecture 03	1	1 <b>Topic:</b> Elements of Cache Design,			
		Ref: https://www.scribd.com/document/647765918/Ele	ments-c	of-cache-c	lesign
Lecture04	1	1 <b>Topic:</b> Pentium-4 Cache Organization			
		Ref: https://www.owchallie.com/systems/cache-pentium	4.php		
Lecture 05	1	Topic: ARM Cache Organization			
		Ref: https://www.rfwireless-world.com/Tutorials/ARM-t	utorial-	P6.html	
Lecture 06	1	Topic: Internal Memory:			
		Ref: https://computerhardwarecomps.weebly.com/interr	ial-mem	ory.html	
Lecture 07	1	Topic: Semiconductor Main Memory			
		Ref: https://en.wikipedia.org/wiki/Semiconductor_memo	ory		
Lecture 08	1	Topic: Error Correction			
		<b>Ref:</b> https://en.wikipedia.org/wiki/Error_detection_and_c	correctio	on	
Lecture 09 1 <b>Topic:</b> Advanced DRAM Organization					
		<b>Ref:</b> https://abhaycopi.blogspot.com/2014/04/advanced	-dram-		
		organization.html			
Lecture 10	1	Topic: External Memory: Magnetic Disk			
		<b>Ref:</b> https://www.javatpoint.com/external-memory-in-co	mputer	-organiza	ition
Lecture 11	2	Topic: Magnetic Disk			
		Ref: https://www.geeksforgeeks.org/magnetic-disk-mem	iory/		
Lecture 12	2	Topic: RAID, Solid State Drivers	_		
		<b>Ref:</b> https://www.enterprisestorageforum.com/hardw	vare/ssc	l-raid-bo	osting-
		ssd-performance-with-raid/			
Lecture 13	2	<b>Topic:</b> Optical Memory			
		<b>Ref:</b> https://en.wikipedia.org/wiki/Optical_storage			
Lecture 14	2	<b>Topic:</b> Magnetic Tape.			
		Input/ Output	. ,		
		<b>Ref:</b> https://www.sciencedirect.com/topics/computer-sci	ence/m	agnetic-t	ape
Lecture 15	2	<b>Topic:</b> External Devices, I/O Modules	1.5	. ,	10
		<b>Ref:</b> https://www.scribd.com/document/79676715/Exter	nal-Dev	rices-and	-10-
1	2	Module			
Lecture 16	Z	<b>1 opic:</b> Programmed I/U <b>Def</b> letters (/en subling die eng ( 111/December 10/1)	C 20/ 0.00	(02. 1	-4
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Lecture 17	Z	<b>I OPIC:</b> Interrupt Driven I/O			
		<b>Kei:</b> https://www.geeksforgeeks.org/10-interface-interru	pt-ama-	moae/	

Lecture 19   2   Topic: The External Interface (Thunderbolt & InfinBand), IBM zEnterprise 196 I/O Structure.     Ref. https://www.redbooksibm.com/redbooks/pdfs/sg247833.pdf     Lecture 20   2   Topic: Instruction Sets Characteristics & Functions     Ref. https://www.redbooksibm.com/redbooks/pdfs/sg247833.pdf     Lecture 21   3   Topic: Instruction Sets Characteristics & Functions     Ref. https://www.geeksforgeeks.org/types-of-machine-instructions/   Executer 23     3   Topic: Types 0 Operands, Intel x86 & ARM Data Types,     Ref. https://www.scibd.com/presentation/513145366/weeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeee	Lecture 18	2	<b>Topic:</b> Direct Memory Access, I/O Channels and Processors <b>Ref:</b> https://www.geeksforgeeks.org/direct-memory-access-dma-controller-in-
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1/0 Structure.   Ref: https://www.redbooks.ibm.com/redbooks/pdfs/sg247833.pdf     Lecture 20   2   Topic: Instruction Sets Characteristics & Functions     Ref: https://www.gebtsforgeeks.org/types-of-machine-instructions/c5bb8246/13d05951   Intervestions/c5bb8246/13d05951     Lecture 21   3   Topic: Types of Operands, Intel x86 & ARM Data Types, Ref: https://www.gebtsforgeeks.org/types-of-machine-instructions/     Lecture 22   3   Topic: Types of Operands, Intel x86 & ARM Operation Types Ref: https://www.gebtsforgeeks.org/types-of-machine-instructions/     Lecture 23   3   Topic: Types of Operands, Intel x86 & ARM Operation Types Ref: https://www.redbactom/en/topics/linux/ARM-vs-x86     Lecture 24   3   Topic: Instruction Sets Addressing Modes & Formats Ref: https://www.redbactom/en/topics/linux/ARM-vs-x86     Lecture 25   3   Topic: chadressing Modes, x86 & ARM Addressing Modes Ref: https://www.androidauthority.com/arm-vs-x86-key-differences-explained- 568718/     Lecture 26   3   Topic: Register Organization, Instruction Cycle Ref: https://en.wikipedia.org/wiki/A     Lecture 27   3   Topic: Register Organization, Instruction _pelining, Ref: https://www.prepbytes.com/biog/computer-architecture/instruction- level-parallelismilp/     Lecture 29   3   Topic: Register Organization, Instruction _pelining, Ref: https://www.prepbytes.com/blog/computer-architecture/instruction- level-para	Lecture 19	Z	<b>I opic:</b> The External Interface (Thunderbolt & InfinBand), IBM ZEnterprise 196
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