ARSD College, University of Delhi

Model Course Handout/Lesson Plan

Course Name : B.Sc. (Physics Sc. Computer Sciecne)						
Semester	Course Code	Course Title	Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
IV	42344403	Computer System Architecture	4	0	4	6
Teacher/Instructor(s)		Jag Mohan				
Session		July- Dec 2022				

Course Objective: The course will introduce students to the fundamental concepts of digital computer organization, design and architecture. It aims to develop a basic understanding of the design of a computer system.

Course Learning Outcomes:

On successful completion of the course, students will be able to :
1. design combinational circuits using basic building blocks. Simplify these circuits using Boolean Algebra and Karnaugh maps.
2. differentiate between combinational circuits and sequential circuits
3. represent data in binary form, convert numeric data between different number systems and perform arithmetic operations in binary.
4. determine various stages of the instruction cycle, various instruction formats and instruction set.
5. describe interrupts and their handling.
6. explain how CPU communicates with memory and I/O devices

Lesson Plan:

Unit No.	Learning Objective	Date	Topics to be covered
1.	Introductions	1	Introduction of CSA,
		2-3	Digital Logic Gates
		4-5	Flipflops and their characterstic table
		5-9	Logic circuit simplification using Boolean Algebra and Karnaugh Map

		10-12	Don't Care conditions. Combinational Circuits, Sequential Circuits.
2.	Digital Components	13-15	Decoders, Encoders,
		15-18	Multiplexers,
		19-24	Binary Adder, Binary Adder-Subtractor, Binary Incrementer, Registers and Memory Units
3.	Data Representation:	25-28	Binary representation of both numeric and alphanumeric data
		29-30	representation of numeric data in different number systems (Binary, Octal, Decimal and Hexadecimal),
		31-32	conversion from one number system to another,
		33-34	complements, representation of decimal numbers
		35	representation of signed and unsigned numbers addition and subtraction of signed and unsigned numbers and overflow detection.
4.	Operations and Control	36	Arithmetic and logical micro-operations
		37	instruction format, micro programmed control vs hardwired control, instruction set completeness,
		38-40	Timing and control, instruction cycle, memory reference instructions and their implementation using arithmetic, logical, program control, transfer and input output micro operations,interrupt cycle.
5	Instructions:	41-42	Instruction format illustration using single accumulator organization
		43-44	general register organization
		45-46	stack organization, zero-address instructions
		47-48	one-address instructions
		49-50	two-address instructions and three-address instructions, Addressing Modes
6.	Peripheral Devices	51-55	I/O interface, I/O vs. Memory Bus, Isolated I/O
		56-60	Memory Mapped I/O, Direct Memory Access

Evaluation Scheme:

No.	Component	Duration	Marks
1.	Internal Assessment ● Quiz ● Class Test ● Attendance ● Assignment		25
2.	End Semester Examination	3 hr	75

Details of the Course		
Unit	Contents	Contact Hours
1	Digital Logic Gates, Flipflops and their characteristic table, Logic circuit simplification using Boolean Algebra and Karnaugh Map, Don't Care conditions. Combinational Circuits, Sequential Circuits.	12
2	Decoders, Encoders, Multiplexers, Binary Adder, Binary Adder- Subtractor, Binary Incrementer, Registers and Memory Units	12
3	Binary representation of both numeric and alphanumeric data, representation of numeric data in different number systems (Binary, Octal, Decimal and Hexadecimal), conversion from one number system to another, complements, representation of decimal numbers, representation of signed and unsigned numbers, addition and subtraction of signed and unsigned numbers and overflow detection.	12
4	Arithmetic and logical micro-operations, instruction format, microprogrammed control vs hardwired control, instruction set completeness, Timing and control,instruction cycle, memory reference instructions and their implementation using arithmetic, logical, program control, transfer and input output micro operations, interrupt cycle.	4
5	Instruction format illustration using single accumulator organization, general register organization and stack organization, zero-address instructions, one-address instructions, two-address instructions and three-address instructions, Addressing Modes	10
6	I/O interface, I/O vs. Memory Bus, Isolated I/O, Memory Mapped I/O,Direct Memory Access	10
	Total	60

Suggested Books:

Sl. No.	Name of Authors/Books/Publishers	Year of Publication/Reprint
1	Mano, M. (1992). Computer System Architecture (3rd Edition). Pearson Education	1992

2	Mano, M. (2013). Digital Design. New Jersey: Pearson Education Asia.	2013
3	Null, L., & Lobur, J. (2014). The essentials of computer organization and architecture. Jones & Bartlett Publishers.	2014
4	Stallings, W. (2003). Computer organization and architecture: designing for performance.	2003
Mode of Evaluation:	Internal Assessment / End Semester Exam	

Progress Report:

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