DPG Institute of Technology and Management
Sector 34, Gurugram HR 122004
Lesson Plan

Course Name: DIGITAL LOGIC AND COMPUTER ARCHITECTURE

Faculty Name: RICHA NEHRA

No. of Lecture Hours/Week	3	Exam Hours	3
Total No. of Lecture Hours	40	Exam Marks	75
Course Code:	PCC-CSE-251G	Semester	3rd

Course Objectives:

1. To understand the basic theoretical concepts of digital systems like the binary system and Boolean algebra.
2. To express real life problem in logic design terminology.
3. To use Boolean algebraic formulations to design digital systems. To design using combinational/sequential circuits.
4. To understand the Instruction execution stages and the functions of the various computer hardware components

Lecture No.	Topics to be covered	Teaching Methodology	Class Activity/ Event	Remark /CO
UNIT -1				
1	Introduction to Digital Systems & Data Representation, Number Systems (Binary, Octal, Hexadecimal)	Chalk &Talk		
2	Number Base Conversions	Chalk &Talk	Practice conversions in class	
3	Complements (1's & 2's), Signed-Magnitude & Signed-1/2's	PPT/Chalk &Talk	Problem-solving session	
4	Binary Codes (BCD, Gray Code, Excess-3, ASCII)	Chalk &Talk	Demonstration using tables	CO1
5	Logic Functions: Basic Logic Gates, Truth Tables	Chalk &Talk		
6	Universal Gates (NAND & NOR), Realization of expressions	Chalk &Talk		
7	Boolean Algebra Laws, De Morgan's Theorem Simplification	Chalk &Talk	Board derivations	
8	Minimization of Boolean Expressions (K-map up to 4 variables)	Chalk &Talk	Practice K-map problems	
9	Combinational Circuits (Adder, Subtractor, MUX, DEMUX, Encoder, Decoder)	Chalk &Talk		

		Combinational Circuits (MUX, DEMUX, Encoder, Decoder)	Chalk &Talk		
10		Design of Synchronous Sequential Circuits – Flip-Flops, FSM Concepts	Chalk &Talk	Classroom design task	
11		Unit-II Revision & Problem Solving		Assignment -1	
UNIT -2					
12		Fixed-Point Representation & Arithmetic	Chalk &Talk		
13		Floating Point Representation (IEEE Standards)	Chalk &Talk		
14		Addition & Subtraction Algorithms (Fixed & Floating Point)	Chalk &Talk		
15		Booth's Algorithm for Multiplication	Chalk &Talk		
16		Division Algorithms (Restoring & Non-restoring)	Chalk &Talk		CO2
17		ALU Design & Hardware Implementation of Arithmetic Operations	Chalk &Talk		
18		High Performance Arithmetic (Carry Look-Ahead, Pipeline arithmetic)	Chalk &Talk		
19		Unit-II Revision & Problem Solving	Discussion		
UNIT -3					
20		Overview of CPU Organization	Chalk &Talk		
21		ALU Structure, Status Flags	PPT		
22		Register Transfers & Micro-operations	PPT		
23		Instruction Cycle & Execution of Instructions	SMART BOARD		CO3
24		Multiple Bus Organization	SMART BOARD		
25		Control Unit Design – Hardwired	Chalk &Talk		
26		Control Unit Design – Microprogrammed	Chalk &Talk		
27		Memory Concepts: Types of Memory (RAM, ROM)	Discussion		
28		Memory Hierarchy & Cache Memory Design (Mapping, Replacement)		Assignment -2	
29		Virtual Memory & Paging			
30		Secondary Storage (HDD, SSD) & Memory Management Requirements			
31		**Unit-III Revision & Quiz**		Assessment activity	
UNIT -4					
32		Introduction to I/O Systems	Chalk &Talk		

33	Interrupts, Hardware Interrupt Mechanism	SMART BOARD		
34	Enabling & Disabling Interrupts, ISR Handling	Chalk &Talk		
35	Device Control & Programmed I/O	Chalk &Talk		CO4
36	Direct Memory Access (DMA) – Operation & Controller Design	Chalk &Talk		
37	Buses: PCI, USB, System Bus Architecture	Chalk &Talk		
38	Interface Circuits & Standard I/O Interfaces	Chalk &Talk		
39	**Unit-IV Revision**		Mock test / viva	
40	**Final Course Review**			

Assessment Methods: -

S.No.	Evaluation Component	Assessment Method	Marks
1	**Internal Marks**		**25**
		Attendance	**5**
2		**Quiz/Presentation**	**5**
3		**Assignment**	**5**
4		**Avg of Sessional 1&2**	**10**
5	**External Marks**	**Final University Exam**	**75**

Reference Books:

1.R. P. Jain, "Modern DigitalElectronics",McGrawHillEducation, 2009.
2. M. M.Mano, "Digital logic and Computerdesign",Pearson Education India,2016.
3. A. Kumar,"Fundamentals ofDigitalCircuits",Prentice HallIndia, 2016.
4. Nasib Singh Gill and J B Dixit, "Digital Design and Computer Organization", University Science Press, New Delhi

Course Outcomes:

At the end of the course, the student will be able:

CO 1	Able to convert data into actionable insights
CO 2	Analyze and validate the models using appropriate performance metrics
CO 3	Build clustering and classification models using R environment
CO 4	Present the results using effective visualization techniques