PVP SIDDHARTHA INSTITUTE OF TECHNOLOGY PROCESS RECORD FOR ACADEMICS

# LESSON PLAN

**(PVPSIT/ACD /01)**

**Academic Year : 2024-25**

## Year/Semester/Section : II B.Tech I SEM – S3

**Branch : Computer Science and Engineering (CSE)**

**Subject Code & Name : 23ES1304** – **Digital Logic & Computer Organization**

**Name of Faculty : Mr P Anil Kumar**

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| **COs** | **Course Outcomes** | **Cognitive Level** |
| **CO1** | Understand the basics of digital circuits, computer system components and organization,  computer arithmetic, and memory organization. | **L2** |
| **CO2** | Apply the basic concepts of I/O organization and Processor Organization | **L3** |
| **CO3** | Apply the minimization techniques to simplify Boolean expressions | **L3** |
| **CO4** | Analyze the functionality of combinational circuits and sequential circuits. | **L4** |

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| **Unit No.** | **Topic of syllabus to be covered** | Learning out comes | **Lecture/**  **Tutorial**  **(L/T)** | **Teaching Mode**  **(BB/LCD)** | Total No. of Cumulative Hours | **Expected date of Topic to be covered** | **Review/**  **Remarks**  **(By HOD)** |
| **I** | Introduction about Vision, Mission, course objectives and outcomes. | Understand about Vision, Mission, course objectives and outcomes. | L | **BB/LCD** | 1 |  |  |
| **I** | **Data Representation :**  Introduction to Digital logic and number of systems.  types of number systems: Binary Numbers, Decima, Octal and Hexadecimal Numbers | Understand about Number Systems. **(CO1-L2)** | L | **BB/LCD** | 2 |  |  |
| **I** | Number base conversions | Understand about conversion of one number system to other number system. **(CO1-L2)** | L | **BB/LCD** | 4 |  |  |
| **I** | Complements | Understand about Complements-1’s,2’s, 9’s and 10’s complements and subtraction using complements.**(CO1-L2)** | L | **BB/LCD** | 6 |  |  |
| **I** | Signed Binary Numbers | Understand about Signed Binary Numbers-Arithmetic Addition  Arithmetic Subtraction.**(CO1-L2)** | L | **BB/LCD** | 7 |  |  |
| **I** | Binary codes | Understand about Binary codes-Binary-Coded Decimal Code, BCD Addition, Subtraction.**(CO1-L2)** | L | **BB/LCD** | 9 |  |  |
| **I** | Binary codes | Understand aboutExcess-3 Code and Gray Code.**(CO1-L2)** | L | **BB/LCD** | 10 |  |  |
| **I** | Basic Gates | Understand about Binary Logic-  Definition of Binary Logic, Logic Gates- Basic Gates and Truth Tables. **(CO1-L2)** | L | **BB/LCD** | 11 |  |  |
|  | **QUIZ-UNIT-1** |  |  | **Google Form** |  |  |  |
| **I** | **Digital Logic Circuits-I:**  Basic theorems and properties of Boolean Algebra | Discuss about Basic theorems and properties of Boolean Algebra –Duality, Basic Theorems. **(CO3-L2)** | L | **BB/LCD** | 12 |  |  |
| **I** | Boolean functions | Discuss about **Boolean functions-** Complement of a Function. **(CO3-L2)** | L | **BB/LCD** | 13 |  |  |
| **I** | Canonical and Standard Forms | Apply the following concepts: Canonical and Standard Forms  Minterms and Maxterms, Sum of Minterms (SOP) to simplify the Boolean function. **(CO3-L3)** | L | **BB/LCD** | 14 |  |  |
| **I** | Canonical and Standard Forms | Apply the following concepts Product of Maxterms (POS) to simplify the Boolean function.**(CO3-L3)** | L | **BB/LCD** | 15 |  |  |
| **I** | Canonical and Standard Forms | Discuss about Standard Forms.***(*CO3*-*L3*)*** | L | **BB/LCD** | 16 |  |  |
| **I** | **Gate–Level Minimization:**  **Introduction,Map Method** | Demonstrate on Introduction of Map Method:-Two-Variable K-Map, Three-Variable K-Map. **(CO3-L3)** | L | **BB/LCD** | 17 |  |  |
| **I** | **Map Method**  Four Variable K-Map | Apply the Karnaugh map or K-map of Two-Variable K-Map or Three-Variable K-Map Method to minimize the Boolean function. **(CO3-L3)** | L | **BB/LCD** | 18 |  |  |
| **I** | Apply the Karnaugh map or K-map-of Four Variable K-Map Method to minimize the Boolean function. | L | **BB/LCD** |  |  |
| **I** | Product of Sums Simplification | Simplify the product of sums using K-Map Method. **(CO3-L3)** | L | **BB/LCD** | 19 |  |  |
| **I** | Don’t Care Conditions | Using Don’t Care Conditions to simplify the Boolean output expression of a digital circuit.**(CO3-L3)** | L | **BB/LCD** | 20 |  |  |
| **II** | **Digital Logic Circuits-II:**  Combinational Circuit  Analysis Procedure | Demonstrate on Combinational Logic:  Introduction,Combinational Circuit,Analysis Procedure.**(CO4-L2)** | L | **BB/LCD** | 21 |  |  |
| **II** | Binary adder – subtractor | Design a combinational circuit using Binary Adders –Half Adder, Full Adder.**(CO4-L2)** | L | **BB/LCD** | 22 |  |  |
| **II** | Binary adder – subtractor | Design a combinational circuit using Binary Subtractor- Half Subtractor, Full Subtractor..**(CO4-L2)** | L | **BB/LCD** |  |  |
| **II** | Decoder | Discuss definition of decoder.  Design of different types of Decoders. .**(CO4-L2)** | L | **BB/LCD** | 23 |  |  |
| **II** | Encoder: Priority Encoder | Design of Priority Encoder.**(CO4-L2)** | L | **BB/LCD** | 24 |  |  |
| **II** | Multiplexers | Definition, Types, Implement a Boolean functions using Multiplexers.**(CO4-L3)** | L | **BB/LCD** | 25 |  |  |
| **II** | **Synchronous Sequential Logic:**  **Introduction** | Understand about the Sequential circuits and distinguish the sequential logic from combinational logic..**(CO4-L2)** | L | **BB/LCD** | 26 |  |  |
| **II** | Storage Elements :Latches, Flip-Flops | Construct a SR Latch, D Latch using logical gates. **(CO4-L4)** | L | **BB/LCD** | 27 |  |  |
| **II** | SR Flip Flop | Design a sequential circuit using SR Flip Flop. **(CO4-L2)** | L | **BB/LCD** | 28 |  |  |
| **II** | JK Flip Flop | Design a sequential circuit using JK Flip Flop. **(CO4-L2)** | L | **BB/LCD** |  |  |
| **II** | D Flip Flop, T Flip Flop | Design a sequential circuit using D Flip Flop, T Flip Flop. **(CO4-L2)** | L | **BB/LCD** | 29 |  |  |
| **II** | Characteristic Tables, Characteristic Equations, Excitation Table | Explain the differences among a truth table, a state table, a characteristic table, and an excitation table.**(CO4-L4)** | L | **BB/LCD** |  |  |
| **II** | **Registers and counters:**  **Shift Registers** | Understand about Registers  **(CO4-L2)**  discuss about shift registers | L | **BB/LCD** | 30 |  |  |
| **II** | **Shift Registers-** Universal Shift Register | Understand the concepts of Shift Registers- Universal Shift Register. **(CO4-L2)** | L | **BB/LCD** | 31 |  |  |
| **II** | **Ripple Counters-** Binary Ripple Up, Down Counter | Design binary ripple counter using flip‐flops. **(CO4-L3)** | L | **BB/LCD** | 32 |  |  |
| **II** | **Ripple Counters-** BCD Ripple Up, Down Counter | Construct a BCD ripple counter using other counters. **(CO4-L4)** | L | **BB/LCD** | 33 |  |  |
| **II** | **Synchronous Counters-** Binary Up, Down Counter | Design **-** Binary Counter, Up–Down Binary Counter using flip‐flops.  **(CO4-L4)** | L | **BB/LCD** | 34 |  |  |
| **III** | **Processor Organization:**  **General Register Organization**  Control Word | Understanding the organization and functionality of processors is crucial for comprehending how computers execute instructions and manage data**(CO2-L2)** | L | **BB/LCD** | 35 |  |  |
| **III** | Examples of Micro Operations | Understanding, how instructions are processed**(CO2-L2)** | L | **BB/LCD** | 36 |  |  |
| **III** | **Stack Organization**  Register Stack  Memory Stack  Reverse Polish Notation  Evaluation of Arithmetic Expressions. | Understanding stack organization is essential for grasping how computers manage function calls, local variables, and expression evaluation**(CO2-L3)** | L | **BB/LCD** | 38 |  |  |
| **III** | **Instruction Formats**  Three Address instructions  Two Address instructions  One Address instructions  Zero Address instructions | Understanding instruction formats is crucial for comprehending how a computer's CPU interprets and executes instructions**(CO2-L3)** | L | **BB/LCD** | 39 |  |  |
| **III** | **Addressing Modes** | Describe how the operand of an instruction is specified**(CO2-L3)** | L | **BB/LCD** | 40 |  |  |
| **III** | **Computer Arithmetic:**  **Addition and Subtraction**  Addition and Subtraction with signed magnitude data | Understanding computer arithmetic is crucial for grasping how computers perform basic mathematical operations**(CO2-L2)** | L | **BB/LCD** | 42 |  |  |
| **III** | Addition and Subtraction with 2’s complement data. | Understanding addition and subtraction with 2's complement data is essential for comprehending how computers handle signed arithmetic operations**(CO2-L3)** | L | **BB/LCD** | 43 |  |  |
| **III** | **Multiplication Algorithms**  Booth Multiplication Algorithm | Understanding multiplication algorithms is crucial for comprehending how computers perform multiplication operations efficiently**(CO2-L3)** | L | **BB/LCD** | 44 |  |  |
| **III** | **Decimal Arithmetic Unit**  BCD Adder  BCD Subtraction | Understanding the Decimal Arithmetic Unit and operations such as BCD (Binary-Coded Decimal) addition and subtraction is important for handling decimal arithmetic in digital systems**(CO2-L2)** | L | **BB/LCD** | 45 |  |  |
| **III** | **Decimal Arithmetic Operations**  Addition  Subtraction | Understanding decimal arithmetic operations, specifically addition and subtraction, is crucial for handling numerical calculations in systems that require precision with decimal numbers**(CO2-L2)** | L | **BB/LCD** | 46 |  |  |
| **IV** | **The Memory Organization:**  **Memory Hierarchy** | Understanding memory organization and the memory hierarchy is crucial for grasping how computers efficiently manage and access data**(CO1-L2)** | L | **BB/LCD** | 47 |  |  |
| **IV** | **Main Memory**  RAM and ROM Chips | Understanding the components of main memory, including RAM and ROM chips, is crucial for grasping how computers store and manage data**(CO1-L2)** | L | **BB/LCD** | 48 |  |  |
| **IV** | **FLIP CLASS :**  ROM, PROM, EEPROM, Flash Memory | Understanding various types of read-only memory (ROM) and programmable memory is essential for comprehending how data storage and retrieval work in computer systems**(CO1-L2)** | L | **BB/LCD** | 49 |  |  |
| **IV** | **Auxiliary Memory**  Magnetic Disks  Magnetic Tape | Understanding auxiliary memory is essential for comprehending how data is stored and accessed in computer systems beyond the primary memory (RAM) **(CO1-L2)** | L | **BB/LCD** | 50 |  |  |
| **IV** | **Associative Memory**  Block Diagram  Read Operation  Write Operation | Associative memory, also known as content-addressable memory (CAM), allows data retrieval based on content rather than address**(CO1-L2)** | L | **BB/LCD** | 51 |  |  |
| **IV** | **Cache Memory** | Understanding cache memory is crucial for improving computer performance and efficiency**(CO1-L2)** | L | **BB/LCD** | 52 |  |  |
| **IV** | **Virtual Memory**  Address Space and Memory Space | Understanding virtual memory is essential for comprehending how modern operating systems manage memory and provide an abstraction of a large, contiguous address space**(CO1-L2)** | L | **BB/LCD** | 53 |  |  |
| **IV** | Page replacement | Understanding page replacement is crucial for managing memory efficiently when the system runs out of physical memory (RAM) **(CO1-L2)** | L | **BB/LCD** | 54 |  |  |
| **V** | **Input/output Organization:**  **Peripheral Devices** | Understanding Input/Output (I/O) Organization is essential for comprehending how computers interact with external devices and manage data transfer**(CO2-L2)** | L | **BB/LCD** | 55 |  |  |
| **V** | **Input Output Interface**  I/O Bus and Interface Modules  I/O versus Memory Bus | Understanding the Input/Output (I/O) interface is crucial for comprehending how a computer system communicates with external devices**(CO2-L2)** | L | **BB/LCD** | 56 |  |  |
| **V** | **Asynchronous Data Transfer**  Strobe Control  Handshaking | Asynchronous data transfer is crucial in digital systems for ensuring reliable communication between components without requiring them to operate in sync with a common clock**(CO2-L4)** | L | **BB/LCD** | 57 |  |  |
| **V** | Asynchronous serial transfer | Understanding this method is crucial for applications involving communication over serial interfaces**(CO2-L2)** | L | **BB/LCD** | 58 |  |  |
| **V** | **Modes of Transfer**  Programmed I/O  Interrupt – initiated I/O  Direct Memory Access (DMA) | Understanding different modes of data transfer is crucial for optimizing I/O operations and improving system performance**(CO2-L3)** | L | **BB/LCD** | 60 |  |  |
| **V** | **Priority Interrupt**  Daisy-Chaining Priority  Interrupt Cycle | Understanding priority interrupts and their management is crucial for handling multiple interrupt requests in computer systems**(CO2-L2)** | L | **BB/LCD** | 61 |  |  |
| **V** | **DMA**  Bus Arbitration  DMA Controller  DMA Transfer | Understanding Direct Memory Access (DMA) and its associated components is crucial for comprehending how data is efficiently transferred between memory and peripherals without CPU intervention**(CO2-L2)** | L | **BB/LCD** | 62 |  |  |
| **V** | Read Operation  Write Operation | Understanding read and write operations is fundamental to grasping how data is accessed and manipulated in computer systems**(CO2-L2)** | L | **BB/LCD** | 63 |  |  |

**Legend**: Teaching Mode **BB**: Black Board / LCD: Power Point Presentation

**Signature of the HOD**

**Signature of the Faculty**