






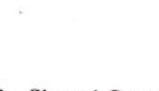
**Government Holkar (Model, Autonomous) Science
College, Indore (M.P.)
Computer Science Department**


Part A - Introduction			
Programme - B.Sc. (Computer Science - Major)		Class – B.Sc. I Semester	Year- 2024 Session- 2024-25
Course Type (Computer Science) – Major			
1	Course Code	S1-CSC1T	
2	Course Title	Computer System Architecture	
3	Pre – requisite (if any)	To study this course, a student must have had the subject Physics/ Mathematics in 12 th class.	
4	Course Learning Outcomes (CLO)	On completion of this course, learners will be able to: <ol style="list-style-type: none">1. Recall and describe the components and basic functioning of a digital computer system. (Remembering)2. Apply knowledge of combinational logic circuits to design and construct basic digital circuits, given specific parameters or requirements. (Applying)3. Analyze the operation and functionality of the arithmetic and logic unit (ALU) in a digital computer, and understand the concept and benefits of pipelining in improving instruction execution efficiency. (Analyzing)4. Evaluate the advantages and trade-offs of cache memories and virtual memory in terms of memory hierarchy management and system performance. (Evaluating)5. Create a comprehensive report or presentation highlighting the significant contributions of Indian researchers and professionals in the field of computer architecture and related technologies, showcasing their innovations and impact. (Creating)	
5	Credit Value	4 Credits	
6	Total Marks	Formative Assessment (CCE) – 40 Marks Summative Assessment (End Semester Exam) – 60 Marks Total 40+60= 100 Marks	Minimum Pass Marks – 35


Mr. Mohit Gupta
Student
Clause 06


Mr. Manish Kumar
Industrial Person
Clause 05


Dr. Ugrasen Suman
Subject Expert
Clause 04


Dr. Sharad Gangele
Subject Expert
Clause 03


Dr. Sanjeev Sharma
Subject Expert
Clause 03


Dr. Pradeep Sharma
Convener & HoD

Part A - Introduction			
Programme - B.Sc. (Computer Science - Major)	Class – B.Sc. I Semester	Year- 2024	Session- 2024-25
Course Type (Computer Science) – Major			
Course Code		S1-CSC1T	
Course Title		Computer System Architecture	
Part – B Content of the Course			
Total no. of lectures – As per UGC rules (1 Credit = 15 Lectures)			
S. No.	Topics	No. of Lectures	
I	Fundamentals of Digital Electronics: Data Types, Complements, Fixed-Point Representation, Floating-Point Representation, Binary and other Codes, Error Detection Codes. Basic Computer Organization: Instruction codes, Computer Registers, Computer Instructions, Timing & Control, Instruction Cycles, Memory Reference Instruction, Input - Output & Interrupts, Complete Computer Description & Design of Basic Computer. Logic Gates: Boolean Algebra, Map Simplification, Combinational Circuits, Sequential Circuits, simple combinational circuit design problems.	15	
II	Circuits- Adder- Subtractor, Multiplexer, Demultiplexer, Decoders, Encoders Flip-Flops, Registers, Counters. Instructions - Instruction formats, Addressing modes, Instruction codes, Machine language, Assembly language. Register Transfer and Micro operations - Register Transfer Language, Register Transfer, Bus & Memory Transfer, Arithmetic Micro operations Logic Micro-operations, Shift Micro-operations.	15	
III	Processor and Control Unit - Hardwired vs. Micro programmed Control Unit, General Register Organization, Stack Organization, Instruction Format, Data Transfer & Manipulation, Program Control, Introductory concept of RISC, CISC, advantages and disadvantages of both. Pipelining - concept of pipelining, introduction to Pipelined data path and control – Handling Data hazards & Control hazards Parallelism - meaning, types of parallelism, introduction to Instruction level-parallelism, Parallel processing challenges, Applications.	12	

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Part A - Introduction			
Programme - B.Sc. (Computer Science - Major)	Class – B.Sc. I Semester	Year- 2024	Session- 2024-25
Course Type (Computer Science) – Major			
Course Code		S1-CSC1T	
Course Title		Computer System Architecture	
S. No.	Topics		No. of Lectures
IV	Memory and I/O Systems - Peripheral Devices, I/O Interface, Data Transfer Schemes - Program Control, Interrupt, DMA Transfer. I/O Processor. Memory Hierarchy, Processor vs. Memory Speed, High-Speed Memories, Main memory, Auxiliary memory, Cache Memory, Associative Memory, Interleaving, Virtual Memory, Memory Management.		10
V	Flynn's classification - Introduction to SISD, SIMD, MISD, MIMD Hardware multithreading - Introduction, types, advantages, and applications. Multicore processors – Introduction, advantages, difference from multiprocessor. Indian contribution to the field - Contributions of reputed scientists of Indian origin - like - Dr. Vinod Dham - Father of Intel Pentium Processor, Dr. Ajay Bhat - Co-Inventor of USB Technology, Dr. Vinod Khosla- co-founder of Sun Microsystems, Dr. Vijay P Bhatkar - architect of India's national initiative in supercomputing, and many others. Parallel Computing projects of India - PARAM, ANUPAM, FLOSOLVER, CHIPPS etc. Other relevant contributors and contributions.		8

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Part A - Introduction			
Programme - B.Sc. (Computer Science - Major)	Class – B.Sc. I Semester	Year- 2024	Session- 2024-25
Course Type (Computer Science) – Major			
Course Code		S1-CSC1T	
Course Title		Computer System Architecture	

Part – C Learning Resources
Text Books, Reference Books, Other Resources
<p>Suggested Readings:</p> <p>Text Books:</p> <ol style="list-style-type: none"> 1. M. Morris Mano, "Computer System Architecture", PHI. <p>Reference Books:</p> <ol style="list-style-type: none"> 1. Heuring Jordan, "Computer System Design & Architecture" (A.W.L.) 2. William Stalling, "Computer Organization & Architecture", Pearson Education Asia. 3. V. Carl Hamacher, "Computer Organization", TMH 4. Tannenbaum, "Structured Computer Organization", PHI. <p>Suggested Digital Platforms Web Links:</p> <ol style="list-style-type: none"> 1. https://www.youtube.com/watch?v=4TzMyXmzL8M 2. https://nptel.ac.in/courses/106/106/106106166/ 3. https://nptel.ac.in/courses/106/106/106106134/ <p>Suggested Equivalent Online Courses:</p> <ol style="list-style-type: none"> 1. https://nptel.ac.in/courses/106/105/106105163/



Part A - Introduction			
Programme - B.Sc. (Computer Science - Major)	Class – B.Sc. I Semester	Year- 2024	Session- 2024-25
Course Type (Computer Science) – Major			
Course Code	S1-CSCIT		
Course Title	Computer System Architecture		

Part – D Assessment and Evaluation				
Internal Assessment: Continuous Comprehensive Evaluation (CCE)/ Formative Assessment: 40 Marks Formative Assessment shall be based on – Quiz, Seminar, Presentation, Written test, Case Study, Project, Assignment etc. The division of marks is as follows:			External Evaluation (Summative Assessment): End Semester Exam:60 Marks Time: 03 hours	
Test I	20 Marks	Best two test Marks = (20 + 20)	Section (A): 5 Objective Questions (1 mark each)	5 x 1 = 5
Test II	20 Marks		Section (B): 5 Short Questions out of eight questions (200 words each) (7 Marks each)	5 x 7 = 35
Test III	20 Marks		Section (C): Two long questions out of four questions (500 Words each) (10 Marks each)	2 x 10 = 20
Total Internal Assessment (CCE) Marks		40 Marks	Total External Evaluation (Theory) Marks (A+B+ C)	60 Marks
Note:	1.	For Major, Minor, Open Elective, Foundation and Vocational Courses, Part D will be as per the scheme of marks given. The student should secure 35% marks in Internal Assessment (CCE) and External Evaluation (theory) combined.		
	2.			



**Government Holkar (Model, Autonomous) Science
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Computer Science Department

Part A- Introduction (Practical)			
Programme - B.Sc. (Computer Science - Major)		Class – B.Sc. I Semester	Year- 2024 Session- 2024-25
Course Type (Computer Science) – Major			
1.	Course Code	S1-CSC1TP	
2.	Course Title	Computer Architecture Lab	
3.	Pre-requisite (if any)	To study this course, a student must have had the subject Physics/ Mathematics in 12th class.	
4.	Course Learning Outcomes (CLO)	On completion of this course, learners will be able to: 1. Demonstrate the ability to recall and identify various computer components and CPU parts through physical examination. 2. Exhibit an understanding of I/O devices and the interpretation of truth tables for different logic gates. 3. Apply acquired knowledge to operate and verify the functions of various logic circuits, such as adders, subtractors, and gates. 4. Analyze and assess the practical applications of logic gates and flip-flops, including their functions and truth tables. 5. Create and construct logic circuits, such as multiplexers, demultiplexers, and conversion processes, using logical components.	
5.	Credit Value	2 Credits	
6	Total Marks	Formative Assessment (CCE) – 40 Marks Summative Assessment (End Semester Exam) – 60 Marks Total 40+60= 100 Marks	Minimum Pass Marks – 35

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Part B- Content of the Course	
Total no. of lectures – As per UGC rules	
Suggestive List of Practical	
1.	To study basic gates (AND, OR, NOT) and verify their truth tables.
2.	To study and verify NAND as Universal gate.
3.	To study half adder using basic gates and verify its truth table.
4.	To study Full Adder using basic gates and verify its truth table.
5.	To design and construct RS flip Flop using gates and verifies the truth table.
6.	To verify DeMorgan's Theorem.
7.	Create a document and apply different Editing options.
8.	Create Banner for your college.
9.	Design a Greeting Card using Word Art for different festivals.
10.	Design your Bio data and use page borders and shading.
11.	Create a document and insert header and footer, page title, date, time, apply various page formatting features etc.
12.	Implement Mail Merge.
13.	Insert a table into a document and try different formatting options for the table.
14.	Design your class Timetable.
15.	Prepare a Mark Sheet of your class result.
16.	Prepare a Salary Slip of an employee of an organization.
17.	Prepare a bar chart & pie chart for analysis of Election Results.
18.	Prepare a generic Bill of a Super Market.
19.	Work on the following exercises on a Workbook: <ul style="list-style-type: none"> a. Copy an existing Sheet. b. Rename the old Sheet. c. Insert a new Sheet into an existing Workbook. d. Delete the renamed Sheet.
20.	Prepare an Attendance sheet of 10 students for any 6 subjects of your syllabus. Calculate their total attendance, total percentage of attendance of each student & average of attendance.
21.	Create a worksheet of Students list of any 4 faculties and perform following database functions on it. <ul style="list-style-type: none"> a. Sort data by Name b. Filter data by Class c. Subtotal of no. of students by Class.
22.	Design a presentation of your institute using auto content wizard, design template and blank presentation.
23.	Design a presentation illustrating insertion of pictures, Word Art, and ClipArt. Design a presentation, learn how to save it in different formats, copying and opening an existing presentation.
24.	Design a presentation illustrating insertion of movie, animation, and sound.
25.	Illustrate use of custom animation and slide transition (using different effects)
26.	Design a presentation using charts and tables of the marks obtained in class.

Part – C Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings:

Text Books:

1. M. Morris Mano, "Computer System Architecture", PHI.

Reference Books:

1. Heuring Jordan, "Computer System Design & Architecture" (A.W.L.)
2. William Stalling, "Computer Organization & Architecture", Pearson Education Asia.
3. V. Carl Hamacher, "Computer Organization", TMH
4. Tannenbaum, "Structured Computer Organization", PHI.

Suggested Digital Platforms Web Links:

1. <https://www.youtube.com/watch?v=4TzMyXmzL8M>
2. <https://nptel.ac.in/courses/106/106/106106166/>
3. <https://nptel.ac.in/courses/106/106/106106134/>

Suggested Equivalent Online Courses:

1. <https://nptel.ac.in/courses/106/105/106105163/>

Part D- Assessment and Evaluation	
Suggested Continuous Evaluation methods:	
Internal Assessment/Formative Examination(A):	40 Marks
Lab Record	15 Marks
Attendance in the Lab	05 Marks
Assignments (It can be in different modes)	20 Marks
End Semester External Evaluation (B):	60 Marks
Viva Voce on Practical	10 Marks
Practical Record File	10 Marks
Experiments	40 Marks
Total Marks (A+B)	(40 + 60 =100 Marks)