Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Information Technology

Choice Based Credit System (CBCS) in the light of NEP-2020

Diploma CSE/AI/DS/Cyber Security

SEMESTER-II (2026-2029)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			Marks	THEORY			PRACTICAL		L	T	P	CREDITS
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
DTCS201	DCC	Introduction to Data Structure	Max	60	20	20	30	20	3	0	2	4
			Min	24	16		14	9				

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:	
The student will have ability to:	
1.	Understand basic data organization concepts.
2.	Learn various data structures and their applications.
3.	Implement data structures using C/C++/Python.
4.	Develop programs using stacks, queues, linked lists, trees, and graphs.
COURSE ALIGNMENT WITH UNSDG:	
The Course aims to fulfill the United Nations Sustainable Development Goals, **SDG 4 (Quality Education)**and **SDG 9 (Industry, Innovation and Infrastructure)**.	
COURSE OUTCOMES:	
After completion of the course, the student will be able to:	
CO1	Explain the concept of data organization and abstract data types.
CO2	Use arrays, linked lists, stacks, and queues in problem-solving.
CO3	Choose appropriate data structures for given problems.
CO4	Apply searching and sorting techniques.
TEACHING PEDAGOGY:	
T1	Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching
T2	ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination
ASSESSMENT TOOLS:	
ATL1	Quiz
ATL2	Activity Based Learning
ATL3	Midterm Exams
ATL4	Flip Class
ATL5	Seminar Presentation
ATL6	Assignments

Chairperson	Chairperson	Controller of Examination	Registrar
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ATL7	Poster
ATL8	Oral Viva-voce examination
ATL9	Industrial Visit Report

PREREQUISITES:

- Basic Computer Knowledge
- Fundamentals of Programming Concepts
- Logical and Analytical Thinking Skills

SYLLABUS:

Module	Descriptors / Topics	Hours	Assessment Tools
I	**Introduction to Data Structures:** Definition and importance of data structures, Classification: Primitive and Non-Primitive Data Types, Abstract Data Types (ADT), Concept of Algorithm, Pseudocode and Flowcharts, Complexity Analysis: Time and Space Complexity, Big-O Notation. Arrays and Strings: One-Dimensional and Multi-Dimensional Arrays, Operations: Traversing, Insertion, Deletion, Searching and Sorting, Applications of Arrays (Matrix Representation, Polynomial Representation), Introduction to Strings and Basic String Operations.	9	ATL1, ATL2, ATL6
II	**Linked Lists:** Concept and Types of Linked Lists: Singly Linked List, Doubly Linked List, Circular Linked List, Operations: Insertion, Deletion, Traversal, Comparison between Arrays and Linked Lists, Applications of Linked Lists.	9	ATL3, ATL4, ATL8
III	**Stacks and Queues:** Stack: Definition, Operations (Push, Pop, Peek), Implementation using Array and Linked List, Applications: Expression Evaluation, Conversion (Infix to Postfix and Vice Versa). Queue: Definition, Operations (Enqueue, Dequeue), Types: Circular Queue, Priority Queue, Double Ended Queue (Deque), Implementation using Array and Linked List.	9	ATL2, ATL5, ATL8
IV	**Trees:** Definition and Terminology (Root, Leaf, Degree, Height, Level), Binary Tree and its Types (Full, Complete, Binary Search Tree), Tree Traversals: Inorder, Preorder, Postorder, Operations on BST: Insertion, Deletion, Searching,	9	ATL2, ATL5, ATL9

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			Marks	THEORY			PRACTICAL		L	T	P	CREDITS
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	Introduction to Heap and Applications. Graphs: Definition and Representation (Adjacency Matrix and Adjacency List), Types of Graphs, Graph Traversal Techniques: Breadth First Search (BFS) and Depth First Search (DFS), Applications of Graphs.		
V	**Searching and Sorting Techniques:** Linear Search, Binary Search, Concept of Sorting, Stable and Unstable Sorting, Insertion Sort, Selection Sort, Bubble Sort, Quick Sort, Merge Sort, Heap Sort, Shell Sort, Radix Sort, Comparative Analysis of Sorting Algorithms based on Time and Space Complexity.	9	ATL3, ATL6, ATL8
	Total Hours	**45**	

ADDITIONAL RESOURCES

A. Value addition to course content/ Skill enhancement content:

- Competitive Programming Fundamentals
- Problem Solving using Data Structures
- Visual Representation of Data Structures using Visualization Tools
- Industry-Oriented Coding Challenges
- Data Structure Applications in AI, Machine Learning and Software Development

Online Learning Resources

1. NPTEL – Programming, Data Structures and Algorithms
2. Visualgo Interactive Learning Platform
3. GeeksforGeeks Data Structures Tutorials
4. LeetCode Data Structure Problem Sets
5. HackerRank Data Structures Practice Track

B. Remedial classes for slow learners:

As per the SVVV SOP for slow and fast learners.

SUGGESTED READINGS:

Textbooks

1. Ashok N. Kamthane, Introduction to Data Structures, 2nd Edition, Pearson Education India, 2011.
2. Tremblay and Sorenson, Introduction to Data Structures with Applications, 8th Edition,

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	Tata McGraw Hill, 2011.
3.	Seymour Lipschutz, Data Structures with C, Schaum's Outline Series, McGraw Hill.

Reference Books:

1. Rajesh K. Shukla, Data Structures Using C & C++, Wiley India, 2016.
2. ISRD Group, Data Structures Using C, Tata McGraw Hill, 2015.
3. E. Balagurusamy, Data Structures Using C, Tata McGraw Hill, 2017.
4. P. S. Deshpande and O. G. Kakde, C and Data Structures, Charles River Media, 2015.
5. Gav Pai, Data Structures, Tata McGraw Hill, 2015.

Suggestede- resources (Websites/e- books)

1.	NPTEL – Programming, Data Structures and Algorithms
2.	GeeksforGeeks Data Structures Portal
3.	Visualgo Interactive Data Structure Visualization

LIST OF PRACTICAL

S. No.	Practical Title	CO Mapping
1	Develop a program to calculate the average of elements stored in an array.	CO1
2	Implement insertion, deletion and modification operations on arrays.	CO1, CO2
3	Write a menu-driven program to implement Push, Pop and Display operations on Stack using static memory allocation.	CO2
4	Write a menu-driven program to implement various operations on a Linear Queue.	CO2
5	Implement insertion and deletion operations on Circular Queue using arrays.	CO2
6	Write a menu-driven program to implement various operations on a Singly Linked List.	CO2
7	Write a menu-driven program to implement various operations on a Circular Linked List.	CO2
8	Develop and implement Binary Search algorithm.	CO4

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DTCS201	DCC	Introduction to Data Structure	Max	60	20	20	30	20	3	0	2	4
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9	Implement Bubble Sort algorithm.	CO4
10	Implement Insertion Sort algorithm.	CO4
11	Implement Merge Sort algorithm.	CO4
12	Implement Quick Sort algorithm.	CO3, CO4

COURSE ARTICULATION MATRIX (MAPPING OF COs WITH POs)

Course Outcomes	Correlation with POs												Correlation with PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	3	2	1	1	3	-	-	-	1	1	-	2	2	1	1
CO2	3	3	2	2	3	2	-	2	2	2	1	3	3	2	3
CO3	3	3	3	3	3	2	1	2	3	2	2	3	3	2	3
CO4	3	3	2	3	3	2	1	2	2	2	1	3	3	2	3

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DTCS202	DCC	Data Communication and Computer Networks	Max	60	20	20	30	20	3	0	2	4
			Min	24	16		14	9				

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:	
The student will have ability to:	
1.	Understand the concepts, fundamentals, and processes of data communication and computer networking.
2.	Study various transmission media, encoding schemes, multiplexing, and switching techniques.
3.	Learn the layered architecture of OSI and TCP/IP models and their associated protocols.
4.	Understand network addressing, routing, transport layer services, and congestion control mechanisms.
5.	Explore networking devices, network security fundamentals, simulation tools, and network configuration techniques.
COURSE ALIGNMENT WITH UNSDG:	
The Course aims to fulfill the United Nations Sustainable Development Goals, **SDG 4 (Quality Education)**and **SDG 9 (Industry, Innovation and Infrastructure)**.	
COURSE OUTCOMES:	
After completion of the course, the student will be able to:	
CO1	Explain the working of data communication systems and network architecture.
CO2	Classify different network topologies, transmission media, encoding and multiplexing techniques.
CO3	Analyze error detection, error correction, flow control, and network layer protocols.
CO4	Evaluate switching, routing, transport layer, congestion control, and network security mechanisms.
TEACHING PEDAGOGY:	
T1	Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching
T2	ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination
ASSESSMENT TOOLS:	
ATL1	Quiz
ATL2	Activity Based Learning
ATL3	Midterm Exams

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DTCS202	DCC	Data Communication and Computer Networks	Max	60	20	20	30	20	3	0	2	4
			Min	24	16		14	9				

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

ATL4	Flip Class
ATL5	Seminar Presentation
ATL6	Assignments
ATL7	Poster
ATL8	Oral Viva-voce examination
ATL9	Industrial Visit Report

PREREQUISITES:

- Basic Computer Knowledge
- Fundamentals of Computer Systems
- Logical and Analytical Thinking Skills
- Basic Understanding of Internet and Communication Concepts

SYLLABUS:

Module	Descriptors / Topics	Hours	Assessment Tools
I	**Fundamentals of Data Communication:** Components of Data Communication System, Types of Connections: Point-to-Point and Multipoint, Transmission Modes: Simplex, Half Duplex, Full Duplex, Network Topologies, Networking Devices (Hub, Switch, Router, Gateway, Repeater, Bridge), Guided and Unguided Transmission Media, Analog and Digital Transmission, Bandwidth, Bit Rate, Delay, Jitter, Noise, Protocols and Standards, Introduction to OSI and TCP/IP Models, Comparison of OSI and TCP/IP Models.	9	ATL1, ATL3, ATL6
II	**Data and Signal Transmission:** Data Encoding Techniques (Unipolar, Polar, Bipolar), Line Coding, Block Coding, Modulation Techniques (AM, FM, PM), Multiplexing: FDM, TDM, WDM, Synchronous and Statistical TDM, Circuit Switching, Message Switching, Packet Switching, Synchronous and Asynchronous Transmission, Flow Control and Error Control Techniques: Stop-and-Wait, Go-Back-N, Selective Repeat ARQ.	9	ATL1, ATL3, ATL6
III	**Data Link and Network Layer:** Data Link Layer Functions, Framing	9	ATL1,

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	Techniques, Error Detection Methods, MAC Sublayer Protocols: ALOHA, Slotted ALOHA, CSMA/CD, CSMA/CA, Network Layer Design Issues and Services, IPv4 and IPv6 Addressing, Classful and Classless Addressing, Subnetting and Supernetting, Routing Algorithms: Distance Vector, Link State, Dijkstra and Bellman-Ford Algorithms, ARP, RARP, ICMP, DHCP and NAT.		ATL3, ATL6
IV	**Transport and Application Layer:** Transport Layer Functions and Services, TCP and UDP Protocols, TCP Header Format, Connection Establishment and Termination, Flow Control and Congestion Control Mechanisms, SCTP Features, Application Layer Protocols: DNS, HTTP, HTTPS, FTP, SMTP, POP3, IMAP, SNMP, Telnet, Introduction to Socket Programming and Network Configuration Basics.	9	ATL1, ATL3, AT6
V	**Network Security, Tools and Emerging Technologies:** Fundamentals of Network Security, Authentication, Encryption, Firewalls, VPNs, Wireless Networks, Mobile Networks, Network Performance Metrics (Throughput, Latency, Bandwidth Utilization), Network Simulation Tools: Cisco Packet Tracer, NS2, Wireshark, Troubleshooting Commands (Ping, Ipconfig, Traceroute, Netstat), Introduction to IoT Networking, Software Defined Networking (SDN), Cloud Networking and Future Trends.	9	ATL1, ATL3, ATL6
	Total Hours	**45**	

ADDITIONAL RESOURCES

A.	**Value addition to course content/ Skill enhancement content:**
	• Cisco Networking Academy Learning Resources • Hands-on Network Configuration and Troubleshooting • Wireshark Packet Analysis Workshops • Network Security Awareness Programs • IPv6 Configuration and Deployment Activities • Cisco Packet Tracer Simulation Exercises **Industry-Oriented Skill Enhancement** • Network Design and Planning

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	• LAN/WAN Configuration • Basic Cybersecurity Practices • Wireless Network Setup • Network Monitoring and Troubleshooting •
B.	**Remedial classes for slow learners:**
	As per the SVVV SOP for slow and fast learners.
SUGGESTED READINGS:	
Textbooks	
1.	Behrouz A. Forouzan, Data Communications and Networking, 5th Edition, McGraw Hill, 2017.
2.	Andrew S. Tanenbaum and David J. Wetherall, Computer Networks, 6th Edition, Pearson, 2021.
3.	Larry L. Peterson and Bruce S. Davie, Computer Networks: A Systems Approach, 6th Edition, Morgan Kaufmann.
Reference Books: 1. William Stallings, Data and Computer Communications, 10th Edition, Pearson, 2014. 2. James F. Kurose and Keith W. Ross, Computer Networking: A Top-Down Approach, 7th Edition, Pearson. 3. W. Richard Stevens, TCP/IP Illustrated, Volume 1, Addison Wesley. 4. Douglas E. Comer, Internetworking with TCP/IP, Pearson. 5. Natalia Olifer and Victor Olifer, Computer Networks: Principles, Technologies and Protocols, Wiley.	
Suggestede- resources (Websites/e- books)	
1.	NPTEL – Computer Networks
2.	Cisco Networking Academy (NetAcad)
3.	Wireshark Official Documentation
4.	GeeksforGeeks Computer Networks Portal

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LIST OF PRACTICAL

S. No.	Practical Title	CO Mapping
1	Demonstrate different types of networking equipment such as Hub, Switch and Router.	CO1
2	Crimp and test CAT5e/CAT6 straight-through and crossover cables.	CO1
3	Establish a Peer-to-Peer LAN connection and verify network connectivity.	CO1
4	Simulate packet transmission and routing using Cisco Packet Tracer.	CO2
5	Implement error detection techniques using CRC and Hamming Code.	CO3
6	Develop a simple Client-Server communication program using Socket Programming.	CO3
7	Perform subnetting and IP address allocation using Packet Tracer.	CO3
8	Analyze HTTP, FTP and DNS packets using Wireshark.	CO4
9	Implement Stop-and-Wait and Sliding Window Flow Control mechanisms.	CO4
10	Configure a Router and perform basic troubleshooting using networking commands.	CO4

COURSE ARTICULATION MATRIX (MAPPING OF COs WITH POs)

Course Outcomes	Correlation with Pos												Correlation with PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	3	2	1	1	3	-	-	-	1	1	-	2	2	1	1
CO2	3	3	2	2	3	2	-	2	2	2	1	3	3	2	3
CO3	3	3	3	3	3	2	1	2	3	2	2	3	3	2	3
CO4	3	3	2	3	3	2	1	2	2	2	1	3	3	2	3

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DTCS203	DCC	Computer Architecture	Max	60	20	20	30	20	2	0	2	3
			Min	24	16		14	9				

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COURSE OBJECTIVES:	
The student will have ability to:	
1.	Understand the basic concepts of computer architecture and computer organization.
2.	Explain the principles involved in designing efficient and cost-effective computer systems.
3.	Understand the internal organization and functioning of the CPU and instruction execution cycle.
4.	Learn different memory systems, memory hierarchy, and storage technologies.
5.	Study input-output communication, multiprocessor systems, and performance enhancement techniques.
COURSE ALIGNMENT WITH UNSDG:	
The Course aims to fulfill the United Nations Sustainable Development Goals, **SDG 4 (Quality Education)**and **SDG 9 (Industry, Innovation and Infrastructure)**.	
COURSE OUTCOMES:	
After completion of the course, the student will be able to:	
CO1	Identify various components of a computer system and explain their interconnection and operation.
CO2	Analyze CPU organization, instruction execution cycle, ALU operations, and control unit design.
CO3	Compare and select appropriate memory devices and memory management techniques based on system requirements.
CO4	Analyze various input-output communication methods, processor interaction techniques, and multiprocessor architectures.
TEACHING PEDAGOGY:	
T1	Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching
T2	ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination
ASSESSMENT TOOLS:	
ATL1	Quiz
ATL2	Activity Based Learning
ATL3	Midterm Exams

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Diploma CSE/Cyber Security

SEMESTER-II (2026-2029)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
DTCS203	DCC	Computer Architecture	Max	60	20	20	30	20	2	0	2	3
			Min	24	16		14	9				

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

ATL4	Flip Class
ATL5	Seminar Presentation
ATL6	Assignments
ATL7	Poster
ATL8	Oral Viva-voce examination
ATL9	Industrial Visit Report

PREREQUISITES:

- Basic Computer Knowledge
- Fundamentals of Digital Electronics
- Number Systems and Logic Gates
- Logical and Analytical Thinking Skills

SYLLABUS:

Module	Descriptors / Topics	Hours	Assessment Tools
I	**Structure of Computers:** Types of Computers, Functional Units of a Computer System, Basic Operational Concepts, Von Neumann Architecture, Bus Structures, Computer Software, Performance Metrics, Multiprocessors and Multicomputers. Data Representation: Number Systems, Fixed Point and Floating Point Representation, Error Detection and Correction Codes. Computer Arithmetic: Addition, Subtraction, Multiplication and Division Algorithms, Floating Point Arithmetic Operations, Decimal Arithmetic Operations.	8	ATL1, ATL3, ATL6
II	**Basic Computer Organization and Design:** Instruction Codes, Computer Registers, Computer Instructions and Instruction Cycle, Timing and Control Unit, Memory Reference Instructions, Input-Output and Interrupts. Central Processing Unit: Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Data Manipulation Instructions. Processor Design: Complex Instruction Set Computer (CISC), Reduced Instruction Set Computer (RISC), Comparison between CISC and RISC Architectures.	8	ATL1, ATL3, ATL6

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			Marks	THEORY			PRACTICAL		L	T	P	CREDITS
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DTCS203	DCC	Computer Architecture	Max	60	20	20	30	20	2	0	2	3
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Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

III	**Register Transfer and Micro-Operations:** Register Transfer Language (RTL), Register Transfer Operations, Bus and Memory Transfers, Arithmetic Micro-Operations, Logic Micro-Operations, Shift Micro-Operations, Arithmetic Logic Shift Unit. Microprogrammed Control: Control Memory, Address Sequencing, Microprogram Examples, Hardwired and Microprogrammed Control Unit Design.	8	ATL1, ATL3, ATL6
IV	**Memory System:** Memory Hierarchy and Performance Considerations, Semiconductor Memories, RAM Organization, Types of RAM (SRAM and DRAM), ROM and Types of ROM (PROM, EPROM, EEPROM), Cache Memory and Mapping Techniques, Virtual Memory, Paging, Segmentation, Secondary Storage Devices, RAID Levels and Applications.	8	ATL1, ATL3, ATL6
V	**Input-Output Organization:** I/O Interface, Programmed I/O, Memory Mapped I/O, Interrupt Driven I/O, Direct Memory Access (DMA). Multiprocessor Systems: Characteristics of Multiprocessors, Interconnection Structures, Inter-Processor Arbitration, Inter-Processor Communication and Synchronization, Shared Memory and Distributed Memory Systems, Cache Coherence Problems and Solutions.	8	ATL1, ATL3, ATL6
	Total Hours	**40**	

ADDITIONAL RESOURCES

A.	**Value addition to course content/ Skill enhancement content:**
	• Processor Architecture Case Studies (Intel, ARM, AMD) • Cache Memory Performance Analysis • Assembly Language Fundamentals • Modern Processor Design Concepts • Embedded System Architecture Basics • Performance Benchmarking Techniques **Industry-Oriented Skill Enhancement** • CPU Architecture Analysis • Processor Performance Evaluation • Memory System Optimization • Embedded Computing Fundamentals

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			Marks	THEORY			PRACTICAL		L	T	P	CREDITS
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DTCS203	DCC	Computer Architecture	Max	60	20	20	30	20	2	0	2	3
			Min	24	16		14	9				

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

	• Hardware Troubleshooting Concepts
B.	**Remedial classes for slow learners:**
	As per the SVVV SOP for slow and fast learners.

SUGGESTED READINGS:

Textbooks

1.	M. Morris Mano, Computer System Architecture, 3rd Edition, Pearson Education.
2.	Carl Hamacher, Zvonko Vranesic, Safwat Zaky and Naraig Manjikian, Computer Organization and Embedded Systems, McGraw Hill.
3.	William Stallings, Computer Organization and Architecture: Designing for Performance, Pearson.

Reference Books:

1. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, Computer Organization, McGraw Hill.
2. William Stallings, Computer Organization and Architecture, 8th Edition, Pearson.
3. Andrew S. Tanenbaum, Structured Computer Organization, Pearson Education.
4. John P. Hayes, Computer Architecture and Organization, McGraw Hill.
5. David A. Patterson and John L. Hennessy, Computer Organization and Design, Morgan Kaufmann.

Suggested- resources (Websites/e- books)

1.	NPTEL – Computer Organization and Architecture
2.	MIT OpenCourseWare – Computer Architecture
3.	GeeksforGeeks Computer Architecture Tutorials

LIST OF PRACTICAL

S. No.	Practical Title	CO Mapping
1	Study of Functional Units of a Computer System and Von Neumann Architecture.	CO1
2	Implementation of Fixed Point and Floating Point Number Representation.	CO1

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			Marks	THEORY			PRACTICAL		L	T	P	CREDITS
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
DTCS203	DCC	Computer Architecture	Max	60	20	20	30	20	2	0	2	3
			Min	24	16		14	9				

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

3	Design and Simulation of Error Detection and Correction Codes using Hamming Code.	CO1
4	Implementation of Arithmetic Algorithms: Addition, Subtraction, Multiplication and Division.	CO2
5	Simulation of the Instruction Cycle of a Basic Computer.	CO2
6	Demonstration of Instruction Formats and Addressing Modes.	CO2
7	Register Transfer and Micro-Operations using RTL Simulation.	CO2
8	Design and Simulation of a Microprogrammed Control Unit.	CO2
9	Study of Memory Hierarchy and Cache Mapping Techniques.	CO3
10	Simulation of Input-Output Techniques: Programmed I/O, Interrupt Driven I/O and DMA.	CO4

COURSE ARTICULATION MATRIX (MAPPING OF COs WITH POs)

Course Outcomes	Correlation with POs												Correlation with PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	3	2	1	1	3	-	-	-	1	1	-	2	2	1	1
CO2	3	3	2	2	3	2	-	2	2	2	1	3	3	2	3
CO3	3	3	3	3	3	2	1	2	3	2	2	3	3	2	3
CO4	3	3	2	3	3	2	1	2	2	2	1	3	3	2	3

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Choice Based Credit System (CBCS) in the light of NEP-2020

Diploma CSE/AI/DS/Cyber Security

SEMESTER-II (2026-2029)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
DTCS205	SEC	Introduction to Scripting	Max	0	0	0	30	20	0	0	2	1
			Min	0	0		14	9				

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:	
The student will have ability to:	
1.	Understand different types of scripting languages and their applications.
2.	Gain knowledge about client-side and server-side scripting technologies.
3.	Learn PHP, Python, Perl and modern web scripting frameworks for application development.
4.	Develop dynamic and interactive web applications using scripting languages.
5.	Analyze and implement scripting solutions for real-world web-based projects.
COURSE ALIGNMENT WITH UNSDG:	
The Course aims to fulfill the United Nations Sustainable Development Goals, **SDG 4 (Quality Education)** and **SDG 9 (Industry, Innovation and Infrastructure)**.	
COURSE OUTCOMES:	
After completion of the course, the student will be able to:	
CO1	Differentiate between various client-side and server-side scripting languages.
CO2	Develop programs using functions, control structures, arrays, and web forms.
CO3	Implement scripting languages using appropriate development tools and frameworks.
CO4	Design and develop dynamic web applications using scripting languages and databases.
TEACHING PEDAGOGY:	
T1	Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching
T2	ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination
ASSESSMENT TOOLS:	
ATL1	Quiz
ATL2	Activity Based Learning
ATL3	Midterm Exams
ATL4	Flip Class
ATL5	Seminar Presentation

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DTCS205	SEC	Introduction to Scripting	Max	0	0	0	30	20	0	0	2	1
			Min	0	0		14	9				

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ATL6	Assignments
ATL7	Poster
ATL8	Oral Viva-voce examination
ATL9	Industrial Visit Report

PREREQUISITES:

- Basic Computer Knowledge
- Fundamentals of Programming Concepts
- HTML and Internet Basics
- Logical and Analytical Thinking Skills

SYLLABUS:

Module	Descriptors / Topics	Hours	Assessment Tools
I	**Introduction to Scripting Languages:** Need and characteristics of scripting languages, advantages and applications of scripting. Overview of Client-Side Scripting Languages: JavaScript, VBScript, HTML5 Structure, CSS3 Styling, AJAX, jQuery. Overview of Server-Side Scripting Languages: PHP, ASP.NET, Java/JSP, Python, Ruby on Rails. Comparison between client-side and server-side scripting.	6	ATL1, ATL3, ATL6
II	**PHP Programming:** Basic features of PHP, embedding PHP code in webpages, variables, constants, operators, data types, expressions, string interpolation, control structures, functions, user-defined functions, arrays, strings, regular expressions, web forms, file handling, authentication, file uploading, sending email using PHP.	6	ATL1, ATL3, ATL6
III	**Python for Web Development:** Introduction to Python, syntax, statements, functions, built-in functions, modules, packages, exception handling, file handling, web application development using Python, introduction to Flask and Django frameworks, development of small web applications.	6	ATL1, ATL3, ATL6
IV	**Perl Scripting:** Introduction to Perl, Perl scripts and execution, variables and data	6	ATL1,

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COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
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DTCS205	SEC	Introduction to Scripting	Max	0	0	0	30	20	0	0	2	1
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	types, scalar expressions, control structures, arrays, lists, hashes, strings, pattern matching, regular expressions, file processing, subroutines, Perl applications in web scripting and automation.		ATL3, ATL6
V	**Modern Web Application Development:** Introduction to AngularJS, features and industrial applications, MVC architecture, directives, modules, forms and validation. Development of a dynamic web application integrating HTML5, CSS3, JavaScript, PHP/Python and database connectivity. Mini project implementation and presentation.	6	ATL1, ATL3, ATL6
	Total Hours	**30**	

ADDITIONAL RESOURCES

A.	**Value addition to course content/ Skill enhancement content:**
	• Full Stack Web Development Fundamentals • REST API Development using Python and PHP • Git and GitHub for Version Control • Web Application Deployment Basics • Responsive Web Design Techniques • Real-world Dynamic Website Development **Online Learning Resources** • Python Web Development Tutorials • PHP Official Documentation • Django Documentation • Flask Documentation • AngularJS Learning Portal • Mozilla Developer Network (MDN)
B.	**Remedial classes for slow learners:**
	As per the SVVV SOP for slow and fast learners.

SUGGESTED READINGS:

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Textbooks

1. David Barron, The World of Scripting Languages, Wiley Publications.
2. Steve Holden and David Beazley, Python Web Programming, New Riders Publications.
3. Jason Gilmore, Beginning PHP and MySQL, 3rd Edition, Apress Publications.
4. Luke Welling and Laura Thomson, PHP and MySQL Web Development, Pearson Education.

Reference Books:

1. J. Lee and B. Ware, Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP, Pearson Education.
2. Mark Lutz, Programming Python, O'Reilly Media.
3. Julie Meloni and Matt Telles, PHP Fast and Easy Web Development, Cengage Learning.
4. I. Bayross and S. Shah, PHP 5.1, SPD Publications.
5. Chun, Core Python Programming, Pearson Education.

Suggested- resources (Websites/e- books)

1. PHP Official Documentation
2. Python Official Documentation
3. Django Project Documentation

LIST OF PRACTICAL

S. No.	Practical Title	CO Mapping
1	Write a JavaScript program to generate Fibonacci series.	CO1
2	Write a JavaScript program to calculate frequency of characters in a string.	CO1
3	Create dynamic HTML pages using JavaScript and DOM manipulation.	CO1
4	Write PHP programs to perform operations on strings and arrays.	CO2

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5	Develop PHP programs implementing mathematical and user-defined functions.	CO2
6	Create web forms and perform validation using PHP.	CO2
7	Create a MySQL database and execute DDL, DML and DQL commands.	CO2
8	Develop PHP programs to connect with MySQL database and perform CRUD operations.	CO2, CO4
9	Design a dynamic website using PHP, HTML5 and CSS3.	CO3
10	Develop Python programs using functions, modules and exception handling.	CO3

COURSE ARTICULATION MATRIX (MAPPING OF COs WITH POs)

Course Outcomes	Correlation with POs												Correlation with PSOs		
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CO1	3	2	1	1	3	-	-	-	1	1	-	2	2	1	1
CO2	3	3	2	2	3	2	-	2	2	2	1	3	3	2	3
CO3	3	3	3	3	3	2	1	2	3	2	2	3	3	2	3
CO4	3	3	2	3	3	2	1	2	2	2	1	3	3	2	3