



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						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				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 |

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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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	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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3.	Tata McGraw Hill, 2011.
	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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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	PO 0	PO 1	PO 2	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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COURSE OBJECTIVES:

The student will have ability to:

- Understand the concepts, fundamentals, and processes of data communication and computer networking.
- Study various transmission media, encoding schemes, multiplexing, and switching techniques.
- Learn the layered architecture of OSI and TCP/IP models and their associated protocols.
- Understand network addressing, routing, transport layer services, and congestion control mechanisms.
- 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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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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	<ul style="list-style-type: none"> • 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	PO 0	PO 1	PO 2	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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Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Information Technology
 Choice Based Credit System (CBCS) in the light of NEP-2020
 Diploma AI/DS
 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*					
DTCS204	DCC	Introduction to Data Visualization	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.

COURSE OBJECTIVES:

The student will have ability to:

1. To understand the principles, concepts, and importance of data visualization in data-driven decision-making and business intelligence.
2. To learn visualization techniques and design principles for representing categorical, numerical, temporal, and geospatial data.
3. To develop practical skills in creating static, interactive, and dashboard-based visualizations using modern tools and Python libraries.
4. To enhance the ability to communicate analytical insights through effective storytelling and visual narratives.
5. To understand ethical, perceptual, and usability aspects of visual communication and emerging trends in data visualization.

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 concepts, principles, and importance of data visualization and identify appropriate visualization techniques for different types of data. |
| CO2 | Develop effective one-dimensional and two-dimensional visualizations using statistical and graphical methods. |
| CO3 | Design interactive, geospatial, and advanced visualizations using modern visualization tools and Python libraries. |
| CO4 | Prepare datasets, develop dashboards, and communicate insights through storytelling and data-driven narratives. |
| | Evaluate visualization quality, ethical considerations, usability factors, and emerging visualization technologies. |

TEACHING PEDAGOGY:

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

PREREQUISITES:

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

SYLLABUS:

Module	Descriptors / Topics	Hours	Assessment Tools
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Diploma AI/DS

SEMESTER-II (2026-2029)

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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.

I	Introduction to Data Visualization: Definition, purpose and scope of data visualization, role of visualization in analytics, decision making and business intelligence, data types including categorical, numerical, temporal and geospatial data, principles of visual perception, cognitive aspects of visualization, characteristics of effective and ineffective visualizations, visualization workflow, overview of visualization tools and frameworks including Tableau, Power BI, Matplotlib, Seaborn and Plotly.	6	ATL1, ATL3, ATL6
II	Visualization Design Principles and Static Visualizations: Visual encoding techniques using color, size, shape, position and texture, chart selection strategies, univariate visualizations including bar charts, histograms, pie charts and box plots, bivariate and multivariate visualizations including scatter plots, pair plots and heat maps, descriptive statistics for visualization, data summarization techniques, implementation of visualizations using Matplotlib and Seaborn libraries.	6	ATL1, ATL3, ATL6
III	Advanced and Interactive Visualizations: Time-series visualization using line charts, moving averages and area charts, geospatial visualization using Plotly and GeoPandas, interactive visualizations using Plotly and Bokeh, handling and visualization of large datasets, animation techniques for visual analytics, development of interactive dashboards using Plotly Dash and Tableau Public.	6	ATL1, ATL3, ATL6
IV	Data Preparation and Storytelling: Data cleaning, aggregation, normalization; feature engineering; combining datasets; dashboard design principles; storytelling with data; narrative development; audience-centric visual communication; business, healthcare and social sector case studies.	6	ATL1, ATL3, ATL6
V	Evaluation, Ethics and Emerging Trends: Visualization evaluation metrics; usability testing; misleading visualizations; ethical considerations including bias, privacy and transparency; AI-driven visualization; AR/VR visualization; real-time dashboards; mini project presentation.	6	ATL1, ATL3, ATL6
Total Hours		30	

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ADDITIONAL RESOURCES	
A.	Value addition to course content/ Skill enhancement content:
	<ul style="list-style-type: none"> Hands-on workshops using Tableau Public and Power BI. Kaggle Data Visualization Challenges. Dashboard Design Competition. Industry datasets for business intelligence applications. Visualization case studies from healthcare, finance and smart cities.
B.	Remedial classes for slow learners:
	As per the SVVV SOP for slow and fast learners.
SUGGESTED READINGS:	
Textbooks	
1.	Kieran Healy, Data Visualization: A Practical Introduction, Princeton University Press, 2019.
2.	Cole Nussbaumer Knaflic, Storytelling with Data: A Data Visualization Guide for Business Professionals, Wiley, 2015.
3.	Claus O. Wilke, Fundamentals of Data Visualization, O'Reilly Media, 2019.
Reference Books:	
1.	Alberto Cairo, The Truthful Art: Data, Charts, and Maps for Communication, New Riders, 2016.
2.	Ben Fry, Visualizing Data: Exploring and Explaining Data with the Processing Environment, O'Reilly Media, 2008.
3.	Andy Kirk, Data Visualization: A Handbook for Data Driven Design, Sage Publications, 2019.
4.	Nathan Yau, Data Points: Visualization That Means Something, Wiley, 2013.
5.	Tamara Munzner, Visualization Analysis and Design, CRC Press, 2014.
Suggested e- resources (Websites/e- books)	
1.	Matplotlib Official Documentation
2.	Seaborn Official Documentation

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			Marks	THEORY			PRACTICAL						
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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.

3.	Power BI Learning Hub	
LIST OF PRACTICAL		
S. No.	Practical Title	CO Mapping
1	Explore Tableau, Power BI and Python visualization libraries.	CO1
2	Create bar charts, histograms and box plots for univariate data analysis.	CO2
3	Generate scatter plots, pair plots and heatmaps for relationship analysis.	CO2
4	Study visual encoding techniques and compare effective vs ineffective visualizations.	CO1, CO4
5	Create time-series visualizations using line charts and rolling averages.	CO2
6	Develop geospatial visualizations using Plotly and GeoPandas.	CO3
7	Design interactive plots using Plotly and Bokeh.	CO3
8	Perform data preprocessing and prepare datasets for visualization.	CO3
9	Design an interactive dashboard integrating multiple visualizations.	CO3, CO4
10	Evaluate visualization quality and identify misleading visualizations.	CO4
11	Develop a business intelligence dashboard using real-world datasets.	CO3, CO4
12	Mini Project: Data Storytelling and Visualization Report.	CO1, CO2, 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	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	2	-	-	2	-	-	-	-	1	-	-	2	1	-
CO2	2	3	2	1	3	-	-	-	-	1	-	-	3	2	-

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Diploma AI/DS

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*					
DTCS204	DCC	Introduction to Data Visualization	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.

CO3	2	3	3	2	3	-	-	-	1	1	-	-	3	3	1
CO4	2	2	2	3	2	2	1	1	2	3	1	1	2	3	2

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 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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SEMESTER-II (2026-2029)

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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.

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

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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

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

Reference Books:

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

Suggested- resources (Websites/e- books)

- PHP Official Documentation
- Python Official Documentation
- 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		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	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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