Kashi Institute of Technology, Varanasi

(An Autonomous Institute Approved by AICTE)

Evaluation Scheme & Syllabus

For

Diploma 2nd Year

(Computer Science and Engineering)

(Effective from Session:2025-26)

MS 23KM, Varanasi – Prayagraj(Allahabad) Highway, Mirzamurad, Varanasi

Uttar Pradesh - 221307

Diploma in Computer Science and Engineering III Semester

S.N.	Course Category	Course Code	Course Title	Evaluation Scheme							
				Type	Periods			FA	SA	Total	Credit
					L	T	P				
1	HS	DHS205	English For Career Development	T	2	0	0	70	30	100	2
2	BS	DBS211	Applied Mathematics-III	T	3	1	0	70	30	100	4
3	PC	DCSPC205	Internet and Web Programming	T	2	0	0	70	30	100	2
4	PC	DCSPC207	Fundamentals of Python Programming	T	2	1	0	70	30	100	3
5	PC	DCSPC209	Fundamentals of Data Structure With C	T	2	1	0	70	30	100	3
6	PC	DCSPC211	Cyber Security Essentials	T	3	0	0	70	30	100	3
7	HS	DHS207	English For Career Development Lab	P	0	0	2	70	30	100	1
8	PC	DCSPC213	Internet and Web Programming Lab	P	0	0	2	70	30	100	1
9	PC	DCSPC215	Fundamentals of Python Programming Lab	P	0	0	2	70	30	100	1
10	PC	DCSPC217	Fundamentals of Data Structure with C Lab	P	0	0	2	70	30	100	1
11	PC	DCSPC19	Cyber Security Essentials Lab	P	0	0	2	70	30	100	1
12	CCA	DCCA203	Co-Curricular Activities	-	-	-	-	-	-	100	0.5
13	GP	DGP203	General Proficiency	-	-	-	-	-	-	100	0.5
Total				**-**	**14**	**3**	**10**	**770**	**330**	**1300**	**23**

Diploma in Computer Science and Engineering IV Semester

SN	Course Category	Course Code	Course Title	Evaluation Scheme							
				Type	Period			FA	SA	Total	Credit
					L	T	P				
1	HS	DHS202	Communication Skills-II	T	2	0	0	70	30	100	2
2	PC	DCSPC210	Database Storage System	T	3	0	0	70	30	100	3
3	PC	DCSPC212	Java Object-Oriented Programming Java	T	2	1	0	70	30	100	3
4	PC	DCSPC214	Web Development Using PHP	T	2	1	0	70	30	100	3
5	PC	DCSPC216	Operating Systems	T	2	1	0	70	30	100	3
6	PC	DCSPC218	Data Processing and Visualisation	T	3	0	0	70	30	100	3
7	PC	DCSPC220	Database Storage System Lab	P	0	0	2	70	30	100	1
8	PC	DCSPC222	Java Object-Oriented Programming Java Lab	P	0	0	2	70	30	100	1
9	PC	DCSPC224	Web Development Using PHP Lab	P	0	0	2	70	30	100	1
10	PC	DCSPC226	Operating Systems Lab	P	0	0	2	70	30	100	1
11	PC	DCSPC228	Data Processing and Visualisation Lab	P	0	0	2	70	30	100	1
12	CCA	DCCA204	Co-Curricular Activities	-	-	-	-	-	-	100	0.5
13	GP	DGP204	General Proficiency	-	-	-	-	-	-	100	0.5
Total				**-**	**14**	**3**	**10**	**770**	**330**	**1300**	**23**

FA: Formative Assessment, **SA**: Summative Assessment, **L**: Lecture, **T**: Tutorial, **P:** Practical

Abbreviation Used:
PCC: Professional Core Courses
HSMC: Humanities, Social Science, and Management Course
MOOC: Massive Open Online Course
CCA: Co-Curricular Activities

Remarks: NASSCOM SUGGESTED COURSES:
1. DIGITAL APPLICATION FUNDAMENTALS – STEM.
2. INTRODUCTION TO CYBERSECURITY.
3. CYBERSECURITY ESSENTIALS.
4. DATA PROCESSING AND VISUALISATION.

NOTES: 4 Weeks of industrial training will be organised after the 4th semester

DETAILED SYLLABUS
DIPLOMA 2nd Year

- **Computer Science & Engineering 3rd Semester**

(Effective from Session: 2025-26)

Diploma in Computer Science and Engineering						
Semester: III				**Course Category: HS**		
Course Code	**Course**		**Period / Week**			**Credit**
			L	**T**	**P**	**C**
DHS205	**ENGLISH FOR CAREER DEVELOPMENT**		**2**	**0**	**0**	**2**
Prerequisite	***At the end of this course, the students will be able to:***					**Bloom's Level**
Course Outcome	**CO1**	*Understand foundational theories and principles of communication.*				K_2
	CO2	*Apply basic grammar and sentence construction rules in written and spoken forms.*				K3,
	CO3	*Analyze and write various formats of professional communication.*				K2
	CO4	*Evaluate the effectiveness of written, verbal, and non-verbal communication.*				K3
	CO5	*Create grammatically correct and well-structured professional documents.*				K3, K4
UNIT – I	**Fundamentals of Communication**					**Contact Hours: 06**
• Definition and purpose of communication • Process and elements of communication • Types: Verbal (Oral & Written), Non-verbal communication • Characteristics of effective communication • Communication barriers and remedies						**CO1**
UNIT – II	**Functional Grammar for Communication**					**Contact Hours: 06**
• Parts of Speech: Definitions and examples • Tenses and their correct usage • Articles, Prepositions, Conjunctions • Sentence types and transformation (affirmative/negative, voice, narration) • Common grammatical errors in professional contexts						**CO2**
UNIT – III	**Written Communication Theory**					**Contact Hours: 06**
• Paragraph writing: Unity, coherence, logical flow • Letter writing: Format, structure, and tone (formal/informal) • Email communication: Structure, clarity, etiquette • Report writing: Structure, essentials of good report						**CO3**
UNIT – IV	**Oral Communication & Non-verbal Aspects**					**Contact Hours: 06**
• Principles of effective speaking • Role of listening in communication • Non-verbal communication: Body language, gestures, posture, eye contact						**CO4**
UNIT – V	**Communication in the Digital and Professional World**					**Contact Hours: 06**
• Resume and cover letter essentials • Importance of tone and formality in digital communication • Ethics and etiquette in workplace communication • Difference between personal and professional communication						**CO5**
Lecture Hours: 30		**Tutorials Hours :00**				**Total: 30**

Reference Books:

1. **Krishna Mohan & Meera Banerji**, *Developing Communication Skills*, Macmillan India
2. **Wren & Martin**, *High School English Grammar and Composition*, S. Chand
3. **Raymond Murphy**, *English Grammar in Use*, Cambridge University Press
4. **Courtland L. Bovee & John V. Thill**, *Business Communication Today*, Pearson Education
5. **R. C. Sharma & Krishna Mohan**, *Business Correspondence and Report Writing*, Tata McGraw Hill

Diploma in Computer Science and Engineering						
Semester: III			**Course Category: BS**			
Course Code:	**Course**		**Period / Week**			**Credit**
			L	**T**	**P**	**C**
DBS211	**APPLIED MATHEMATICS-III**		**3**	**1**	**0**	**4**
Prerequisite	**After completion of the course students are able to -**					**Bloom's Level**
Course Outcome	**CO1**	*Understand matrix operations and uses of matrix in different problems. Apply elementary row and column operations in finding the inverse of a matrix. Find eigenvalues, Eigen vectors of a matrix and their different properties.*				K_1,K_2,K_3
	CO2	*Apply to mathematically formulate, and thus aid the solution of, physical and other problems involving functions of several variables.*				K_2,K_3
	CO3	*Understand degree/order of differential equations and their solution techniques.*				K_1,K_2,K_3
	CO4	*Apply Laplace transform and their applications in solving engineering problems.*				K_2,K_3
	CO5	*Understand concept of probability distribution and their applications.*				K_1,K_2,K_3
UNIT – I	**Matrices**					**Contact Hours: 12**
1.1 Algebra of Matrices, Inverse Addition, Multiplication of matrices, Null matrix and a unit matrix, Square matrix, Symmetric, Skew symmetric, Hermitian, Skew hermition, Orthagonal, Unitary, diagonal and Triangular matrix, Determinant of a matrix. Definition and Computation of inverse of a matrix. 1.2 Elementry Row/Column Transformation. Meaning and use in computing inverse and rank of a matrix. 1.3 Linear Dependence, Rank of a Matrix . Linear dependence/independence of vectors, Definition and computation of rank of matrix. Computing rank through determinants, Elementary row transformation and through the concept of a set of independent vectors. 1.4 Eigen Pairs, Cayley-Hamilton Theorem. Definition and evaluation of eigenvalues and eigenvectors of a matrix of order two and three, Cayley-Hamilton theorem (without Proof), and its verification.						**CO1**
UNIT – II	**Differential Calculus**					**Contact Hours: 12**
2.1 Function of two variables, identification of surfaces in space, conicoids 2.2 Partial Differentiation, Directional derivative, Gradient, Use of gradient f, Partial derivatives, Chain rule, Higher order derivatives, Euler's theorem for homogeneous functions, Jacobians.						**CO2**
UNIT – III	**Differential Equation**					**Contact Hours: 12**
3.1 Formation, Order, Degree, Types, Solution. Formation of differential equations through physical, geometrical, mechanical, and electrical considerations, Order, Degree of a differential equation, Linear, and nonlinear equations. 3.2 First Order Equations Variable Separable, equations reducible to separable forms, Homogeneous equations, equations reducible to homogeneous forms, Linear and Bernoulli form exact equation and their solutions. 3.3 Higher Order Linear Equation: Property of solution, Linear differential equation with constant coefficients (PI for X= e^{ax},Sin ax, Cos ax).						**CO3**
UNIT – IV	**Integral Calculus-II**					**Contact Hours: 12**
4.1 Beta and Gamma Functions Definition, Use, Relation between the two, and their use in evaluating integrals. 4.2 Laplace Transform ---Definition, Basic Theorem and Properties, Inverse Laplace Transform,						**CO4**

UNIT 5	Probability and Statistics	Contact Hours: 12
5.1 Probability Introduction, Addition and Multiplication theorem and simple problem. 5.2 Distribution, Bionimal Distribution, Poisson distribution, Normal Distribution		CO5
Lecture Hour :45	**TUTORIAL HOURS :15**	**TOTAL:60**

Reference Books:

4. *Applied Mathematics-III by Ajay Kumar,Jai Prakash Nath Publication Merrut.*
5. *Applied Mathematics-III by H.R. Luthera, Bharat Bharati Publication Merrut*
6. *Applied Mathematics-III by Kailash Sinha, BBP Publication,Merrut*

Diploma in Computer Science and Engineering						
Semester: III			**Course Category: PC**			
Course Code	**Course**		**Period / Week**			**Credit**
			L	**T**	**P**	**C**
DCSPC205	**INTERNET AND WEB PROGRAMMING**		**2**	**0**	**0**	**2**
Prerequisite	***At the end of this course, the students will be able to:***					**Bloom's Level**
Course Outcome	**CO1**	*understand working of Internet/ Websites, Client Server Model and Internet Tools.*				K_2, K_3
	CO2	*understand and develop HTML Web pages.*				K_2
	CO3	*control the Look and feel of web pages by using CSS*				K_3
	CO4	*provide logics on the web pages by using JavaScript*				K_2
	CO5	*use Bootstrap to develop responsive website*				K_2, K_3
UNIT – I	**Web Development Introduction**					**Contact Hours: 06**
Internet, WWW, Browser, Search engine Client Server Model, URL, Web Pages, Website and Web Services, Types of Websites (Static, Dynamic and Responsive), Developer options of Browser (View page source, Developer Tools, Inspect Element etc), Need of cyber security & IT Laws						**CO1**
UNIT – II	**HTML**					**Contact Hours: 06**
Basics: HTML Document, Basic Structure of HTML, Syntax, HTML Tags and Attributes, Types of HTML Tags, Rules of nesting, Basic Tags (HTML Tag. Head Tag, Title Tag, Body Tags).Page Formatting: Adding a new Paragraph, Adding a line break, Inserting a blank space , changing page background, Div and Span tags, Creating Lists: Ordered List, Unordered Lists, Definition Lists, Others: Images, Text Links, Image Links, opening a page in New Window or Tab, , Introduction to Table Tags, HTML Forms						**CO2**
UNIT – III	**Cascading Style Sheets**					**Contact Hours: 06**
Introduction, Benefits of CSS, CSS Syntax, CSS Implementation (inline, internal and external), CSS Selectors (ID Selectors, Class Selectors, Grouping Selectors, Universal Selectors, CSS Pseudo-classes), CSS properties (background-color, background-image, border-style, height, width, color, text-align, font-family, font-style, font-size, font weight), Box Model in CSS(margin, border, padding)						**CO3**
UNIT – IV	**Java Scripts**					**Contact Hours: 06**
Java Script Introduction, variables, data types, operators, control flow (if-else, for loop, while loop, do-while loop), Declaring Functions, Calling functions with parameters, Adding JavaScript to Web Documents, JavaScript Objects, Document Object Models, HTML Events and calling Java Script functions on Events.						**CO4**
UNIT – V	**Bootstrap**					**Contact Hours: 06**
Color Management, Buttons, Table, drop-down, navigation -bar, images, pagination, jumbotron, alerts, forms, progress bar, grid, utilities & filters						**CO5**
Lecture Hours: 30		**Tutorials Hours :00**				**Total: 30**

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests
- Actual laboratory and practical work, exercises and viva-voce
- Software installation, operation, development and viva-voce

Reference Books:

1. *Internet And Web Technology by Dr.Tariq Hussain (Author), 2023*

<table>
<tr><td colspan="7">Diploma in Computer Science and Engineering</td></tr>
<tr><td colspan="4">Semester: III</td><td colspan="3">Course Category: PC</td></tr>
<tr><td rowspan="2">Course Code</td><td colspan="3" rowspan="2">Course</td><td colspan="3">Period / Week</td><td>Credit</td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>C</td></tr>
<tr><td>DCSPC207</td><td colspan="3">FUNDAMENTALS OF PYTHON PROGRAMMING</td><td>2</td><td>1</td><td>0</td><td>3</td></tr>
<tr><td>Prerequisite</td><td colspan="5">At the end of this course, the students will be able to:</td><td>Bloom's Level</td></tr>
<tr><td rowspan="5">Course Outcome</td><td>CO1</td><td colspan="4">To understand the basics of Python programming.</td><td>K1</td></tr>
<tr><td>CO2</td><td colspan="4">To implement various control structures on different data types and analyze the use of different data structures in Python.</td><td>K2, K3</td></tr>
<tr><td>CO3</td><td colspan="4">Implement bult in functions and collections in the python programming.</td><td>K3</td></tr>
<tr><td>CO4</td><td colspan="4">Use the IO model in Python to read and write disk files</td><td>K2, K3</td></tr>
<tr><td>CO5</td><td colspan="4">Create their own classes and use existing Python classes.</td><td>K1, K2</td></tr>
<tr><td>UNIT – I</td><td colspan="5">Introduction to Python</td><td>Contact Hours: 08</td></tr>
<tr><td colspan="6">History, Features and application of python, installing Python, Basic structure of python program, Input and Output Functions in Python, Variable, Identifiers, Basic Operators, Expressions and Types of Data Int, Float, Complex, String, List, Tuple, Set, Dictionary and its Methods, Type Conversions, Comments, Input Processing and output.</td><td>CO1</td></tr>
<tr><td>UNIT – II</td><td colspan="5">Control Flow Structures in Python</td><td>Contact Hours: 08</td></tr>
<tr><td colspan="6">Conditional Blocks Using if, if-Else and Else If, Simple for Loops in Python, For Loop Using Ranges, String, List and Dictionaries Use of While Loops in Python, Loop Manipulation Using Pass, Continue, Break and Else</td><td>CO2</td></tr>
<tr><td>UNIT – III</td><td colspan="5">Collection and Function</td><td>Contact Hours: 08</td></tr>
<tr><td colspan="6">Introduction: Lists, Tuples, Sets, Dictionaries, Sorting Dictionaries, Copying Collections.

Function:
Introduction to Functions, defining a Function, Calling a Function, Types of Functions, Function Arguments, Anonymous Functions, Global and Local Variables.</td><td>CO3</td></tr>
<tr><td>UNIT – IV</td><td colspan="5">File Handling</td><td>Contact Hours: 08</td></tr>
<tr><td colspan="6">Introduction to Text files, File Handling functions: Basic functions: open, close, Reading file: read, read line, read lines, Writing file: write, append, write lines</td><td>CO4</td></tr>
<tr><td>UNIT – V</td><td colspan="5">Classes in Python</td><td>Contact Hours: 08</td></tr>
<tr><td colspan="6">•Classes in Python
• Creating Classes
• Instance Methods
• File Organization
• Special Methods
• Class Variables
• Inheritance
• Polymorphism</td><td>CO5</td></tr>
<tr><td colspan="3">Lecture Hours: 30</td><td colspan="3">Tutorials Hours:10</td><td>Total: 40</td></tr>
<tr><td colspan="7">Reference Books:
i. Learning Python by Mark Lutz; Pratham Books, Bangalore
ii. Dive Into Python by Mark Pilgrim; Pratham Books, Bangalore
iii. Think Python by Allen B. Downey; O'Reilly Media</td></tr>
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Diploma in Computer Science and Engineering						
Semester: III				**Course Category: PC**		
Course Code	**Course**		**Period / Week**			**Credit**
			L	**T**	**P**	**C**
DCSPC209	**FUNDAMENTALS OF DATA STRUCTURE WITH C**		**2**	**1**	**0**	**3**
Prerequisite	***At the end of this course, the students will be able to:***					**Bloom's Level**
Course Outcome	**CO1**	*Identify the problem and formulate an algorithm for it.*				K1
	CO2	*Identify the best data structures to solve the problem*				K2, K3
	CO3	*Store data, process data using appropriate data structures*				K1, K2
	CO4	*Implement trees and various traversing techniques.*				K3
	CO5	*Implement various searching and sorting algorithms and to compare them to check efficiency.*				K1, K2
UNIT – I	**Fundamental Notations**					**Contact Hours: 08**
1.1 Problem solving concept top down and bottom up design, structured programming 1.2 Concept of data types, variables and constants 1.3 Concept of pointer variables and constants 1.4 Categories of Data structure 1.5 Concept of Arrays 1.6 Storage representation of multi-dimensional arrays. 1.7 Operations on arrays with Algorithms (searching, traversing, inserting, deleting).						**CO1**
UNIT – II	**Linked Lists**					**Contact Hours: 08**
2.1 Introduction to linked list 2.2 Representation of linked lists in Memory 2.3 Operations on linked list (Insertion, deletion and traversals) 2.4 Application of linked lists 2.5 Doubly linked lists 2.6 Operations on doubly linked lists (Insertion, deletion and traversals)						**CO2**
UNIT – III	**Stacks, Queues and Recursion**					**Contact Hours: 08**
3.1 Introduction to stacks 3.2 Representation of stacks 3.3 Implementation of stacks 3.4 Applications of stacks 3.5 Introduction to queues 3.6 Implementation of queues 3.7 Circular Queues 3.8 De-queues 3.9 Application of Queues						**CO3**
UNIT – IV	**Trees**					**Contact Hours: 08**
4.1 Concept of Trees 4.2 Representation of Binary tree in memory 4.3 Traversing Binary Trees (Pre order, Post order and In order) 4.4 Searching, inserting and deleting binary search trees.						**CO4**
UNIT – V	**Sorting and Searching**					**Contact Hours: 08**
5.1 Introduction to sorting and searching 5.2 Search algorithm (Linear and Binary) 5.3 Sorting algorithms (Bubble Sort, Insertion Sort, Quick Sort, Selection Sort, Merge Sort, Heap Sort						**CO5**
Lecture Hours: 30		**Tutorials Hours :10**				**Total: 40**
Reference Books:						

1. Data Structure using C by Robert Kruse; Prentice Hall of India
2. Data Structure through C by Yashwant Kanekar; BPB Publications
3. Data structures – Schaum's Outline Series by Lipschutz; McGraw Hill Education PvtLtd , New Delhi

Text Book

1. *Data Structure through C in depth by SK Srivastava, Deepali Srivastava; BPB Publications*

Diploma in Computer Science and Engineering						
Semester: III			**Course Category: PC**			
Course Code	**Course**		**Period / Week**			**Credit**
			L	**T**	**P**	**C**
DCSPC211	**CYBER SECURITY ESSENTIALS**		**3**	**0**	**0**	**3**
Prerequisite	***At the end of this course, the students will be able to:***					**Bloom's Level**
Course Outcome	**CO1**	*Understand and explain the core principles of cybersecurity, including the significance of ethical behavior and responsible use of digital technologies.*				K_2
	CO2	*Identify common network vulnerabilities and apply fundamental techniques to secure wired and wireless network communications.*				K3,
	CO3	*Demonstrate the ability to protect data and systems by implementing appropriate security controls for operating systems.*				K2
	CO4	*Analyze various types of cyber threats and develop adversarial thinking to anticipate potential attack vectors and security breaches*				K3
	CO5	*Apply the principles of risk management and incident response, and evaluate the impact of emerging cybersecurity trends on individuals and organizations*				K3,K4
UNIT – I	**Foundations of Cybersecurity & Ethics**					**Contact Hours: 08**
Introduction to Cybersecurity: Definition of cybersecurity, importance in modern society, CIA Triad (Confidentiality, Integrity, Availability). **Threats, Vulnerabilities, and Risks:** Understanding the difference between threats, vulnerabilities, and risks; common types of cyber threats (malware, phishing, DoS, etc.).						**CO1**
UNIT – II	**Network & Connectivity Security**					**Contact Hours: 08**
Network Fundamentals: Basic networking concepts (TCP/IP, OSI model), network topologies, and common network devices (routers, switches, firewalls). **Wireless Network Security:** Wi-Fi security protocols (WPA2/3), common wireless attacks, and best practices for securing wireless networks. **Firewalls and VPNs:** Types of firewalls, firewall rules, and the role of Virtual Private Networks (VPNs) in secure communication.						**CO2**
UNIT – III	**Data & System Protection**					**Contact Hours: 08**
Operating System Security: Hardening operating systems (Windows, Linux). **Endpoint Security:** Antivirus/anti-malware, host-based firewalls. **Encryption:** Symmetric and asymmetric encryption, hashing, digital signatures, and Public Key Infrastructure (PKI).						**CO3**
UNIT – IV	**Threat Landscape & Adversarial Thinking**					**Contact Hours: 08**
Cyber Threat Intelligence: Sources of threat intelligence, indicators of compromise (IOCs), and threat intelligence platforms. **Malware Analysis:** Types of malware(viruses, worms, ransomware, spyware), their characteristics, **Attack Vectors and Methodologies:** Understanding common attack methodologies (e.g., kill chain, MITRE ATT&CK framework) and different attack types (e.g., DDoS, SQL Injection, XSS).						**CO4**
UNIT – V	**Risk Management & Future Implications**					**Contact Hours: 08**
Cybersecurity Risk Management: Risk identification, assessment, mitigation, and monitoring. **Security Awareness Training**: Importance of human factor in cybersecurity and effective security awareness programs. **Cloud Security:** Security considerations for cloud computing (IaaS, PaaS, SaaS), shared responsibility model, and cloud security best practices. **Emerging Technologies and Future Trends:** IoT security, AI/ML in cybersecurity, quantum computing threats, and the evolving cyber landscape.						**CO5**
Lecture Hours: 40		**Tutorials Hours:00**				**Total: 40**

Reference Books:
1. Cybersecurity Essentials by Charles J. Brooks. **2.** Principles of Information Security by Michael E. Whitman.

Diploma in Computer Science and Engineering						
Semester: III			**Course Category: HS**			
Course Code	**Course**		**Period/Week**			**Credit**
			L	**T**	**P**	**C**
DHS207	**ENGLISH FOR CAREER DEVELOPMENT LAB**		**0**	**0**	**2**	**1**
Prerequisite	***At the end of this course, the students will be able to:***					
Course Outcome	**CO1**	*Use correct grammatical structures in speaking and writing through task-based activities.*				
	CO2	*Demonstrate fluent and confident oral communication in professional scenarios.*				
	CO3	*Enhance listening comprehension using authentic audio resources.*				
	CO4	*Create professional written content such as resumes, emails, and reports.*				
	CO5	*Participate in and manage group-based digital communication using modern tools.*				

LIST OF PRACTICAL	
• Sentence correction using worksheets • Word form transformation tasks (noun to verb, adjective to adverb, etc.) • Peer quizzes on grammar usage • Functional grammar tasks (asking permission, making suggestions, giving advice)	**CO1**
• Role-play: Interview, customer service, college admission, tech support • JAM (Just a Minute) sessions with peer feedback • Picture description tasks (what do you see, interpret, narrate) • Telephone/virtual call etiquette practice	**CO2**
• Listen and respond to instructions/tasks • Audio comprehension using TED Talks/YouTube (MCQ + short answer based) • Note-taking from spoken content • Spot the error/word game while listening	**CO3**
• Email writing with real-life prompts (leave request, job enquiry, complaint) • Resume and cover letter creation using MS Word templates • Report writing based on mock company visit or workshop	**CO4**
• Practice group discussion on MS Teams/Zoom • Record and evaluate a short video resume (self-pitch) • Collaborative writing task in Google Docs (proposal, notice)	**CO5**

Department: Computer Science and Engineering						
Semester: III			**Course Category: PC**			
Course Code	**Course**		**Period/Week**			**Credit**
			L	**T**	**P**	**C**
DCSPC213	**INTERNET AND WEB PROGRAMMING LAB**		**0**	**0**	**2**	**1**
Prerequisite	***At the end of this course, the students will be able to:***					
Course Outcome	**CO1**	*understand working of Internet/ Websites, Client Server Model and Internet Tools.*				
	CO2	*understand and develop HTML Web pages.*				
	CO3	*control the Look and feel of web pages by using CSS*				
	CO4	*provide logics on the web pages by using JavaScript*				
	CO5	*use Bootstrapto develop responsive website*				

List of Practical

1. Install, configure and start using developer tools /Code Editor/Browser	**CO1**
2. Creating Web Pages using different HTML tags. 3. Create a personal portfolio using headings, paragraphs, images, tables, and lists	**CO2**
4. Control the look and feel of Web Page Styling by using CSS. 5. Create a webpage with inline, internal, and external CSS demonstrating colors, borders, spacing, etc.	**CO3**
6. Write JavaScript functions and control the different components of Web page by predefined javascript objects 7. Validation of Form fields using Java Script	**CO4**
8. Use Bootstrap library and icons to develop a responsive websites 9. Validate a registration form (e.g., email, password strength, etc.). 10. Create a script for a calculator (Add, Subtract, Multiply, Divide)	**CO5**

Department: Computer Science and Engineering						
Semester: III			**Course Category: PC**			
Course Code	**Course**		**Period/Week**			**Credit**
			L	**T**	**P**	**C**
DCSPC215	**FUNDAMENTALS OF PYTHON PROGRAMMING LAB**		**0**	**0**	**2**	**1**
Prerequisite	***At the end of this course, the students will be able to:***					
Course Outcome	**CO1**	*To understand the basics of Python programming.*				
	CO2	*To implement various control structures on different data types and analyze the use of different data structures in Python.*				
	CO3	*Implement built-in functions and collections in Python.*				
	CO4	*Use the IO model in Python to read and write disk files*				
	CO5	*Create their own classes and use existing Python classes.*				

List of Practical

1. WAP for a simple calculator 2. WAP to convert Celsius to Fahrenheit	**CO1**
3. Write a Python program to find whether the given number is even or odd using if - if-else statement. 4. Write a Python program to check whether an input number is positive, negative, or zero using if–elif–else statement.	**CO2**
5. Write a Python program for printing the multiplication table of a given number using for loop 6. Implementation of Dictionaries, Sets, Tuples and Lists and its various methods in Python.	**CO3**
7. Implementation of file handling in Python. 8. Write a Python program to read data from file and extract record data from it	**C04**
9. Implement Data Abstraction and Inheritance. 10. Write a program to implement encapsulation	**C05**

Department: Computer Science and Engineering						
Semester: III			**Course Category: PC**			
Course Code	**Course**		**Period/Week**			**Credit**
			L	**T**	**P**	**C**
DCSPC217	**FUNDAMENTALS OF DATA STRUCTURE WITH C LAB**		**0**	**0**	**2**	**1**
Prerequisite	***At the end of this course, the students will be able to:***					
Course Outcome	**CO1**	*Identify the problem and formulate an algorithm for it.*				
	CO2	*Identify the best data structures to solve the problem*				
	CO3	*Store data, process data using appropriate data structures*				
	CO4	*Implement trees and various traversing techniques.*				
	CO5	*Implement various searching and sorting algorithms and compare them to check efficiency.*				

List of Practical

1. Addition of two matrices using functions	**CO1**
2. Multiplication of two matrices	
3. Insertion and deletion of elements in linked list	**CO2**
4. Insertion and deletion of elements in doubly linked list	
5. Push and pop operation in stack	**CO3**
6. Inserting and deleting elements in queue	
7.Program for pre-order, post order and in order traversal of binary tree.	**CO4**
8.The selection sort technique	**CO5**
9. The bubble sort technique	
10. The quick sort technique	
11. The merge sort technique	

Department: Computer Science and Engineering						
Semester: III			**Course Category: PC**			
Course Code	**Course**		**Period/Week**			**Credit**
			L	**T**	**P**	**C**
DCSPC219	**CYBER SECURITY ESSENTIALS LAB**		**0**	**0**	**2**	**1**
Prerequisite	***At the end of this course, the students will be able to:***					
Course Outcome	**CO1**	*Understand and demonstrate basic cybersecurity tools.*				
	CO2	*Perform basic network security analysis and scanning.*				
	CO3	*Protect data and systems using encryption and hardening techniques.*				
	CO4	*Identify cyber threats and demonstrate vulnerability exploitation techniques ethically.*				
	CO5	*Evaluate cyber risks and implement recovery strategies.*				

LIST OF PRACTICAL

1. Explore basic tools like antivirus software, firewalls, and password managers. 2. Create and Evaluate Strong Passwords.	**CO1**
3. Perform a basic network scan to identify open ports and services. 4. Explore IP Address and Subnetting.	**CO2**
5. Encrypt files using open-source tools. 6. Install and Configure Antivirus Software.	**CO3**
7. Identify and analyze phishing emails/websites. 8. Understand password vulnerabilities.	**CO4**
9. Perform a risk analysis of a given digital scenario. 10. Use cloud or local tools to backup and recover data.	**CO5**

DETAILED SYLLABUS
DIPLOMA 2nd Year

- **Computer Science & Engineering 4th Semester**

(Effective from Session: 2025-26)

Diploma in Computer Science and Engineering						
Semester: IV				**Course Category: HS**		
Course Code	**Course**		**Period / Week**			**Credit**
			L	**T**	**P**	**C**
DHS202	**COMMUNICATION SKILLS-II**		**2**	**0**	**0**	**2**
Prerequisite	***At the end of this course, the students will be able to:***					**Bloom's Level**
Course Outcome	**CO1**	*Frame Correct sentences with language*				K1
	CO2	*Comprehend the language correctly.*				K2
	CO3	*Mastering writing skills.*				K3
	CO4	*Learning classified knowledge on speaking etiquettes*				K1, K3
	CO5	*Identifying and evaluating the entire concepts of Presentation Skills*				K2, K3
UNIT – I	**DESCRIPTIVE GRAMMAR**					**Contact Hours: 06**
Tense, Preposition, Conjunction, Comparison of Adverbs, Simple, Compound & Complex Sentences Adverb						**CO1**
UNIT – II	**READING SKILLS**					**Contact Hours: 06**
Unseen Passages for comprehension, Vocabulary enhancement:- Prefix, Suffix, Synonyms, Antonyms						**CO2**
UNIT – III	**PROFESSIONAL WRITING SKILLS**					**Contact Hours: 06**
Business Letters & its types, Memorandum, Circulars, Office orders, Professional Email, Resume & CV writing						**CO3**
UNIT – IV	**EFFECTIVE LEARNING PATTERNS FOR INTERVIEW ROUNDS**					**Contact Hours: 06**
Professional Interview Practices, Types of Interview (Placement, Govt. job, academics, research, internships & training), Do's and don'ts of Interview session						**CO4**
UNIT – V	**BUSINESS WRITING AND LITERARY WORK**					**Contact Hours: 06**
Business Letters & its types, Memorandum, Circulars, Office orders, Glossary of Literary term						**CO5**
Lecture Hours: 30		**Tutorials Hours :00**				**Total: 30**

Reference Books:

1.Business Communication by M. Raman, Oxford University Press,2006

2. Word Power Made by Easy by Norman Lewis, Goyal Publishers & Distributors Pvt. Ltd.1949

3.30 days to Better English by Norman Lewis, Pocket Books,1965

Diploma in Computer Science and Engineering						
Semester: IV					**Course Category: PC**	
Course Code	**Course**		**Period / Week**			**Credit**
			L	**T**	**P**	**C**
DCSPC210	**DATABASE STORAGE SYSTEM**		**3**	**0**	**0**	**3**
Prerequisite	***At the end of this course, the students will be able to:***					**Bloom's Level**
Course Outcome	**CO1**	*Understand the concept of Database system and Client Server Architecture*				K_2, K_3
	CO2	*Understand and develop the concepts of Data Modeling, Security and Integrity.*				K_2
	CO3	*Convert and compare the designs and differentiate between the keys*				K_3
	CO4	*Normalize the database using normal forms.*				K_2
	CO5	*Understand and execute different SQL queries and PL / SQL programs*				K_2, K_3
UNIT – I	**Introduction To Database Systems**					**Contact Hours: 08**
Database concepts:-Data, Database, Database management system, File system vs DBMS, Applications of DBMS, Data Abstraction, Data Independence, Database Schema,						**CO1**
UNIT – II	**Data Model**					**Contact Hours: 08**
Define data model, Data Models: Network Model, Hierarchical Model, E-R Model, Advantages & Disadvantages of each Data Model **ER Model:** Entity sets and relationship sets- Attributes - Keys in entity and relationship sets: (a) Super Key (b) Candidate Key (c) Primary Key (e) Unique Key - Mapping constraints, Participation Constraint, E-R diagram,						**CO2**
UNIT – III	**Relation Model**					**Contact Hours: 08**
Definition of Relations, Schema, Subschema. Relational Model Constraints (Domain, Tuple Uniqueness, Key Constraints, Integrity Constraints, Entity constraints). Relations algebra (Basic operations: Union, intersection, difference, and Cartesian product), Converting ER Model to Relational Model.						**CO3**
UNIT – IV	**Relational Database Design**					**Contact Hours: 08**
Purpose of Normalization, Functional Dependencies and Decomposition, Process of Normalization using 1NF, 2NF, 3NF, multivalued dependencies and BCNF, Fourth Normal Form, Fifth Normal Form,						**CO4**
UNIT – V	**MYSQL/SQL**					**Contact Hours: 08**
Data definition language, Data manipulation language, SQL, Object naming conventions, Object naming guidelines, Data types, Tables (Creating, Inserting, Updating, and deleting tables and using constraints), Views, Indexes, SQL Command:- DESCRIBE, SELECT, WHERE CLAUSE, DISTINCT CLAUSE, ORDER BY, HAVING, LOGICAL OPERATIONS, SQL OPERATORS, JOIN Aggregate functions, String functions, Date and time functions, and Null values						**CO**
Lecture Hours: 40		**Tutorials Hours:00**				**Total: 40**

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests
- Actual laboratory and practical work, exercises, and viva-voce
- Software installation, operation, development, and viva-voce

Reference Books:

1. *Database System Concepts by Abraham Silberschatz, 2019*
2. *Database Management System by Raghu Ramakrishna 1996*
3. *Fundamentals of Database Systems by Ramez Elmasri, 2008*

Diploma in Computer Science and Engineering						
Semester: IV				**Course Category: PC**		
Course Code	**Course**		**Period / Week**			**Credit**
			L	**T**	**P**	**C**
DCSPC212	**JAVA OBJECT-ORIENTED PROGRAMMING**		**2**	**1**	**0**	**3**
Prerequisite	***At the end of this course, the students will be able to:***					**Bloom's Level**
Course Outcome	**CO1**	*Install Java IDE, Compiler, and Java virtual machines debug and compile the program written in Java..*				K_1,K_2,K_4
	CO2	*Use the techniques and be able to interpret the drawing in the Engineering field.*				K_2,K_3
	CO3	*Draw exploded views of components & assemblies in preparation of the service drawing.*				K_2,K_3,K_4,K_5
	CO4	*Draw free-hand sketches of the schematic diagrams of electronic circuits, using standard symbols.*				K_2,K_3
	CO5	*Prepare a drawing from the rough sketches provided and/or enlarge/reduce the given drawing to the desired scale.*				K_3,K_5,K_6
UNIT – I	**Introduction and Features**					**Contact Hours: 08**
Fundamentals of object-oriented programming–procedure-oriented programming Vs.object oriented programming (OOP), object-oriented programming concepts– Classes, objects, object reference, abstraction, encapsulation, inheritance, polymorphism, Introduction of Eclipse (IDE) for developing programs in Java.						**CO1**
UNIT – II	**Language Constructs**					**Contact Hours: 08**
Variables, types and type declarations, data types: Integer, floating point type, character, boolean, all Operators, iteration and jump statement, if-then-else clause; conditional expressions, input using scanner class and output statement, loops, switch case, arrays, methods.						**CO2**
UNIT – III	**Inheritance**					**Contact Hours: 08**
Definition of inheritance, protected data, private data, public data, constructor chaining, order of invocation, types of inheritance, single inheritance, multilevel inheritance, hierarchical inheritance, hybrid inheritance, access control (Private Vs Public Vs Protected Vs Default)						**CO3**
UNIT – IV	**Abstract Class and Interface**					**Contact Hours: 08**
Defining an interface, the difference between classes and interface, Key points of Abstract class & interface, difference between an abstract class & interface, and implementation of multiple inheritance through interface.						**CO4**
UNIT – V	**Polymorphism**					**Contact Hours: 08**
Method and constructor overloading, method overriding, up-casting, and down-casting.						**CO5**
Lecture Hours: 30		**Tutorials Hours:10**				**Total: 40**

Reference Books:

1. Programming with Java: A Primer; E. Balagurusamy
2. Head First Java, O'Reilly, Kathy Sierra & Bert Bates.
3. OCA Java SE Programmer I Certification Guide, Wiley Publisher, Mala Gupta
4. PROGRAMMER'S GUIDE TO JAVA SE 8, Pearson, Khalid E Mughal

Diploma in Computer Science and Engineering						
Semester: IV					**Course Category: PC**	
Course Code	**Course**		**Period / Week**			**Credit**
			L	**T**	**P**	**C**
DCSPC214	**WEB DEVELOPMENT USING PHP**		**2**	**1**	**0**	**3**
Prerequisite	***At the end of this course, the students will be able to:***					**Bloom's Level**
Course Outcome	**CO1**	*Creating the PHP statements using get and POST methods.*				K_2
	CO2	*Storage of Cookies at the client side and creation of server-side session using timeout.*				K3,
	CO3	*How to Create a Database using MySQL and Oracle Database.*				K2
	CO4	*How to Create Blogs, Links to Post, Wrapping Text Around Images.*				K3
	CO5	*How WordPress Works: Installation of WordPress.*				K3,K4
UNIT – I	**Introduction to PHP**					**Contact Hours:08**
Introduction to PHP: How PHP Works, The php.ini File, Basic PHP Syntax, PHP variables, statements, operators, decision making, loops, arrays, strings, PHP OOP concept, PHP forms (form handling, validation), get and post methods, functions						**CO1**
UNIT – II	**COOKIES**					**Contact Hours:08**
Introduction to cookies, storage of cookies at the client side, and using information from cookies. Creating single or multiple server side sessions. Timeout in sessions.						**CO2**
UNIT – III	**PHP with MYSQL**					**Contact Hours: 08**
Introduction to MySQL, connecting to MySQL, database, creation, insertion, deletion, and retrieval of MySQL data using PHP						**CO3**
UNIT – IV	**Blogging**					**Contact Hours:08**
Introduction to Blogging, Creating Blogs, Using Images, Wrapping Text Around Images, Comments, Post Formats, Linking to Posts, Pages, and Categories, Using Smilies, Links Manager, WordPress Feeds, Using Password Protection.						**CO4**
UNIT – V	**WordPress**					**Contact Hours: 08**
Introduction to content management systems based on PHP, Introduction to WordPress, How WordPress Works, Installation of WordPress						**CO5**
Lecture Hours :30		**Tutorials Hours:10**				**Total:40**

Reference Books:

4. PHP and MySQL Web Development, by Luke Welling, Pearson Education India.
5. WordPress Web Application Development, Packet Publishing.
6. Head First PHP & MySQL, O'Reilly Media, Inc., Michael Morrison, Lynn Beighley
7. Building Web Apps with WordPress: WordPress as an Application Framework, by Brian Messenlehner and Jason Coleman, O'Reilly Media

Text Book

1. PHP in a Nutshell
2. PHP: The Complete Guide for Beginners, Intermediate, and Advanced Detailed Approach To Master PHP Programming

Department: Computer Science and Engineering						
Semester: IV			**Course Category: PC**			
Course Code	**Course**		**Period / Week**			**Credit**
			L	**T**	**P**	**C**
DCSPC216	**OPERATING SYSTEMS**		**2**	**1**	**0**	**3**
Prerequisite	***At the end of this course, the students will be able to:***					**Bloom's Level**
Course Outcome	**CO1**	*Operating System interface and system calls*				K1,K3
	CO2	*Process management, CPU scheduling, and Deadlock concepts*				K3
	CO3	*Memory Allocation and Variable Partition*				K3,K5
	CO4	*Types of File Systems*				K2,K3
	CO5	*Linux System Requirements and Linux Commands*				K2,K3
UNIT – I	**OPERATING SYSTEM INTERFACE AND SYSTEM CALLS**					**Contact Hours: 08**
Definition of Operating Systems, Types of Operating Systems, Operating System Services, User Operating System Interface, System Calls, Types of System Calls, System Programs, Operating System Structure, Virtual Machine, Benefits of Virtual Machine.						**CO1**
UNIT – II	**PROCESS MANAGEMENT, CPU SCHEDULING**					**Contact Hours: 08**
Process concept, Process State, Process Control Block, Scheduling Queues, Scheduler, Job Scheduler, Process Scheduler, Context Switch, Operations on Processes, CPU Scheduler, Scheduling Criteria, Scheduling Algorithms, Preemptive and Non-Preemptive, First come first serve (FCFS), Shortest Job first (SJF), Round Robin (RR), Multiprocessor scheduling.						**CO2**
UNIT – III	**MEMORY MANAGEMENT CONCEPT**					**Contact Hours: 08**
Definition – Logical and Physical address Space, Swapping, Memory allocation, Contiguous Memory allocation, Fixed and variable partition, Internal and External fragmentation, and Compaction.						**CO3**
UNIT – IV	**FILE MANAGEMENT, DEADLOCK**					**Contact Hours: 08**
Types of File System: Simple file system, Basic file system, Logical file system, Physical file system. Definition –Logical and Physical address Space, Swapping, Memory allocation, Contiguous Memory allocation, Fixed and variable partition, Internal and External fragmentation and Compaction.						
UNIT – V	**LINUX OPERATING SYSTEM**					**Contact Hours: 08**
History of Linux and Unix, Linux Overview, Structure of Linux, Linux releases, Open Linux, Linux System Requirements, Linux Commands and Filters: mk-dir, cd,rmdir,pwd, ls, who, whoami, date, cat,chmod, cp, mv, rm, sort, kill, write.						**CO5**
Lecture Hours: 30		**Tutorials Hours:10**				**Total: 40**

Reference Books:

1. Operating System Concepts by Silberschatz, Galvin; Wiley Publication.
2. Operating Systems by Stallings; Tata McGraw-Hill.
3. Operating Systems- A Concept-Based Approach by DhamDhare; Tata McGraw-Hill Education Pvt Ltd , New Delhi
4. Operating Systems by Achyut S Godbole and AtulKahate; Tata McGraw Hill Education Pvt Ltd , New Delhi
5. Unleashed Linux by Tech Media Publishers, New Delhi

Department: Computer Science and Engineering						
Semester: IV			**Course Category: PC**			
Course Code	**Course**		**Period / Week**			**Credit**
			L	**T**	**P**	**C**
DCSPC218	**DATA PROCESSING AND VISUALIZATION**		**3**	**0**	**0**	**3**
Prerequisite	***At the end of this course, the students will be able to:***					**Bloom's Level**
Course Outcome	**CO1**	*Understand and Apply Data Preprocessing Techniques.*				K1,K2
	CO2	*Perform Data Wrangling and Transformation.*				K3, K4
	CO3	*Conduct Exploratory Data Analysis.*				K2,K3
	CO4	*Create Effective Visualizations Using Matplotlib and Seaborn.*				K1,K2
	CO5	*Develop Interactive Dashboards and Perform Real-World Data Visualization.*				K3
UNIT – I	**Introduction to Data and Preprocessing**					**Contact Hours: 08**
Introduction to Data Science, Types of Data: Structured vs Unstructured, Data Formats: CSV, JSON, Excel, SQL, Importing & Exporting Data in Python, Introduction to Pandas and NumPy, Data Cleaning Basics: Handling Missing, Duplicate & Invalid Data.						**CO1**
UNIT – II	**Data Wrangling and Transformation**					**Contact Hours: 08**
Filtering, Sorting, and Indexing Data, Aggregation, Grouping, and Summarization, Merge, Join, and Concatenate operations, Feature Engineering Basics, Lambda Functions and Apply Method in Pandas, Handling Categorical Data and Encoding.						**CO2**
UNIT – III	**Exploratory Data Analysis**					**Contact Hours: 08**
Importance and Steps in EDA, Descriptive Statistics: Mean, Median, Mode, Std. Dev., Percentiles, Outlier Detection and Treatment, Correlation and Covariance, Frequency Distributions and Crosstabs, Boxplots, Histograms, and Violin Plots, Data Profiling and Reporting.						**CO3**
UNIT – IV	**Data Visualization using Matplotlib and Seaborn**					**Contact Hours: 08**
Principles of Good Visualization, Line Plot, Bar Chart, Scatter Plot, Histogram, Pie Chart, Customizing Plots: Titles, Legends, Colors, Annotations, Subplots and Figure Layouts, Seaborn: Count plot, Boxplot,Pair plot, Multi-dimensional Plotting- Styling and Exporting Graphs.						
UNIT – V	**Advanced Visualization & Real-world Projects**					**Contact Hours: 08**
Dashboarding Basics with Plotly/Streamlit, Interactive Visualizations, Time Series Plotting, Geographic Data Visualization (Intro to Geo-Pandas or Folium), Data Storytelling & Visual Narrative, Capstone Project: Data Processing to Visualization, Case Study: Real-World Dataset EDA + Visualization						**CO5**
Lecture Hours: 40		**Tutorials Hours:00**				**Total: 40**

Reference Books:

1. *Python for Data Analysis by Wes McKinney.*
2. *Data Science from Scratch by Joel Grus.*
3. *Interactive Data Visualization with Python by Abha Belorkar, Kamal Kant Hiran.*

Diploma in Computer Science and Engineering						
Semester: IV			**Course Category: PC**			
Course Code	**Course**		**Period/Week**			**Credit**
			L	**T**	**P**	**C**
DCSPC220	**DATABASE STORAGE SYSTEM LAB**		**0**	**0**	**2**	**1**
Prerequisite	***At the end of this course, the students will be able to:***					
Course Outcome	**CO1**	*Understand the concept of Database system and Client Server Architecture*				
	CO2	*Understand and develop the concepts of Data Modeling, Security and Integrity.*				
	CO3	*Convert and compare the designs and differentiate between the keys*				
	CO4	*Normalize the database using normal forms.*				
	CO5	*Understand and execute different SQL queries and PL / SQL programs*				

LIST OF PRACTICAL

1.**Creating Database:** (i)Creating a database (ii)Creating table **2. Table and Record Handling:** −INSERT statement −Using SELECT and INSERT together −DELETE, UPDATE, TRUNCATE Statement. −DROP, ALTER statement	**CO1**
3.Write queries using DDL Statements for following operations− 1)Create, alter, truncate, drop, rename table 2) Apply Key Constraints for suitable relation **4.Write queries using DML Statements for following operations−** 1) Select, Insert, delete, update, table 2) Apply Key Constraints for suitable Relation.	**CO2**
5. Retrieving Data From a Database: The SELECT statement −Using the WHERE clause −Using Logical Operators in the WHERE clause	**CO3**
6. Retrieving Data From a Database: − Using In, BETWEEN, LIKE, ORDER BY, GROUP BY & HAVING clause − Combining Tables Using JOINS **7.** Write SQL queries using different String Function	**CO4**
8. Write SQL queries using different String Function **9.** Write SQL queries using different Aggregate Function **10.** Create virtual tables and improve performance	**CO5**

Department: Computer Science and Engineering						
Semester: IV			**Course Category: PC**			
Course Code	**Course**		**Period / Week**			**Credit**
			L	**T**	**P**	**C**
DCSPC222	**JAVA OBJECT-ORIENTED PROGRAMMING -LAB**		**0**	**0**	**2**	**1**
Prerequisite	***At the end of this course, the students will be able to:***					**Bloom's Level**
Course Outcome	**CO1**	*Install Java IDE, Compiler, Java virtual machines debug and compile the program written in Java..*				K3,K4
	CO2	*Debug and compile the program written in Java. explain and implement class programs.*				K2,K3
	CO3	*Explain the concepts of OOPS. describe and implement inheritance concepts.*				K3
	CO4	*Explain and implement the abstract class and interface.*				K2
	CO5	*Explain and implement Polymorphism using Java program.*				K2,K3
1. WAP to create a simple class to find out the area of rectangle. 2. WAP to find the factor of number using user-input.						**CO1**
3. WAP to Swap two numbers without using third variable. 4. WAP to Swap two numbers using third variable. 5. WAP to print the table of any Number.						**CO2**
6. WAP for inheritance. *7.* WAP for multiple inheritance? How we solve multiple inheritance problem						**CO3**
8. WAP to design a class using abstract methods and classes. *9.* WAP to design a interface using abstract methods and classes. .						**CO4**
10. WAP for method Overloading. *11.* WAP for method Overriding.						**CO5**

Diploma in Computer Science and Engineering						
Semester: IV			**Course Category: PC**			
Course Code	**Course**		**Period/Week**			**Credit**
			L	**T**	**P**	**C**
DCSPC224	**WEB DEVELOPMENT USING PHP LAB**		**0**	**0**	**2**	**1**
Prerequisite	***At the end of this course, the students will be able to:***					
Course Outcome	**CO1**	*Design and Development of PHP program.*				
	CO2	*How to create a cookies in PHP.*				
	CO3	*How to establish a connection to access MYSQL database using PHP.*				
	CO4	*Many methods to create a Blog.*				
	CO5	*Design a form using get and post method.*				

List of Practical

1. Design PHP based web pages using correct PHP, CSS. 2. Write a Program in PHP to reverse a String	**CO1**
3. To store a cookie using PHP on client side. 4. Write a Program in PHP to print array elements.	**CO2**
5. Install and configure both PHP and MYSQL. 6. Design SQL language within MYSQL and PHP to access and manipulate databases.	**CO3**
7. Creation of basic Blogging website. 8. To save the user session on server side.	**CO4**
9. Design website using WordPress. 10. Design a Form by using get and post method.	**CO5**

Diploma in Computer Science and Engineering						
Semester: IV			**Course Category: PC**			
Course Code	**Course**		**Period/Week**			**Credit**
			L	**T**	**P**	**C**
DCSPC226	**OPERATING SYSTEM LAB**		**0**	**0**	**2**	**1**
Prerequisite	***At the end of this course, the students will be able to:***					
Course Outcome	**CO1**	*Installation of operating system and virtual machine.*				
	CO2	*shell program to find the factorial and check the number is prime or not.*				
	CO3	*Installation of Linux operating system and program based on linux command*				
	CO4	*Programming based on CPU scheduling.*				
	CO5	*Programming based on deadlock*				

LIST OF PRACTICALS

1.Demonstration of all the controls provided in windows control panel	**CO1**
2.Installation of Virtual Machine	
3.Write a shell program that finds whether a given number is prime or not.	**CO2**
4. Write a shell program that finds the factorial of a number.	
5. Installation of Linux Operating System	**CO3**
6.Usage of File Management commands of Linux: cat, chmod, cp, mv, rm, pg, more, find	
7.Write a program to find the average of three numbers.	**CO4**
8.Write a program to include the FCFS process	
9.Write a program for deadlock detection.	**CO5**
10.Write a program for deadlock avoidance	

Diploma in Computer Science and Engineering						
Semester: IV			**Course Category: PC**			
Course Code	**Course**		**Period/Week**			**Credit**
			L	**T**	**P**	**C**
DCSPC228	**DATA PROCESSING AND VISUALISATION**		**0**	**0**	**2**	**1**
Prerequisite	***At the end of this course, the students will be able to:***					
Course Outcome	**CO1**	*Demonstrate the ability to import/export data in various formats and apply techniques to handle missing, duplicate, and invalid data using Python tools like Pandas and NumPy.*				
	CO2	*Apply data manipulation techniques such as sorting, filtering, indexing, grouping, aggregation, and creation of derived features using Python libraries for effective data analysis.*				
	CO3	*Combine data from multiple sources and perform basic statistical analysis to find averages, percentiles, and outliers.*				
	CO4	*Analyze relationships between variables and visualize data using various charts like line, bar, scatter, histogram, boxplot, and pie.*				
	CO5	*Create interactive charts and basic dashboards, and apply complete data analysis and visualization on real-world datasets.*				

LIST OF PRACTICALS

1. Importing and Exporting Data in Python. 2. Handling Missing, Duplicate, and Invalid Data	**CO1**
3. Learn to sort, filter rows/columns and reset/set indexes. 4. Use group by, aggregation, and add new derived features.	**CO2**
5. Combine multiple Data Frames using merge, join, and concat. 6. Compute mean, median, mode, percentiles; detect outliers.	**CO3**
7. Analyze variable relationships with correlation and crosstab. 8. Create line, bar, scatter, histogram, boxplot, and pie charts.	**CO4**
9. Build basic dashboards and create interactive charts. 10. Perform full-cycle data analysis and visualization on a real dataset (e.g., Titanic, Iris, COVID-19).	**CO5**