UNIVERSITY POLYTECHNIC
BIRLA INSTITUTE OF TECHNOLOGY MESRA – 835215 (RANCHI)
DEPARTMENT OF COMPUTER ENGINEERING

NEW COURSE STRUCTURE – To be effective for Diploma 2023-24
Based on CBCS system & OBE model
Recommended scheme of study for
Diploma in Computer Engineering

Semester of Study	Category of course	Course Code	Subjects	Mode of delivery			Credits
				L	T	P	C
			THEORY				
FIFTH	Program Core	DCE 501	Java Programming	4	0	0	4
	Program Elective	PE-I: DPE 521/ DPE 522/ DPE 523		3	0	0	3
		PE-II: DPE 524/ DPE 525/ DPE 526		3	0	0	3
	Open Elective	OE-II: DOE 521/ DOE 522/ DOE 523		3	0	0	3
			SESSIONAL				
	Program Core	DCE 502	Java Programming Lab	0	0	2	1
		DCE 504	Multimedia Technology Lab	0	0	2	1
	Major Project	DPR 521	Major Project	0	0	4	2
	Summer Internship	DSI 521	Summer Internship	0	0	0	4
TOTAL CREDITS							21
Total Lectures Per Week							

Semester of Study	Category of course	Course Code	Subjects	Mode of delivery			Credits
				L	T	P	C
SIXTH			**THEORY**				
	Program Core	DCE601	Computer Hardware	3	0	0	3
	Program Elective	PE-III: DPE 621/ DPE 622/ DPE 623		3	0	0	3
		PE-IV: DPE 624/ DPE 625/ DPE 626		3	0	0	3
	Humanities and Social Sc.	DHS 601	Entrepreneurship and Start-ups	3	1	0	4
	Open Elective	OE-III: DOE 621/ DOE 622/ DOE 623		3	0	0	3
	Mandatory Course	DAU 601	Indian Constitution	2	0	0	0
			SESSIONAL				
	Program Core	DCE 602	Computer Hardware lab	0	0	2	1
	Program Core	DCE 604	IOT lab	0	0	2	1
	Seminar	DSE621	Seminar	0	0	2	1
	Major Project	DPR621	Project	0	0	4	2
	TOTAL CREDITS			**17**	**1**	**10**	**21**
	Total Lectures Per Week						
	GRAND TOTAL FOR THIRD YEAR						

(RAMNISH SINHA)
Abhay Kumar
(ABHAY KUMAR)

Ronakte
Trivedi

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BIRLA INSTITUTE OF TECHNOLOGY MESRA – 835215 (RANCHI)
DEPARTMENT OF COMPUTER ENGINEERING

PROGRAMME ELECTIVES (PE)

SEMESTER	Code no.	Name of the PE courses	Prerequisite/ Co-requisite courses	L	T	P	C
PE-I							
SEM-V	DPE521	Computer Graphics		3	0	0	3
	DPE522	Introduction to Cloud Computing		3	0	0	3
	DPE523	Object-oriented programming in C++		3	0	0	3
PE-II							
SEM- V	DPE524	Introduction to Computer Algorithms		3	0	0	3
	DPE525	Data Science		3	0	0	3
	DPE526	Multimedia and Animation		3	0	0	3
PE-III							
SEM- VI	DPE621	Foundations of AI/ML		3	0	0	3
	DPE622	Operations Research		3	0	0	3
	DPE623	Cyber Security		3	0	0	
PE-IV							
SEM- VI	DPE624	Internet of Things		3	0	0	3
	DPE625	Machine Learning		3	0	0	3
	DPE626	Computer Oriented Numerical and Statistical Methods		3	0	0	3

(RAMNISH SINHA)

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DEPARTMENT OF COMPUTER ENGINEERING

OPEN ELECTIVES (OE)*

SEMESTER	Code no.	Name of the PE courses	Prerequisite/ Co-requisite courses with code	L	T	P	C
OE-I							
SEM-IV	DOE421	C Programming Language		3	0	0	3
	DOE422	Introduction to Python		3	0	0	3
	DOE423	Data Base Concepts		3	0	0	3
OE-II							
SEM- V	DOE521	Web Programming Concepts		3	0	0	3
	DOE522	Data Structures in C		3	0	0	3
	DOE523	PC Maintenance & Networking		3	0	0	3
OE-III							
SEM- VI	DOE621	Intro. to Computer Graphics		3	0	0	3
	DOE622	Intro. to Machine Learning		3	0	0	3
	DOE623	Introduction to Multimedia		3	0	0	3
*OPEN ELECTIVES TO BE OPTED ONLY BY OTHER DEPARTMENT STUDENTS							

UNIVERSITY POLYTECHNIC
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DEPARTMENT OF COMPUTER ENGINEERING

JAVA PROGRAMMING

PROGRAMME: Diploma in Computer Engineering							
COURSE CODE: **DCE 501**			COURSE TITLE: **JAVA PROGRAMMING**				
COMPULSORY: **Program Core**							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HRS/WK	CREDIT	PE	FINAL	TOTAL
4	0	0	4	4	50	50	100

RATIONALE:

1	Introduces Java's background, features, and setup to build a strong foundation for programming.
2	Covers essential syntax, data handling, and logic building through operators, arrays, and control flow.
3	Develops object-oriented programming skills using classes, constructors, inheritance, and I/O operations.
4	Focuses on code modularity, abstraction, and multiple inheritance using packages and interfaces.
5	Explores advanced concepts for building interactive, multithreaded, and networked Java applications.

COURSE OUTCOMES:

At the end of the course students will be able to:

1.	Students will be able to describe the role of Java in internet-based applications, understand OOP principles, set up the Java environment, and write and execute basic Java programs.
2.	Students will be able to implement data types, arrays, string operations, and apply decision-making and looping constructs in Java programs.
3.	Students will be able to create classes and objects, use constructors, implement various types of inheritance, and perform input/output operations in Java.
4.	Students will be able to develop modular applications using packages, abstract classes, and interfaces, including multiple inheritance through interfaces.
5.	Students will be able to handle exceptions, create and manage threads, design basic GUI applications, and implement Java-based networking and applet programs.

COURSE CONTENT DETAILS:

Module	Topics/Subtopics
1.	**TITLE: Describe Internet role, advantages and, environment setup of Java.** 1.1 Basics of Java, Background/History of Java, Java and the Internet, Advantages of Java 1.2 Java Virtual Machine & Byte Code 1.3 Java Environment Setup 1.4 Java Program Structure 1.5 Procedure-Oriented vs. Object-Oriented Programming concept 1.6 Basics of OOP: Abstraction, Inheritance, Encapsulation, Classes, subclasses and super classes, Polymorphism 1.7 Compiling and running a simple "Hello World" program: Setting Up Your Computer, Writing a Program, Compiling, Interpreting and Running the program, Common Errors **Course Outcome: CO1** **Teaching Hours: 8 hrs**
2.	**TITLE: Explain Data types, Arrays and String Handling, Different Operators, Decision & Control Statements.** 2.1 Primitive Data Types : Integers, Floating Point type, Characters, Booleans 2.2 User Defined Data Type 2.3 Identifiers & Literals 2.4 Declarations of constants & variables 2.5 Type Conversion and Casting 2.6 Scope of variables & default values of variables declared 2.7 Wrapper classes 2.8 Comment Syntax 2.9 Garbage Collection 2.8 Arrays of Primitive Data Types 2.9 Types of Arrays 2.10 Creation, concatenation and conversion of a string, changing case of string, character extraction, String 2.11 Different Operators: Arithmetic, Bitwise, Rational, Logical, Assignment, Conditional, Ternary, Increment and Decrement, Mathematical Functions 2.12 Decision & Control Statements: Selection Statement (if, if...else, switch), Loops (while, do-while, for), Jump statements (break, continue, return & exit) **Course Outcome: CO2** **Teaching Hours: 10 hrs**
3.	**TITLE: Define Objects and Classes and methods, Constructors, Types of inheritance, Input and Output.** 3.1 Defining classes, fields and methods, creating objects, accessing rules, this keyword, static keyword, method overloading, final keyword 3.2 Constructors: Default constructors, Parameterized constructors, Copy constructors, Passing object as a parameter, constructor overloading Basics of Inheritance, 3.3 Types of inheritance: single, multiple, multilevel, hierarchical and hybrid inheritance, concepts of method overriding, extending class, super class, subclass, dynamic method dispatch & Object class 3.4 Input and output using Scanner Class and BufferedReader Class **Course Outcome: CO3** **Teaching Hours: 10 hrs**

Abhay Kumar
(NIRAJ KUMAR) Gmabte

4.	**TITLE: Package, Interface** 4.1 Creating package, importing package, access rules for packages, class hiding rules in a package. 4.2 Abstract class and final class 4.3 Defining interface, inheritance on interfaces, implementing interface, multiple inheritance using 4.4 interface Defining interface, inheritance on interfaces, implementing interface, multiple inheritance using interface 4.5 Explain inheritance on interfaces, implementing interface, multiple inheritance using interface. **Course Outcome: CO4** **Teaching Hours: 8 hrs**
5.	**TITLE: Explain errors, & exceptions, Thread, Graphics, Applet** 5.1 Types of errors, exceptions, try..catch statement, multiple catch blocks, throw and throws keywords, finally clause, uses of exceptions, user defined exceptions 5.2 Creating thread, extending Thread class, implementing Runnable interface, life cycle of a thread, Thread priority & thread synchronization, exception handing in threads 5.3 Graphics programming using AWT Simple ,AWT , Components Window and Frame Create Frame ,Event Delegation, Closing Frame Use Frame, Drawing in the Frame , Filling with Colors. 5.4 Applet Programming 5.5 Networking in java TCP/IP Protocol ,UDP, Socket, Knowing IP address, URL, Creating a server/Client that Sends Data. **Course Outcome: CO5** **Teaching Hours: 10 hrs**

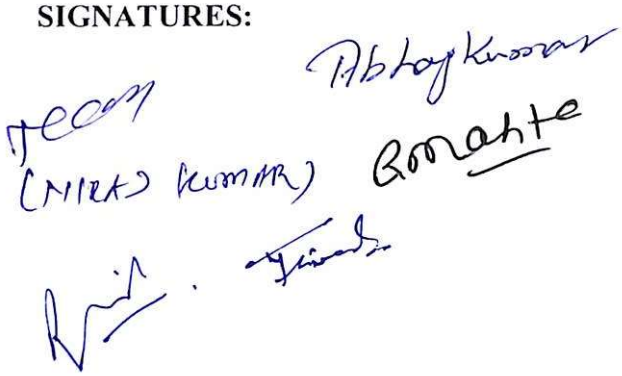
TEXT & REFERENCE BOOKS:

S. N.	Authors	Title of Books	Publication	ISBN
1.	Hebert Schildt	Java: The Complete Reference, Seventh Edition	Tata McGraw Hill 2 E, 2007	978-0-07-226385-5
2.	Balagurusamy	Programming with Java	Tata McGraw Hill, 2023	9355325894, 978-9355325891
3.	Cay S. Horstmann, Gray Cornell	Core Java, Vol I-Fundamentals Java Series,	Sun MicroSystem	0143130447, 978-0143130444

CO VS PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	3	3	3	1	1	3	3	3	3
CO2	3	3	3	3	1	1	3	3	3	3
CO3	3	3	3	3	1	1	3	3	3	3
CO4	3	3	3	3	1	1	3	3	3	3
CO5	3	3	3	3	1	1	3	3	3	3

SIGNATURES:



COURSE:COMPUTER GRAPHICS

PROGRAMME: DIPLOMA IN COMPUTER ENGINEERING							
COURSE CODE:**DPE 521**			COURSE TITLE: **COMPUTER GRAPHICS**				
COMPULSARY / ELECTIVE: **ELECTIVE**							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WEEK	CREDIT	PE	FINAL	TOTAL
3	0	0	3	3	Q-20, TA-5, MID-25	50	100

L= Lecture, T= Tutorial and P= Practical, Q= Quiz, TA= Teacher Assessment, MID= Mid Semester

Course Objectives

This course envisions to impart to students to:

A.	This unit introduces the core components and technologies of computer graphics systems, including display types, rendering methods, input/output devices, graphics software, and 3D visualization tools like VR and stereoscopic systems.
B.	This unit explains the basic building blocks of computer graphics by focusing on how points, lines, and circles are generated and rendered using efficient algorithms and frame buffer techniques.
C.	This unit covers essential 2D transformation techniques using matrix operations to perform and combine geometric changes like translation, rotation, scaling, reflection, and shear in graphical objects.
D.	This unit explains the 2D viewing process, including coordinate transformations and various clipping techniques, to control what part of a scene is displayed on the screen.
E.	This unit focuses on representing and manipulating 3D objects using polygons, mathematical models, and geometric transformations to create realistic shapes and surfaces in computer graphics.

Course Outcomes

After the completion of this course, students will be able to:

CO1	Can perform visual computations for geometrical drawings.
CO2.	Can model 2D objects.
CO3.	Apply geometrical transformation of the modelled objects.
CO4.	Can develop simple Graphical User Interface.
CO5.	Students will be able to represent and transform 3D objects using polygon surfaces, curved geometry, and geometric transformation techniques.

SYLLABUS

S.NO	MODULE
1.	**Module – I** 1. **Introduction to Graphics Systems**: 1. 1. Video Display Devices 1.2. Raster Scan Systems 1.3. Random Scan Systems 1.4. Graphics Monitors and Workstations 1.5. Input Devices, Hard Copy Devices, Graphics Software. 1.6. Three-Dimensional Viewing, Devices, Stereoscopic & Virtual Reality Systems **Course Outcome: CO1** **Teaching Hours: 8 hrs**
2.	**Module – II** 2. **Output Primitives**: 2.1. Points and Lines 2.2. Line Drawing Algorithms (DDA and Bresenham's Algorithms) 2.3. Loading the Frame Buffer 2.4. Circle Generating Algorithm. **Course Outcome: CO2** **Teaching Hours: 6 hrs**
3.	**Module – III** 3. **2D Transformation**: 3.1. Basic Transformations 3.2. Matrix Representations and Homogeneous Coordinates 3.3. Composite Transformations(Translations, Rotations, Scalings), 3.4. Other Transformations (Reflection and Shear) **Course Outcome: CO3** **Teaching Hours: 8 hrs**
4.	**Module – IV** **4. 2D Viewing** 4.1. The Viewing Pipeline 4.2. Viewing Coordinate Reference Frame 4.3. Window- to- Viewport Coordinate Transformation 4.4. Clipping- Point, Cohen-Sutherland 4.5. Line Clipping and Sutherland Hodgeman polygon clipping, Text cliping **Course Outcome: CO4** **Teaching Hours: 6 hrs**
5.	**Module – V** **5. Three-Dimensional object representation:** 5.1. Polygon Surfaces 5.2. Polygon Tables 5.3. Plane Equations 5.4. Curved Lines and Surfaces **5.5. Three-Dimensional Geometric and Modeling Transformations:** Translation, Rotation, Scaling, Other Transformations **Course Outcome: CO5** **Teaching Hours: 8 hrs**

TEXT BOOKS:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	"Computer Graphics: C Version"	Hearn D. and Baker M. P, 2nd Edition, Pearson Education, 1994	0131615300, 978-0131615304
2.	"Computer Graphics: Principles andPractice in C"	Foley J. D., Dam A. Van, Feiner S. K. and Hughes J. F., 3rd Edition, Pearson Education, 2013.	0321399528, 978-0321399526

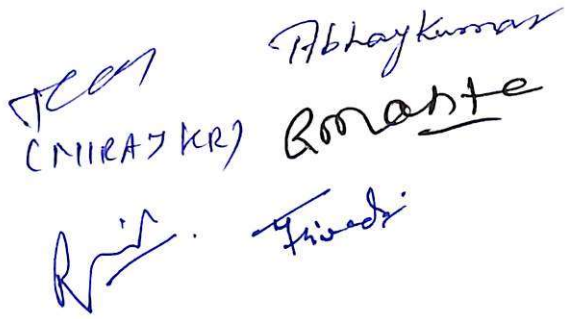
Mapping of Course Outcomes onto Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	3	3	2	1	1	2	1	2	2
CO2	3	1	1	1	1	3	1	3	2	3
CO3	2	3	3	1	2	1	2	2	2	3
CO4	1	1	3	3	1	1	1	2	3	3
CO5	3	3	3	1	2	1	1	1	2	3

Correlation Levels 1, 2 or 3 as defined below:

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

SIGNATURES:



COURSE: INTRODUCTION TO CLOUD COMPUTING

PROGRAMME: DIPLOMA IN COMPUTER ENGINEERING							
COURSE CODE:**DPE 522**			COURSE TITLE: **INTRODUCTION TO CLOUD COMPUTING**				
COMPULSARY / ELECTIVE: **ELECTIVE**							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WEEK	CREDIT	PE	FINAL	TOTAL
3	0	0	3	3	Q-20, TA-5, MID-25	50	100

L= Lecture, T= Tutorial and P= Practical, Q= Quiz, TA= Teacher Assessment, MID= Mid Semester

RATIONALE:

This course envisions to impart to students to:

A.	This module provides an overview of cloud computing, highlighting its vision, benefits, essential service requirements, dynamic infrastructure, and defining characteristics that distinguish it from traditional computing.
B.	This module introduces the fundamentals of parallel and distributed computing, covering processing principles, hardware architectures, programming approaches, system components, architectural styles, and communication models essential for efficient computation.
C.	This module explores virtualization as a core technology in cloud computing, detailing its characteristics, types, advantages and disadvantages, and its role in storage and network-based infrastructure like SAN, NAS, and cloud servers.
D.	This module explains the architecture of cloud computing through the cloud reference model, detailing its service layers—Infrastructure, Platform, and Software as a Service—and categorizing cloud types into public, private, hybrid, and community clouds.
E.	This module introduces Aneka, a cloud application development platform, detailing its framework and container architecture—including platform abstraction, core services, and application layers—used for building customizable Aneka-based cloud environments.

COURSE OUTCOMES:

At the end of the course students will be able to:completion of this course, students will be able to:

CO1	Students will be able to understand the vision, benefits, characteristics, and infrastructure requirements of cloud computing systems.
CO2	Students will be able to explain parallel and distributed computing architectures, programming models, and inter-process communication techniques.
CO3	Students will be able to analyze virtualization technologies, their types, advantages, and their integration with cloud computing infrastructures.
CO4	Students will be able to describe the cloud reference model and differentiate between various cloud service layers and deployment models.
CO5	Students will be able to comprehend the architecture of Aneka and its role in developing scalable and customizable cloud applications.

SYLLABUS

MODULES WITH TOPICS	
1. MODULE-I Introduction - Cloud Computing at a Glance 1.1. The Vision of Cloud Computing 1.2. Benefits and need for Cloud Computing 1.3. Cloud Services Requirements 1.4. Cloud and Dynamic Infrastructure 1.5. Cloud Computing Characteristics	
Course Outcome: CO1	**Teaching Hours: 6 hrs**
2. Module – II Principles of Parallel and Distributed Computing: 2.1. Elements of Parallel Computing- What is Parallel Processing? 2.2. Elements of Parallel Computing- Hardware Architectures for Parallel Processing 2.3. Elements of Parallel Computing- Approaches to Parallel Programming 2.4. Elements of Distributed Computing- Components of a Distributed System 2.5. Elements of Distributed Computing- Architectural Styles for Distributed Computing 2.6. Elements of Distributed Computing- Models for Inter-Process Communication	
Course Outcome: CO2	**Teaching Hours: 8 hrs**
3. Module – III Virtualization 3.1. Characteristics of virtualized environments 3.2 Taxonomy of virtualization techniques 3.3. Virtualization and cloud computing 3.4. Pros and cons of virtualization. 3.5 Storage virtualization - Storage Area Networks 3.6. Network-Attached storage - Cloud Server	
Course Outcome: CO3	**Teaching Hours: 8 hrs**
4. MODULE – IV Cloud computing architecture 4.1. Cloud reference model- Architecture 4.2. Cloud reference model- Infrastructure / Hardware as a Service 4.3. Cloud reference model- Platform as a Service 4.4. Cloud reference model- Software as a Service 4.5. Types of Clouds- Public Clouds, Private Clouds, Hybrid Clouds, Community Clouds	
Course Outcome: CO4	**Teaching Hours: 8 hrs**
5. **MODULE – V Introduction to Aneka** 5.1. Framework Overview 5.2. Anatomy of the Aneka Container- Platform Abstraction Layer 5.3. Anatomy of the Aneka Container- Fabric Services 5.4. Anatomy of the Aneka Container- Foundation Services 5.5. Anatomy of the Aneka Container- Application Service 5.6. Building Aneka Clouds	
Course Outcome: CO5	**Teaching Hours: 6 hrs**

TEXT BOOKS:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	"Mastering Cloud Computing"	Raj Kumar Buyya, Christian Vecchiola & S. Thamarai Selvi, Mc Graw Hill Publication, New Delhi – 2013	0124114547, 978-0124114548
2.	"Cloud Computing: A Practical Approach"	T. Velte, A. Velte and R. Elsenpeter, Mc Graw Hill, India,	0071626948, 978-0071626941

Reference Books:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	"Cloud Computing: Principles and Paradigms"	R. Buyya, J. Broberg, Wiley	9788126541256, 978-8126541256
2.	"Distributed and Cloud Computing, From Parallel Processing to the Internet of Things"	K. Hwang, G. Fox and J. Dongarra, Morgan Kaufmann, 2012.	978-0128002049

CO VS PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	3	3	3	1	1	3	3	3	3
CO2	3	3	3	3	1	1	3	3	3	3
CO3	3	3	3	3	1	1	3	3	3	3
CO4	3	3	3	3	1	1	3	3	3	3
CO5	3	3	3	3	1	1	3	3	3	3

SIGNATURES:

CHIRAG KUMAR

COURSE: OBJECT-ORIENTED PROGRAMMING IN C++

PROGRAMME: DIPLOMA IN COMPUTER ENGINEERING							
COURSE CODE:**DPE 523**			COURSE TITLE: **OBJECT-ORIENTED PROGRAMMING IN C++**				
COMPULSARY / ELECTIVE: **ELECTIVE**							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WEEK	CREDIT	PE	FINAL	TOTAL
3	0	0	3	3	Q-20, TA-5, MID-25	50	100

L= Lecture, T= Tutorial and P= Practical, Q= Quiz, TA= Teacher Assessment, MID= Mid Semester

RATIONALE:

This course envisions to impart to students to:

A.	This module introduces the fundamentals of object-oriented programming and functions, covering key concepts like function overloading, reference variables, optional parameters, and basic console I/O for effective program design.
B.	This module explains the core concepts of classes and objects in object-oriented programming, emphasizing access specifiers, object manipulation, static members, friend functions, and object return techniques for modular code design.
C.	This module explores constructors and destructors, highlighting their role in object lifecycle management, along with concepts like parameterization, dynamic initialization, copy constructors, and operator overloading for enhanced object behavior control.
D.	This module focuses on inheritance and polymorphism in object-oriented programming, explaining access control, types of inheritance, virtual functions, abstract classes, and the use of pointers for dynamic behavior and code reusability.
E.	This module introduces console I/O and file handling in C++, covering stream classes, formatted/unformatted I/O, file operations, sequential and random access techniques, and error handling for robust data management.

COURSE OUTCOMES:

At the end of the course students will be able to:completion of this course, students will be able to:

CO1	Students will be able to understand the basics of object-oriented programming, function handling, overloading, and console I/O operations.
CO2	Students will be able to design and implement classes with various member types and understand object interactions, including static members, arrays, and friend functions.
CO3	Students will be able to apply different types of constructors, destructors, and operator overloading to manage and extend object behaviors.
CO4	Students will be able to implement different types of inheritance, function overriding, and polymorphism using virtual functions and pointers.
CO5	Students will be able to perform formatted and unformatted I/O operations and manage file handling using streams, sequential access, and error management.

SYLLABUS

MODULES WITH TOPICS

1. MODULE-I Introdution to Object Oriented Programming & functions:

1.1. Introduction to Object Oriented Programming
1.2. Overview of function
1.3. Optional parameters in function, Reference variables
1.4. Function overloading
1.5. Basics of console I/O

Course Outcome: CO1 **Teaching Hours: 6 hrs**

2. Module – II : Classes and Objects:

2.1. Significance of classes and objects
2.2. Creating a class - Private and public members of class, Inline functions
2.3. Creating a class - static members
2.4. Array of objects, Objects as arguments
2.5. Friend functions, Returning objects.

Course Outcome: CO2 **Teaching Hours: 8 hrs**

3. Module – III Constructors and Destructors

3.1. Significance of constructor and destructors.
3.2. Defining constructor, Parameterized constructor, Constructors with default arguments.
3.3. Dynamic initialization of objects, Copy constructor.
3.4. Overloading constructors and data members, Operator overloading.
3.5. Operator overloading, Overloading using friend function.

Course Outcome: CO3 **Teaching Hours: 8 hrs**

4. MODULE – IV Inheritance:

4.1. Significance of inheritance, Access specifier.
4.2. Base class and derived class constructors.
4.3. Types of inheritance, Function overriding.
4.4. Virtual Function, Pure virtual function, Abstract class.
4.5. Pointers to objects, Pointers to Derived class objects, Polymorphism.

Course Outcome: CO4 **Teaching Hours: 8 hrs**

5. **MODULE – V Console I/O and File Handling:**

5.1. Stream and Stream classes
5.2. Unformatted I/O Operations, Formatted I/O operations
5.3. File stream classes, File operations
5.4. Sequential I/O operations, Updating files
5.5. Random access, Error Handling

Course Outcome: CO5 **Teaching Hours: 6 hrs**

TEXT BOOKS:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	"Object Oriented Programming with C++"	E. Balagurusamy, , McGraw Hill, 2020	9389949181, 978-9389949186
2.	"Teach Yourself C++"	Herbert Schildt, Osborne McGraw Hill, 1997	0078823927, 978-0078823923

CO VS PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	3	3	3	1	1	3	3	3	3
CO2	3	3	3	3	1	1	3	3	3	3
CO3	3	3	3	3	1	1	3	3	3	3
CO4	3	3	3	3	1	1	3	3	3	3
CO5	3	3	3	3	1	1	3	3	3	3

SIGNATURES:

COURSE: INTRODUCTION TO COMPUTER ALGORITHMS

PROGRAMME: DIPLOMA IN COMPUTER ENGINEERING							
COURSE CODE: DPE 524			COURSE TITLE: INTRODUCTION TO COMPUTER ALGORITHMS				
COMPULSARY / ELECTIVE: ELECTIVE							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WEEK	CREDIT	PE	FINAL	TOTAL
3	0	0	3	3	Q-20, TA-5, MID-25	50	100

L= Lecture, T= Tutorial and P= Practical, Q= Quiz, TA= Teacher Assessment, MID= Mid Semester

RATIONALE:

This course envisions to impart to students to:

A.	To build a strong foundation in solving problems efficiently using core algorithm design techniques like recursion, greedy, backtracking, and branch and bound.
B.	To equip students with the skills to evaluate algorithm efficiency using asymptotic notations and performance analysis.
C.	To ensure students develop familiarity with essential algorithms and data structures that form the backbone of computational problem-solving.
D.	To enable students to apply algorithmic strategies and analysis methods to tackle real-world computational challenges.
E.	To develop the ability to design and synthesize optimized algorithms for engineering applications and complex problem-solving scenarios.

COURSE OUTCOMES:

At the end of the course students will be able to:completion of this course, students will be able to:

CO1	Students will be able to have a clear understanding on solving the problems systematically.
CO2	Students will be able to make use of linear and non-linear data structures, like, graphs and trees while designing algorithms.
CO3	Students will be having a clear understanding of different design paradigms..
CO4	Students will be able to analyze and measure the efficiency of an algorithm
CO5	Students will have basic knowledge of fundamentals of algorithms which would help them to take up an advanced course in the same field.

Abhay Kumar

SYLLABUS

MODULES WITH TOPICS	
1. MODULE-I - Fundamentals/Introduction: 1.1. What is an algorithm? 1.2. Design and performance analysis of algorithms, space and time trade-offs. 1.3. Analysis of selection sort and insertion sort. 1.4. Asymptotic notations (Big O, Theta and Omega notations) to measure complexity of algorithms.	
Course Outcome: CO1	**Teaching Hours: 6 hrs**
2. Module – II : Sorting 2.1. The sorting problem. 2.2. Selection sort 2.3. Merge sort 2.4. Quick sort 2.5. Best and worst case analysis for the mentioned algorithms	
Course Outcome: CO2	**Teaching Hours: 8 hrs**
3. Module – III : Searching 3.1. Searching and its types -Interpolation Search; String Search; 3.2. Unordered Linear Search 3.3. Ordered Linear Search 3.4. Binary Search	
Course Outcome: CO3	**Teaching Hours: 8 hrs**
4. MODULE – IV Tree 4.1. Concept of Binary Trees. 4.2. Tree Traversal- Pre-order 4.3. In-order, Post-order 4.4. Binary Search Trees 4.5. Expression Tree and Polish Notation.	
Course Outcome: CO4	**Teaching Hours: 8 hrs**
5. **MODULE – V Algorithms on Graphs:** 5.1. Graph Terminologies- directed and undirected graphs. 5.2. Weighted graphs, degree of a vertex, paths, cycles. 5.3. Matrix Representation of Graph, Spanning trees. 5.4. Directed Acyclic Graphs. 5.5. Minimum Spanning Tree algorithms- Dijkstra's Algorithms, Prim's Algorithms.	
Course Outcome: CO5	**Teaching Hours: 6 hrs**

Team
(MMRAJ KR)

TEXT BOOKS:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	"Introduction to Algorithms"	CormenThomas H., LeisersonCharles E., & Rivest.Ronald L., PHIpublication, 2009	978-0262033848
2.	"Fundamentals of Computer Algorithms"	Horowitz Ellis, SahniSartaj and Rajasekaran S., Galgotia publications, Second, 2008	978-8173716126

REFERENCE BOOKS:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	"The Design & Analysis of Computer Algorithms"	Aho Alfred V., Hopcroft John E. & Ullman Jeffrey D., Addison Wesley Publications, 1st, 1974	0201000296, 978-0201000290
2.	"Algorithm Design"	Kleinberg Jon &Tardos Eva, Pearson Education Publications, 1st, Pearson, 2013	978-1292037042, 978-0133350685
3.	"Fundamentals of Algorithms"	Brassard Gilles & Bratley Paul, PHI Publications, 1st, 1996	8120311310, 978-8120311312

CO VS PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	3	3	2	1	1	2	3	3	3
CO2	3	1	1	1	1	3	1	3	3	3
CO3	2	3	3	1	2	1	2	3	3	3
CO4	1	1	3	3	1	1	1	3	3	3
CO5	3	3	3	1	2	1	1	3	3	3

SIGNATURES:

Abhay Kumar Maurya

(NIRAJ KUMAR)

COURSE:DATA SCIENCE

PROGRAMME: DIPLOMA IN COMPUTER ENGINEERING							
COURSE CODE:**DPE 525**			COURSE TITLE: **DATA SCIENCE**				
COMPULSARY / ELECTIVE: **ELECTIVE**							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WEEK	CREDIT	PE	FINAL	TOTAL
3	0	0	3	3	Q-20, TA-5, MID-25	50	100

L= Lecture, T= Tutorial and P= Practical, Q= Quiz, TA= Teacher Assessment, MID= Mid Semester Exam

RATIONALE:

A	Builds foundational understanding of data types, preprocessing, and pattern discovery necessary for AI and data mining tasks.
B	Introduces key techniques to quantify relationships between data, which are essential for clustering, classification, and pattern recognition.
C	Teaches methods to discover hidden patterns and relationships in datasets, supporting intelligent decision-making.
D	Covers popular classification algorithms and evaluation techniques to train predictive models for real-world applications.
E	Explores clustering algorithms and techniques for grouping similar data, enabling pattern discovery in unsupervised learning.

COURSE OUTCOMES:

At the end of the course students will be able to:completion of this course, students will be able to:

CO1	Students will be able to explain the fundamentals of data mining, pattern recognition, data types, and preprocessing techniques.
CO2	Students will be able to compute similarity and dissimilarity measures for various types of data and apply proximity concepts in analysis.
CO3	Students will be able to discover frequent itemsets and generate association rules using algorithms like Apriori.
CO4	Students will be able to apply classification algorithms such as Decision Trees, Naïve Bayes, and evaluate model performance.
CO5	Students will be able to perform clustering using K-means and hierarchical methods, and address key clustering issues.

COURSE CONTENT DETAILS:

MODULES WITH TOPICS
1. MODULE-I Introduction to AI and Pattern Recognition Basics 1.1. Motivation,Definitions, Kind of Data, Data Mining Functionalities, Kinds of Patterns, Classification of Data Mining Systems, 1.2. Data Mining Task Primitives, Integration of a Data Mining System with a Database or Data Warehouse System, 1.3. Types of Data Sets and Attribute Values, Basic Statistical Descriptions of Data, Data Visualization. 1.4. PREPROCESSING: Data Quality, Major Tasks in Data Preprocessing, Data Reduction, Data Transformation and Data Discretization, Data Cleaning and Data Integration. **Course Outcome: CO1** **Teaching Hours: 4 hrs**
2. Module – II Measures of Similarity and Dissimilarity: 2.1 Similarity and Dissimilarity between Simple Attributes. 2.2 Dissimilarities between Data Objects. 2.3 Similarities between Data Objects. 2.4 Examples of Proximity Measures. **Course Outcome: CO2** **Teaching Hours: 6 hrs**
3. MODULE-III Mining Frequent Patterns and Associations 3.1. Frequent Itemsets, Closed Itemsets, and Association Rules 3.2. Apriori Algorithm 3.3. Generating Association Rules from Frequent Itemsets 3.4. Application Examples **Course Outcome: CO3** **Teaching Hours: 6 hrs**
4. MODULE-IV Supervised Learning: Classification Problems 4.1. Decision Tree Induction- ID3, C4.5 and CART 4.2. Bayesian Classification Methods 4.3. Naïve Bayes' Classification. 4.4. Rule-Based Classification 4.5. Model Evaluation and Selection, 4.6. Techniques to Improve Classification Accuracy: Ensemble Methods, Handling Different Kinds of Cases in Classification. **Course Outcome: CO4** **Teaching Hours: 10 hrs**
5. MODULE- V Cluster Analysis 5.1. Basic Concepts 5.2. K-means algorithm 5.3. Hierarchical Clustering Algorithm 5.4. Key issues in Hierarchical Clustering **Course Outcome: CO5** **Teaching Hours: 10 hrs**

TEXT AND REFERENCE BOOKS

S. N.	Title	Author, Publisher, Edition, and Year of publication	ISBN
1.	Data Mining: Concepts and Techniques	Jiawei Han, Micheline Kamber, Jian Pei, 4th Ed. Elsevier,	9780128117606
2.	Data Mining Introductory and Advanced Topics	Margaret H Dunham, Pearson Education,	9788177587852
3.	The Top Ten Algorithms in Data Mining	Xingdong Wu, Vipin Kumar, CRC Press, UK	9780429138423

E-REFERENCES:

1. https://www.aspiration.ai/mlbook.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	1	2	1	1	2	3
CO2	3	1	2	1	1	2	3
CO3	3	2	2	1	1	2	3
CO4	3	2	2	1	1	2	3
CO5	3	2	2	1	1	2	3

Level 3- Highly Mapped, Level 2-Moderately Mapped, Level 1-Low Mapped,

Level 0- Not Mapped

COURSE: MULTIMEDIA AND ANIMATION

PROGRAMME: DIPLOMA IN COMPUTER ENGINEERING							
COURSE CODE:**DPE 526**			COURSE TITLE: **MULTIMEDIA AND ANIMATION**				
COMPULSARY / ELECTIVE: **ELECTIVE**							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WEEK	CREDIT	PE	FINAL	TOTAL
3	0	0	3	3	Q-20, TA-5, MID-25	50	100

L= Lecture, T= Tutorial and P= Practical, Q= Quiz, TA= Teacher Assessment, MID= Mid Semester

RATIONALE:

This course envisions to impart to students to:

A.	Introduces the fundamentals of multimedia, its types, architecture, and real-world applications, laying the groundwork for all upcoming modules.
B.	Covers the use of text and fonts in multimedia, exploring font types, formatting, and standards like Unicode, essential for clear digital communication.
C.	Explains how sound is digitized and represented, including audio properties, formats, and system components, vital for integrating audio in multimedia systems.
D.	Teaches image types, color models, compression formats, and editing techniques using Photoshop, building visual design and image processing skills.
E.	Focuses on video formats, conversion, capture tools, and animation techniques, providing essential knowledge for dynamic media content creation.

COURSE OUTCOMES:

At the end of the course students will be able to:completion of this course, students will be able to:

CO1	Students will be able to explain the concept, classification, system architecture, and applications of multimedia systems.
CO2	Students will be able to identify and use different text types, fonts, encoding standards, and text formats used in multimedia content.
CO3	Students will be able to describe the characteristics of sound, its digital representation, audio system components, and file formats.
CO4	Students will be able to explain image data types, color models, compression techniques, and apply basic image processing using editing software.
CO5	Students will be able to describe video formats, standards, and animation techniques, and understand the process of video capture and conversion.

Abhay Kumar

(NIRAJ KUMAR)

SYLLABUS

MODULES WITH TOPICS
1. MODULE-I Introduction to Multimedia 1.1. What is multimedia, Classification of multimedia 1.2. Need of Multimedia, Multimedia System Architecture 1.3. Evolving Technologies for Multimedia System 1.4. Applications of Multimedia. **Course Outcome: CO1** **Teaching Hours: 6 hrs**
2. Module – II : Computer Fonts and Hypertext 2.1. Usage of text in Multimedia 2.2. unformatted text, formatted text and hypertext, Font size and style 2.3. TrueType Font, PostScript Font, Open Type Font 2.4. Insertion of Font, Unicode standard outline fonts 2.5. bitmap fonts International character sets .Text file formats. **Course Outcome: CO2** **Teaching Hours: 8 hrs**
3. Module – III : Audio fundamentals and representations 3.1. Digitization of sound, Amplitude,Frequency,Waveform and speed. 3.2. Type and properties of sounds: speech,music and environmental sounds. 3.3. Decibel system, Sound Measurements, 3.4. Hearing threshold and Masking, 3.5. Components of an Audio Systems, Audio file format. **Course Outcome: CO3** **Teaching Hours: 8 hrs**
4. MODULE – IV : Image fundamentals and representations 4.1. Image data representations ,Type of image 4.2. Image acquisition Colour Science , Colour Models 4.3. Image Compression and File Formats :GIF, JPEG, JPEG 2000, PNG, TIFF, PS, PDF 4.4. Basic Image Processing using Adobe Photoshop 4.5. Use of image editing software, Anti-aliasing,Dithering Retouching,Cloning, Masks, Thresholding, Filters **Course Outcome: CO4** **Teaching Hours: 8 hrs**
5. **MODULE – V : Video and Animation** 5.1. Video Basics , How Video Works 5.2. Broadcast Video Standards, Motion video 5.3. Motion picture,Analog video 5.4. Video connectors, Digital video, Analog to digital converter 5.5. Video capture software, Video file formats. 5.6. Animation: Cell Animation, Computer Animation, Morphing. **Course Outcome: CO5** **Teaching Hours: 6 hrs**

TEXT BOOKS:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	"Principal of Multimedia"	Ranjan Parekh ,McGraw Hill Education (India) Private Limited, 2edition	978-1-25-900650-0
2.	"Introduction to Multimedia and its Applications"	Dr. V. K. Jain ,Khanna Publication House, 1edition	978-93-81068-57-1

CO VS PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	3	3	3	1	1	3	3	3	3
CO2	3	3	3	3	1	1	3	3	3	3
CO3	3	3	3	3	1	1	3	3	3	3
CO4	3	3	3	3	1	1	3	3	3	3
CO5	3	3	3	3	1	1	3	3	3	3

SIGNATURES:

COURSE: JAVA PROGRAMMING LAB

PROGRAMME: DIPLOMA IN COMPUTER ENGINEERING							
COURSE CODE: **DCE 502**	COURSE TITLE: **JAVA PROGRAMMING LAB**						
COMPULSARY / ELECTIVE: **COMPULSARY**							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WEEK	CREDIT	PE	FINAL	TOTAL
0	0	2	2	1	QUIZ-20, VIVA-10, DAY TO DAY PERFORMANCE-30	VIVA - 10, END PERFORMANCE-30	100

L= Lecture, T= Tutorial and P= Practical, Q= Quiz, TA= Teacher Assessment, MID= Mid Semester

RATIONALE:

1	Introduces Java's background, features, and setup to build a strong foundation for programming.
2	Covers essential syntax, data handling, and logic building through operators, arrays, and control flow.
3	Develops object-oriented programming skills using classes, constructors, inheritance, and I/O operations.
4	Focuses on code modularity, abstraction, and multiple inheritance using packages and interfaces.
5	Explores advanced concepts for building interactive, multithreaded, and networked Java applications.

COURSE OUTCOMES:

At the end of the course students will be able to:

1.	Students will be able to describe the role of Java in internet-based applications, understand OOP principles, set up the Java environment, and write and execute basic Java programs.
2.	Students will be able to implement data types, arrays, string operations, and apply decision-making and looping constructs in Java programs.
3.	Students will be able to create classes and objects, use constructors, implement various types of inheritance, and perform input/output operations in Java.
4.	Students will be able to develop modular applications using packages, abstract classes, and interfaces, including multiple inheritance through interfaces.
5.	Students will be able to handle exceptions, create and manage threads, design basic GUI applications, and implement Java-based networking and applet programs.

Abhay Kumar

(AMRAT KUMAR)

SYLLABUS

MODULES WITH TOPICS	
1. MODULE-I : Java Basics, OOP & Setup 1.1. Install and configure JDK and any IDE. 1.2. Write, compile and run a basic "Hello World" Java program. 1.3. Demonstrate structure of a Java program and comment syntax. 1.4. Compare OOP vs POP with example outputs. 1.5. Create a class demonstrating abstraction and encapsulation. 1.6. Create simple class hierarchy: Superclass and subclass with inheritance 1.7. Implement polymorphism using method overriding.	
Course Outcome: CO1	**Teaching Hours: 4 hrs**
2. Module – II : Data Types, Arrays, Strings, Operators & Control Structures 2.1. Demonstrate use of all primitive data types and type casting. 2.2. Create a program using wrapper classes and constants. 2.3. Demonstrate scope and default values of variables. 2.4. Work with single and multidimensional arrays (initiation, access, iteration). 2.5. String manipulation: concatenation, case change, extraction. 2.6. Apply arithmetic, logical, bitwise and ternary operators in a program. 2.7. Use all control flow statements (if, switch, loops, break, continue).	
Course Outcome: CO2	**Teaching Hours: 4 hrs**
3. Module – III : Classes, Methods, Constructors, Inheritance, I/O 3.1 Define a class with fields, methods, static and final keywords. 3.2. Constructor overloading with different parameter types. 3.3. Demonstrate passing objects to methods and returning objects. 3.4. Implement different types of inheritance (single, multilevel, hierarchical). 3.5. Use super keyword and dynamic method dispatch. 3.6. Take input using Scanner and BufferedReader, display formatted output.	
Course Outcome: CO3	**Teaching Hours: 4 hrs**
4. MODULE – IV : Packages and Interfaces 4.1. Create and import user-defined packages. 4.2. Demonstrate access modifiers with packages 4.3. Implement abstract class and final class in inheritance structure. 4.4. Define and implement a Java interface. 4.5. Demonstrate multiple inheritance using interfaces.	
Course Outcome: CO4	**Teaching Hours: 6 hrs**
5. MODULE – V : Exception Handling, Threads, GUI, Applet, Networking 5.1. Demonstrate exception handling using try-catch, throw, throws, finally. 5.2. Create custom user-defined exception class. 5.3. Create a thread by extending Thread class and using Runnable interface. 5.4. Implement thread priority and synchronization in Java. 5.5. Use AWT to create a simple GUI with Frame, Button, and Event Handling. 5.6. Draw and fill shapes using Graphics class. 5.7. Create a basic applet and run it using appletviewer. 5.8. Create a server-client communication program using TCP and UDP.	
Course Outcome: CO5	**Teaching Hours: 6 hrs**

TEXT & REFERENCE BOOKS:

S. N.	Authors	Title of Books	Publication	ISBN
1.	Hebert Schildt	"Java: The Complete Reference, Seventh Edition"	Tata McGraw Hill 2 E, 2007	978-0-07-226385-5
2.	Balagurusamy	"Programming with Java"	Tata McGraw Hill, 2023	9355325894, 978-9355325891
3.	Cay S. Horstmann, Gray Cornell	"Core Java, Vol I- Fundamentals Java Series"	Sun MicroSystem	0143130447, 978-0143130444

CO VS PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	3	3	3	1	1	3	3	3	3
CO2	3	3	3	3	1	1	3	3	3	3
CO3	3	3	3	3	1	1	3	3	3	3
CO4	3	3	3	3	1	1	3	3	3	3
CO5	3	3	3	3	1	1	3	3	3	3

SIGNATURES:

Abhay Kumar

(NIRAJ KUMAR)

COURSE: MULTIMEDIA TECHNOLOGY LAB

PROGRAMME: DIPLOMA IN COMPUTER ENGINEERING							
COURSE CODE: **DPE 504**	COURSE TITLE: **MULTIMEDIA TECHNOLOGY LAB**						
COMPULSARY / ELECTIVE: **ELECTIVE**							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/ WEEK	CREDIT	PE(60)	FINAL(40)	TOTAL
0	0	2	2	1	QUIZ-20, VIVA-10, DAY TO DAY PERFORMANCE -30	VIVA - 10, END PERFORMANCE -30	100

L= Lecture, T= Tutorial and P= Practical, Q= Quiz, TA= Teacher Assessment, MID= Mid Semester

RATIONALE:

This course envisions to impart to students to:

A.	Introduces basic photo editing and design skills for thumbnails and posters.
B.	Teaches creative design for social media and ad storyboards.
C.	Builds basic video editing skills for montages and promos.
D.	Covers 3D modeling, animation, and voiceover sound design.
E.	Explores AI tools for art generation, image enhancement, and product mockups.

COURSE OUTCOMES:

At the end of the course students will be able to:completion of this course, students will be able to:

CO1	Students will be able to enhance and retouch images, and design basic posters and thumbnails using Photoshop Express.
CO2	Students will be able to create visually appealing social media carousels and animated ad storyboards using Canva.
CO3	Students will be able to edit video clips, apply transitions, and create short promo videos using Wondershare Filmora.
CO4	Students will be able to design and animate 3D logos in Blender and produce voiceovers with sound effects using Audacity and 11 Labs.
CO5	Students will be able to generate AI-based artwork, enhance images, and create product mockups using modern AI design tools.

SYLLABUS

MODULES WITH TOPICS
1. MODULE-I Photoshop Express - Photo Enhancement & Retouching 1.1. Photoshop Express – Photo Enhancement & Retouching Software: Photoshop Express (Windows App / Web) Import 3 raw images Apply Auto Enhance Adjust exposure, clarity, and contrast manually Use blemish removal tool on one portrait Save all in HD JPEG 1.2. Photoshop Express – Poster & Thumbnail Design Create a 1280x720 YouTube thumbnail for a tech video Create a 1080x1350 poster for an event using text, icons, and filters Export both in high-res formats **Course Outcome: CO1** **Teaching Hours: 4 hrs**
2. Module – II : : Canva - Social Media Carousel Design 2.1. Canva – Social Media Carousel Design Software: Canva (Web) Design a 4-slide Instagram carousel post on "5 Tips for Healthy Living" Use shapes, icons, custom fonts, and image grids Maintain consistent style & spacing 2.2. Canva – Ad Storyboard Presentation Create a 5-slide animated storyboard for a fictional product ad Include transitions, voiceover script boxes, and logo placements Export as a shareable PDF or video **Course Outcome: CO2** **Teaching Hours: 4 hrs**
3. Module – III Wondershare Filmora – Basic Video Montage 3.1. Wondershare Filmora – Basic Video Montage Software: Filmora (Free) Import 4–5 clips Cut, trim, reorder Add background music and fade transitions Export as 720p video for YouTube 3.2. Wondershare Filmora – Promo Video Creation Create a 30-second promo for a product or event Add text overlays, motion effects, and music sync Include logo animation if possible **Course Outcome: CO3** **Teaching Hours: 4 hrs**
4. MODULE – IV : Blender – 3D Logo or Text Modeling, 11 Labs + Audacity – AI Voiceover with Sound Design 4.1. **Blender – 3D Logo or Text Modeling** Software: Blender Model a 3D logo or name text Add lighting and shadows Render a still PNG image with transparent background

Abhay Kumar

4.2. **Blender – Basic Logo Animation**
Animate the 3D text/logo with camera motion or rotation
Add keyframes and adjust timeline
Render as MP4 video (5–10 seconds)

4.3. **11 Labs + Audacity – AI Voiceover with Sound Design**
Software: 11 Labs (Web) + Audacity
Generate a 30-second voiceover using 11 Labs
Import into Audacity
Add background music, apply fade-in/out, noise reduction
Export as WAV/MP3

Course Outcome: CO4 **Teaching Hours: 6 hrs**

5. **MODULE – V : Leonardo AI – Prompt-Based Creative Art, Fotor – AI Enhancement & Effects, Photoroom – Product Mockup Creation**

5.1. Software: Leonardo AI (Web)
Generate 2 AI artworks: one character + one landscape
Refine prompt to adjust detail
Download and reuse these in Canva or Photoshop Express

5.2. **Fotor – AI Enhancement & Effects**
Software: Fotor (Web/Desktop)
Upload 2 low-quality images
Use AI Enhance & AI Portrait tools
Apply one artistic effect (e.g., cartoon, oil paint)
Save final versions for a mock portfolio

5.3. **Photoroom – Product Mockup Creation**
Software: Photoroom (Web)
Remove background from 2 product images
Place them in a realistic template (Instagram post, catalog, etc.)
Add text & logo
Export mockups in HD

Course Outcome: CO5 **Teaching Hours: 6 hrs**

TEXT BOOKS:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	"Adobe Photoshop Classroom in a Book"	Conrad Chavez, Andrew Faulkner, 2024	0138262659, 9780138262655
2.	"Principal of Multimedia"	Ranjan Parekh ,McGraw Hill Education (India) Private Limited, 2edition	978-1-25-900650-0
3.	"Introduction to Multimedia and its Applications"	Dr. V. K. Jain ,Khanna Publication House, 1edition	978-93-81068-57-1

ERESOURCES:

1. **https://helpx.adobe.com/photoshop-express/**
2. https://www.canva.com/designschool/
3. https://filmora.wondershare.com/video-editor/
4. https://help.elevenlabs.io/
5. **https://help.leonardo.ai/**
6. **https://www.fotor.com/**
7. **https://support.photoroom.com/**

CO VS PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	3	3	3	1	1	3	3	3	3
CO2	3	3	3	3	1	1	3	3	3	3
CO3	3	3	3	3	1	1	3	3	3	3
CO4	3	3	3	3	1	1	3	3	3	3
CO5	3	3	3	3	1	1	3	3	3	3

SIGNATURES:

Abhay Kumar

(ZAHRAT KUMAR)

COURSE : WEB PROGRAMMING CONCEPTS

			PROGRAMME: **Diploma in Engineering**								
COURSE CODE: DOE521						COURSE TITLE: **Web Programming Concepts**					
			COMPULSARY / OPTIONAL: **OPEN ELECTIVE**								
Teaching Scheme and Credits					EXAMINATION SCHEME					
L	T	P	HOURS/WEEK	CREDIT	*MID SEM*	*Q-I*	*QII*	*TA*	*END SEM*	*TOTAL*
3	-	-	3	3	*25*	10	10	5	50	100

RATIONALE :

1.	Introduces the basics of networking and internet applications, essential for understanding web communication and architecture.
2.	Equips students with skills to create structured, responsive web pages using HTML and CSS for both static and dynamic content.
3.	Teaches server-side scripting and file management using PHP, forming the backend foundation for web applications.
4.	Enhances students' ability to build complex, data-driven web applications using advanced PHP features and integration techniques.
5.	Focuses on implementing web security measures to protect both client and server from vulnerabilities and cyber threats.

COURSE OUTCOMES:

Students will be able to understand about

CO1	To understand concept of Network functions and various types of internet applications.
CO2	Creation and Designing of Static and Dynamic HTML pages.
CO3	Programming concept of PHP with file handling.
CO4	Develop more complex web applications with advance PHP.
CO5	Web security with server and client security features

Abhay Kumar
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COURSE CONTENT DETAILS:

MODULE	TOPICS/SUBTOPICS
1	**TITLE: Introduction to Network** 1.1 Network Topologies, 1.2 Types of Network, 1.3 Network Devices 1.4 Protocols, TCP/IP and IP Addresses **Course Outcome: CO1** **Teaching Hours : 6hrs**
2	**TITLE:Introduction to HTML** 2.1H TML and its application, HTML Document features, 2.2 HTML Tags, Attributes, 2.3Special Tags, 2.4Documents Structuring Tags in HTML, 2.5Dynamic HTML. Concept of Java Script. **Course Outcome: CO2** **Teaching Hours : 8 hrs**
3	**TITLE: Internet and Web Technology** 3.1 Concepts of Internet, Domain name and address of Internet, 3.2 World Wide Web (WWW), Email, Web Pages, Unified Resource Locator(URL), 3.3 The Web Server, Web Browsers, The Proxy Servers, 3.4 Telnet, HTTP, FTP, Hypertext, Hyperlinks and Web, Applications, E-Commerce. **Course Outcome: CO3** **Teaching Hours : 8 hrs**
4	**TITLE:PHP Basics** **4.1** Introduction to PHP, Evaluation of PHP, 4.2 Basic Syntax, Defining variable and constant, PHP Data type, Operator 4.3 Decisions and loop, 4.4 Functions and Arrays, 4.5 Handling Html Form with PHP **Course Outcome: CO4** **Teaching Hours : 8 hrs**
5	**TITLE: Web Security** 5.1Introduction to Web Security, 5.2 Firewalls and Transaction Security, Secure Socket Layer (SSL) 5.3 Server Security, Threats and Data Security 5.4 Introduction to .NET **Course Outcome: CO5** **Teaching Hours : 6 hrs**

TEXT BOOKS:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	Beginning PHP and My SQL	W. Jason Gilmore, Amazon, 5th, 2014,	978-1430269885,1430269880
2.	Internet and Web Technologies	Raj kamal, Tata McGraw-Hill, 2002	0070472963, 9780070472969

REFERENCE BOOKS:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	Web Technologies And Applications	SammulalPorika, Bsp	9789352300846
2.	Using the World Wide Web	David Wall, Que Publishing, 1995	0789706458, 978-0789706454

SIGNATURES:

(NIRAJ KUMAR)

DATA STRUCTURES IN C

PROGRAMME: Diploma in Computer Engineering							
COURSECODE: DOE 522			COURSE TITLE: DATA STRUCTURES IN C				
COMPULSORY/ELECTIVE: **OPEN ELECTIVE**							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HRS/ WK	CREDIT	PE	FINAL	TOTAL
3	0	0	3	3	50	50	100

RATIONALE:

1. Data structures are essential for organizing and storing data efficiently, allowing for optimized data retrieval and manipulation.
2. Understanding data structures helps students develop problem-solving skills by choosing the appropriate structure for a given problem.
3. Knowledge of data structures is fundamental for writing efficient algorithms, which is crucial in software development.
4. Mastery of data structures enables students to analyze the time and space complexity of algorithms, enhancing their ability to write performance-driven code.
5. Data structures are the backbone of many advanced topics in computer science, such as databases, operating systems, and artificial intelligence.

COURSE OUTCOMES:

At the end of the course students will be able to:

1.	Demonstrate proficiency in fundamental programming concepts such as arrays, functions, pointers, structures, and dynamic memory allocation.
2.	Apply abstract data types to organize and manipulate data efficiently, distinguishing between linear and non-linear data structures and employing sorting and searching algorithms effectively.
3.	Implement stack data structures, perform stack operations, understand Polish notations, and apply stacks to solve real-world problems.
4.	Implement queue data structures, perform queue operations, understand circular queues, and utilize queues in various scenarios.
5.	Implement linked list data structures, differentiate between different types of linked lists, understand their advantages and disadvantages, and apply linked lists to solve practical problems.

COURSE CONTENT DETAILS:

Module	Topics/Subtopics
1.	**TITLE: Prerequisite of Data Structures** 1.1. Review of Arrays, 1.2. Functions and Pointers, 1.3. Overview of Structures and Union, 1.4. Dynamic Memory Allocation **Course Outcome: CO1** **Teaching Hours :6 hrs**
2.	**TITLE: Introduction to Data Structures** 2.1. Abstract Data Types 2.2. Linear and Non-linear 2.3. Static and Dynamic Data Structures 2.4. Insertion sort, Bubble sort Algorithm & Linear and Binary searching **Course Outcome: CO2** **Teaching Hours :8 hrs**
3.	**TITLE: Stacks** 3.1. Introduction to Stack 3.2. Operations on Stack 3.3. Implementation of Stack 3.4. Polish Notations- Infix, Postfix and Prefix **Course Outcome: CO3** **Teaching Hours :6 hrs**
4.	**TITLE: Queues** 4.1 Introduction to Queue, 4.2 Operations on Queues, 4.3 Implementation of Simple Queue 4.4 Circular Queue **Course Outcome: CO4** **Teaching Hours :8 hrs**
5.	**TITLE: Linked List** 5.1 Introduction to Self-referential Structures 5.2 Linked-List and its advantages and disadvantages 5.3 Types of Linked-Lists (Singly-linked, Doubly-linked and Circularly-linked) **Course Outcome: CO5** **Teaching Hours :8 hrs**

REFERENCE BOOKS:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	Mastering data structure through 'C'	J.B. Dixit, Laxmi Publications, 1e	978-9380386720
2.	Data Structure using 'C'	Y. Kanetkar, BPB, 4th	978-9355511898
3.	Data Structure using C	E. Balaguruswamy, McGraw Hill.	978-1259029547

Abhaykumar Borade

CO VS PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	2	2	3	0	1	2	3	3	2
CO2	2	3	3	3	0	1	2	3	3	2
CO3	2	3	3	3	0	1	2	3	3	2
CO4	2	3	3	3	0	1	2	3	3	2
CO5	2	3	3	3	0	1	2	3	3	2

SIGNATURES:

PC MAINTENANCE & NETWORKING

PROGRAMME: Diploma in Computer Engineering							
COURSE CODE: **DOE 523**			COURSE TITLE: **PC MAINTENANCE & NETWORKING**				
COMPULSORY/ ELECTIVE: **OPEN ELECTIVE**							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HRS/WK	CREDIT	PE	FINAL	TOTAL
3	0	0	3	3	50	50	100

RATIONALE:

1. Covers motherboard types and processor specs to help students build and troubleshoot efficient computer systems.
2. Teaches memory, storage, SMPS, and UPS to enhance system performance and ensure data safety.
3. Focuses on printer operations and PC troubleshooting to reduce system downtime and extend hardware life.
4. Introduces network devices, topologies, and IP addressing for secure and optimized network design.
5. Explains wired/wireless media and protocols like OSI and TCP/IP for efficient data transmission and network setup.

COURSE OUTCOMES:

At the end of the course students will be able to:

1.	Identify motherboard types and microprocessor features for system optimization and troubleshooting.
2.	Understand memory, storage, and power systems (SMPS, UPS) for better system management.
3.	Learn printer functions, preventive maintenance, virus protection, and PC troubleshooting.
4.	Gain knowledge of network topologies, devices, and IP addressing for secure network setup.
5.	Understand transmission media and protocols (OSI, TCP/IP) to design and troubleshoot networks.

COURSE CONTENT DETAILS:

Module	Topics/Subtopics
1.	**TITLE:Overview of Components:** 1.1 **Motherboard**- Motherboard form factors; 1.2 **Motherboard -** Components of motherboard — chipset, processor socket, expansion slots 1.3 **Motherboard -** Components of motherboard —Power supply connectors, ROM BIOS, CMOS, ports etc. 1.4 **Microprocessor -**Processor Specification, FSB; Evolution of Processor 1.5 **Microprocessor -**Modern Microprocessor technology Course Outcome: CO1Teaching Hours: 6 hrs
2.	**TITLE:Memory and Power Supply**: 2.1.**Memory-** Types of Dynamic RAM— FPM, EDO, BEDO, SDRAM, RD RAM, DDR RAM. 2.2. **Memory**-Hard Drives, CD & DVD. 2.3**Power Supply**- Power Problems— Spike, Surge, Brownout and Blackout; EMI (Electromagnetic Interference); ESD 2.4**Power Supply**- SMPS— SMPS form factors, connectors and voltages 2.5**Power Supply**- UPS— Purpose of UPS, SPS and Double conversion UPS. Course Outcome: CO2Teaching Hours: 6 hrs
3.	**TITLE:Printer, Preventive Maintenance & Troubleshooting** 3.1 **Printer:** Working of Dot matrix printer, Inkjet printer and Laser printer 3.2 **Maintenance and Troubleshooting:** Preventive Maintenance, Viruses detection and Protection 3.3 **Maintenance and Troubleshooting:** Viruses detection and Protection 3.4 **Maintenance and Troubleshooting:** Steps of Logical Troubleshooting 3.5 **Maintenance and Troubleshooting:** Common PC problems Course Outcome: CO3Teaching Hours: 6 hrs
4.	**TITLE:Network Fundamentals** 4.1 **Network Topology**-Star, Bus, Ring, Mesh 4.2 **Network devices**- Ethernet card, Hub, Switch, Bridge, Router, Gateway 4.3 **Addressing**- Physical address, Logical address 4.4 **Classes of IP address-** Class A, Class B, Class C, Class D, Class E 4.5 **Classes of IP address-** dotted decimal notation, binary notation Course Outcome: CO4Teaching Hours: 6 hrs
5.	**TITLE:Transmission Media & Protocol** : **5.1 Transmission Media -** Guided transmission media- Coaxial cable, UTP, STP, OFC. **5.2 Transmission Media : W**ireless transmission- Infrared, Radio waves, Microwaves. **5.3 Protocols**-OSI Model **5.4 Protocols**-TCP/IP protocol suite. **5.5 Protocols**-Overview of protocols used at various layers Course Outcome: CO5Teaching Hours: 6 hrs

TEXT BOOK & REFERENCE BOOKS:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	"PC Hardware: A Beginner's Guide"	Ron Gilster,TMH	0070447365, 9780070447363
2.	"The Complete Computer Repair Textbook"	C.A.Schmidt, 3e, Dreamtech	1576760332, 9781576760338
3.	"A+ Complete Study Guide"	David Groth, 3e, Sybex Inc	0782142435, 978-0782142433
4.	"Data Communication and Networking"	B.A. Forouzan,4e, TMH	0072967757, 9780072967753
5.	"Data and ComputerCommunication"	Stallings. W., 6e, PHI	8131715361, 9788131715369
6.	"Computer Networks"	Andrew S. Tanenbaum, 4e, PHI	9780130661029

CO VS PO MAPPING:

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CO1	3	3	3	3	1	1	3	3	3	3
CO2	3	3	3	3	1	1	3	3	3	3
CO3	3	3	3	3	1	1	3	3	3	3
CO4	3	3	3	3	1	1	3	3	3	3
CO5	3	3	3	3	1	1	3	3	3	3

SIGNATURES: