



**PSGR  
Krishnammal College for Women**



Affiliated to Bharathiar University \ Autonomous \ College of Excellence \ Accredited with A++ Grade \ Ranked 9<sup>th</sup> in NIRF

**DEPARTMENT OF COMPUTER SCIENCE WITH  
GRAPHICS AND CREATIVE DESIGN**

**CHOICE BASED CREDIT SYSTEM (CBCS)  
&  
LEARNING OUTCOMES-BASED CURRICULUM FRAMEWORK (LOCF)**

**B.Sc. COMPUTER SCIENCE WITH GRAPHICS AND  
CREATIVE DESIGN**

**2025-2028 BATCH**

## PROGRAMME LEARNING OUTCOMES (PLO's)

After completion of the Programme, the students will be able to

- PLO1:** Demonstrate an understanding of visual communication principles to convey messages effectively through design.
- PLO2:** Gain proficiency in industry-standard design software such as Adobe Photoshop, Illustrator, InDesign, After Effects, and others for creating and manipulating graphics, illustrations, and animations.
- PLO3:** Develop critical thinking and creative problem-solving abilities to tackle design challenges, including conceptualization, ideation, and the application of design solutions across various mediums.
- PLO4:** Master the use of typography, fonts, and layout techniques to enhance the legibility, readability, and aesthetic appeal of design projects.
- PLO5:** Understand the principles of branding and identity design, creating visual identities that effectively communicate a brand's message and values.

## PROGRAMME SPECIFIC OUTCOMES (PSO's)

The students at the time of graduation will

- PSO1:** Apply and create high-quality graphic designs and visual content across various media platforms (digital, print, multimedia) that meet industry standards and client requirements.
- PSO2:** Design unique and impactful brand identities, including logos, packaging, and marketing collateral, that reflect the essence of a brand and appeal to its target audience.
- PSO3:** Possess the knowledge and skills to design user interfaces (UI) and user experiences (UX) that prioritize functionality, user-friendliness, and accessibility for websites and mobile applications.



II	I	TAM2502A/ HIN2502A/ FRE2502A	Tamil Paper II/ Hindi Paper II/ French Paper II	L	4	58	2	3	25	75	100	3
	II	ENG2502A	English Paper II	E	4	58	2	3	25	75	100	3
	III	GC25C04	OOPs with Graphics	CC	5	73	2	3	25	75	100	3
	III	IN23C05	Data Structure and Al- gorithm	CC	4	58	2	3	25	75	100	3
	III	GC25CP2	OOPs with Graphics Lab	CC	5	75	-	3	15 <sup>#</sup>	35 <sup>#</sup>	50	3
	III	TH24A11	Discrete Mathematics	GE	6	88	2	3	25	75	100	5
	IV	NM25UHR	Universal Human Values and Human Rights	AEC	2	30	-	-	100	-	100	2
	IV	*NME25B2/ NME25A2	Basic Tamil II / Advance Tamil II	AEC	-	-	-	-	100	-	100	Gr.
I-II	VI	NM25GAW	General Awareness	AECC	SS	-	-	-	100	-	100	Gr.
I-II	VI	COM25SER	Community Services 30 Hours	GC	-	-	-	-	-	-	-	-
I-V	VI	24BONL1 24BONL2 24BONL3	Online Course I Online Course II Online Course III	ACC	-	-	-	-	-	-	-	-
III	I	TAM2303A/ HIN2303A/ FRE2303A	Tamil Paper III/ Hindi Pa- per III/ French Paper III	L	4	58	2	3	25	75	100	3
III	II	ENG2403A	English Paper III	E	4	58	2	3	25	75	100	3
III	III	IN23C06	Database Management Sys- tem	CC	4	58	2	3	25	75	100	3
III	III	GC25C07	2D Graphics and Illustra- tion	CC	4	58	2	3	25	75	100	3
III	III	GC25CP3	2D Graphics and Illustra- tion lab	CC	5	75	-	3	15 <sup>*</sup>	35 <sup>*</sup>	50	3
III	III	TH24A20	Optimization Techniques	GE	4	58	2	3	25	75	100	3
III	III	CS23SBGP	Gen-AI	SEC	3	44	1	-	100	-	100	3

III	IV	NM23DTG	Design Thinking	AEC	2	30	-	-	100	-	100	2
III	IV	NM25HAW	Health and Wellness	VAC	SS	-	-	-	100*	-	100	1
I-V	VI	24BONL1 24BONL2 24BONL3	Online Course I Online Course II Online Course III	ACC	-	-	-	-	-	-	-	-

\*CA conducted for 25 and converted in to 15, ESE conducted for 75 and converted in to 35

CC: Core Courses

GE: Generic Elective

AEC: Ability Enhancement Course

GC: General Course

VAC: Value Added Course

CA: Continuous Assessment

ESE: End Semester Examination

SEC: Skill Enhancement Course

ACC: Additional Credit Course

### GC25C01 - Graphics and Multimedia

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	M	S	M	S	M
CLO2	S	M	M	S	M
CLO3	M	S	S	S	S
CLO4	S	S	S	S	S

### PP22C02 – Computational and Algorithmic Thinking for Problem Solving

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	M	S	S	S	S
CLO2	S	S	S	M	S
CLO3	S	M	S	S	S
CLO4	S	S	M	S	S

### GC25C03 - Programming in C with Graphics

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	S	S	S	M
CLO2	S	S	S	M	S
CLO3	S	M	S	S	M
CLO4	S	S	S	S	S

### GC25CP1 - Programming in C with Graphics Lab

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	M	M	S	S	S
CLO2	S	S	S	S	S
CLO3	S	S	S	S	S
CLO4	S	S	M	S	S

**GC25C04 - OOPs with Graphics**

<b>CLOs</b>	<b>PLO1</b>	<b>PLO2</b>	<b>PLO3</b>	<b>PLO4</b>	<b>PLO5</b>
<b>CLO1</b>	S	M	S	S	M
<b>CLO2</b>	S	S	M	S	M
<b>CLO3</b>	S	S	M	S	M
<b>CLO4</b>	S	S	S	M	S

**IN23C05 – Data Structure and Algorithm**

<b>CLOs</b>	<b>PLO1</b>	<b>PLO2</b>	<b>PLO3</b>	<b>PLO 4</b>	<b>PLO5</b>
<b>CLO1</b>	S	M	M	S	S
<b>CLO2</b>	S	M	S	M	M
<b>CLO3</b>	M	M	S	M	S
<b>CLO4</b>	S	S	S	M	S

**GC25CP2 - OOPs with Graphics Lab**

<b>CLOs</b>	<b>PLO1</b>	<b>PLO2</b>	<b>PLO3</b>	<b>PLO4</b>	<b>PLO5</b>
<b>CLO1</b>	S	S	M	S	M
<b>CLO2</b>	S	S	S	S	S
<b>CLO3</b>	S	S	S	S	M
<b>CLO4</b>	S	S	M	S	S

**IN23C06 -Database Management System**

<b>CLOs</b>	<b>PLO1</b>	<b>PLO2</b>	<b>PLO3</b>	<b>PLO4</b>	<b>PLO5</b>
<b>CLO1</b>	M	S	M	S	M
<b>CLO2</b>	S	M	M	S	M
<b>CLO3</b>	M	S	S	S	S
<b>CLO4</b>	S	S	S	S	S

**GC25C07 -2D Graphics and Illustration**

<b>CLOs</b>	<b>PLO1</b>	<b>PLO2</b>	<b>PLO3</b>	<b>PLO4</b>	<b>PLO5</b>
<b>CLO1</b>	S	M	M	S	S
<b>CLO2</b>	S	M	S	S	M
<b>CLO3</b>	M	S	S	M	S
<b>CLO4</b>	S	S	S	M	S

**GC25CP3-2D Graphics and Illustration lab**

<b>CLOs</b>	<b>PLO1</b>	<b>PLO2</b>	<b>PLO3</b>	<b>PLO4</b>	<b>PLO5</b>
<b>CLO1</b>	S	M	S	S	M
<b>CO2</b>	S	M	S	S	S
<b>CLO3</b>	M	S	S	M	S
<b>CLO4</b>	S	S	M	S	S

**CS23SBGP - Gen-AI**

<b>CLOs</b>	<b>PLO1</b>	<b>PLO2</b>	<b>PLO3</b>	<b>PLO4</b>	<b>PLO5</b>
<b>CLO1</b>	S	S	S	S	M
<b>CLO2</b>	S	S	S	S	S
<b>CLO3</b>	S	S	M	S	S
<b>CLO4</b>	S	M	S	M	S

Code	Course Title	Category	L	T	P	Credit
GC25C01	Graphics and Multimedia	Theory	58	2	-	3

### Preamble

This course provides the knowledge and skills to create visually engaging digital content by teaching them the fundamentals of graphic design, animation, video editing, audio manipulation, and multimedia authoring tools.

### Course Learning Outcomes

On the successful completion of the course, students will be able to

CLO Number	CLO Statement	Knowledge Level
CLO1	Understand concepts of 2D and 3D, Viewing, Curves and surfaces, Hidden Line/surface elimination techniques	K1
CLO2	Understand Multimedia Systems, Text, Audio and Video tools	K2
CLO3	Apply and Compress audio and video using MPEG-1 and MPEG-2	K3
CLO4	Analyze to Create Animation with special effects using algorithms	K4

### Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	M	S	M	S	M
CLO2	S	M	M	S	M
CLO3	M	S	S	S	S
CLO4	S	S	S	S	S

S- Strong; M-Medium;

**UNIT I****12 Hrs**

Output Primitives: Points and Lines – Line - Drawing algorithms – Loading frame Buffer – Line function – Circle - Generating algorithms – Ellipse - generating algorithms. Attributes of Output Primitives: Line Attributes – Curve attributes – Color and Grayscale Levels – Area-fill attributes – Character Attributes.

**UNIT II****12 Hrs**

2D Geometric Transformations: Basic Transformations – Matrix Representations – Composite Transformations – Other Transformations. 2D Viewing: The Viewing Pipeline – Viewing Coordinate Reference Frame – Window-to-Viewport Co-ordinate Transformation - 2D Viewing Functions – Clipping Operations.

**UNIT III****12 Hrs**

Text: Types of Text – Unicode Standard – Font – Insertion of Text – Text compression – File formats. Image: Image Types – Seeing Color – Color Models – Basic Steps for Image Processing – Scanner – Digital Camera – Interface Standards – Specification of Digital Images – CMS – Device Independent Color Models – Image Processing software – File Formats – Image Output on Monitor and Printer.

**UNIT IV****11 Hrs**

Audio: Introduction – Acoustics – Nature of Sound Waves – Fundamental Characteristics of Sound – Microphone – Amplifier – Loudspeaker – Audio Mixer – Digital Audio – Synthesizers – MIDI – Basics of Staff Notation – Sound Card – Audio Transmission – Audio File formats and CODECs – Audio Recording Systems – Audio and Multimedia – Voice Recognition and Response - Audio Processing Software.

**UNIT V****11 Hrs**

Video: Analog Video Camera – Transmission of Video Signals – Video Signal Formats – Television Broadcasting Standards – PC Video – Video File Formats and CODECs – Video Editing – Video Editing Software. Animation: Types of Animation – Computer Assisted Animation – Creating Movement – Principles of Animation – Some Techniques of Animation – Animation on the Web – Special Effects – Rendering Algorithms. Compression: MPEG-1 Audio – MPEG-1 Video - MPEG-2Audio – MPEG-2 Video.

**TEXT BOOK**

S. No	Author	Title of the Book	Publisher	Year and Edition
1	M.Pauline Baker	Computer Graphics (Unit- I & II)	PHI	2014, 4 <sup>th</sup> Edn
2	Ranjan Parekh	Principles of Multimedia(Unit-III,IV & V)	CRC Press	2025, 3 <sup>rd</sup> Edn

**REFERENCE BOOK**

S. No	Author	Title of the Book	Publisher	Year and Edition
1	Amarendra N Sinha, Arun D	Computer Graphics	McGraw Hill	2007, 2 <sup>nd</sup> Edn.
2	Tay Vaughan	Multimedia : Making it Work	McGraw Hill	2014, 9 <sup>th</sup> Edn.

**Pedagogy**

Chalk and talk, PPT, Discussion, Assignment, Demo, Quiz, Seminar.

**Course Designer**

1. Dr. P. Parvathi

Course Code	Course Title	Category	L	T	P	Credit
PP22C02	Computational And Algorithmic Thinking For Problem Solving	Theory	45	-	-	3

#### Preamble

- This course aims to kindle the young minds to think like a computer scientist, with the idea that Computing and computers will enable the spread of computational thinking.
- Computational thinking is thinking recursively, reformulating a seemingly difficult problem into one which we know how to solve and taking an approach to solving problems, designing systems, and understanding human behavior that draws on concepts fundamental to computer science.

#### Course Learning Outcomes

On the successful completion of the course, students will be able to

CLO Number	CLO Statement	Knowledge Level
CLO1	Define the basic principles of logical reasoning, problem solving in computational thinking	K1
CLO2	Understanding the applications of propositional logic, problem representation and techniques	K2
CLO3	Apply algorithmic thinking to problem solving using tools	K3
CLO4	Apply and analyze to solve domain specific problems using computational thinking concepts	K4

#### Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	M	S	S	S	S
CLO2	S	S	S	M	S
CLO3	S	M	S	S	S
CLO4	S	S	M	S	S

S - Strong; M - Medium;

### COMPUTATIONAL AND ALGORITHMIC THINKING FOR PROBLEM SOLVING - PP22C02

45 Hrs

#### Syllabus

#### Unit I

7 Hrs

Basics: Introduction to Computational Thinking- Data Logic - History of Computational Thinking- Applications of Computational Thinking.

**Unit II****8 Hrs**

Data- Information and Data - Data Encoding - Logic - Boolean logic - Applications of simple Propositional Logic. Tool: Flowgorithm and Scratch.

**Unit III****10 Hrs**

Problem Solving and Algorithmic Thinking: Problem definition- Logical reasoning- Problem decomposition- Abstraction- Problem representation via Algorithmic thinking: Name binding- Selection- Repetition and Control Abstraction- Simple Algorithms – Comparison of performance of Algorithms.

**Unit IV****8 Hrs**

Activities in Class: Sudoku-Towers of Hanoi- Graph Coloring-Geographical Map reading- Poem reading-Novel reading- Data analysis on news.

**Unit V****12 Hrs**

Problem Solving Techniques- Factoring and Recursion Techniques- Greedy Techniques- Divide and Conquer- Search and Sort Algorithms- Text Processing and Pattern matching. Tool: iPython

**Text Book**

S. No	Author	Title of the Book	Publisher	Year and Edition
1	David Riley and Kenny Hunt	Computational Thinking for Modern Solver	Chapman & Hall/CRC	2014, 1 <sup>st</sup> Edn
2	Paolo Ferragina, Fabrizio Luccio	Computational Thinking First Algorithms	Springer	2018, 1 <sup>st</sup> Edn
3	Karl Beecher	Computational Thinking – A beginner’s guide to problem solving	BSC publication	2017, 1 <sup>st</sup> Edn

**Pedagogy**

- Lectures, Group discussions, Demonstrations, Case studies

**Course Designer**

1. Dr. V. Deepa

Course Code	Course Title	Category	L	T	P	Credit
GGC25C03	Programming in C with Graphics	Theory	58	2	-	3

### Preamble

This course equips students with the ability to design two-dimensional and three-dimensional graphics, apply transformations, and solve programming problems using C. It covers arrays, functions, structures, pointers, and file handling while incorporating graphical programming techniques, including clipping and animation.

### Course Learning Outcomes

On the successful completion of the course, students will be able to

CLO Number	CLO Statement	Knowledge Level
CLO1	Understand the programming constructs and structure of C programming.	K1
CLO2	Understand the purpose of arrays, strings, structures, pointers, and files to solve problems.	K2
CLO3	Apply functions to solve problems using a procedure-oriented approach.	K3
CLO4	Analyze problems and solve them by applying appropriate logic and graphics techniques.	K4

### Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	S	S	S	M
CLO2	S	S	S	M	S
CLO3	S	M	S	S	M
CLO4	S	S	S	S	S

S- Strong; M-Medium;

## SYLLABUS

### UNIT I

12 Hrs

Overview of C: Constants, Variables, Keywords, and Data Types. Structure of a C program, Compilation, and Execution. Operators and Expressions. Control Structures: Decision-making (if, switch), looping (for, while, do-while), and case control structures. Graphics Basics: Introduction to <graphics.h>, initializing graphic modes, and basic graphics functions (line, circle, rectangle).

### UNIT II

12 Hrs

Arrays: One-dimensional and multi-dimensional arrays. Strings: String handling functions (strlen, strcpy, strcmp). Reading and writing strings. Graphics Drawing: Algorithms for line drawing (DDA, Bresenham's line algorithm). Circle drawing algorithms (Midpoint, Bresenham's circle algorithm).

### UNIT III

12 Hrs

Functions: Types, recursion, scope, and visibility. 2D Graphics: Basics of transformations – translation, rotation, scaling, reflection. Matrix representation and composite transformations. Animation: Introduction to basic animation concepts – frame-by-frame animation.

### UNIT IV

11 Hrs

Pointers: Basics of pointers, pointer arithmetic, accessing variables through pointers. File Handling: File operations, random access, and command-line arguments. Clipping Techniques: Line clipping (Cohen-Sutherland Algorithm), polygon clipping (Sutherland-Hodgman Algorithm).

### UNIT V

11 Hrs

3D Graphics: Basics of 3D transformations – translation, scaling, rotation. Projections: Orthographic and perspective projections.

### TEXT BOOKS

S. No	Author	Title of the Book	Publisher	Year and Edition
1	Balagurusamy	Programming in ANSI C	McGrawHill,	2024,9 <sup>th</sup> Edn
2	David J.Eck	Introduction to Computer Graphics	OTL	2023, 1 <sup>st</sup> Edn

## REFERENCE BOOKS

S. No	Author	Title of the Book	Publisher	Year and Edition
1	Byron Gottfried	Programming with C	McGrawHill,	2018, 4 <sup>th</sup> Edn
2	Yashavant Kanetkar	Let Us C	BPB	2022, 19 <sup>th</sup> Edn
3	Donald Hearn & M. Pauline Baker	Computer Graphics: Principles and Practice	Pearson	2013, 4 <sup>th</sup> Edn

## Pedagogy

Chalk and talk, PPT, Discussion, Assignment, Demo, Quiz, Seminar.

## Course Designer

1. Dr. T. Sangeetha

Course Code	Course Title	Category	L	T	P	Credit
GC25CP1	Programming in C with Graphics Lab	Practical	-	-	45	2

### Preamble

This lab course provides students with practical experience in implementing graphical applications using C programming. Students will work with the graphics. library to design and develop 2D and 3D graphics, apply graphical transformations, implement basic animation techniques, and utilize clipping algorithms.

### Course Learning Outcomes

On the successful completion of the course, students will be able to

CLO Number	CLO Statement	Knowledge Level
CLO1	Demonstrate an understanding of the basic syntax, semantics, and structure of C programming.	K1
CLO2	Design and Implement simple graphical interfaces and 2D visualizations using C graphics libraries	K2
CLO3	Apply logical problem-solving techniques to develop algorithms and write structured programs in C to solve computational problems.	K3
CLO4	Analyze and Implement graphical algorithms such as line drawing, circle drawing, and transformations using C.	K4

### Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	M	M	S	S	S
CLO2	S	S	S	S	S
CLO3	S	S	S	S	S
CLO4	S	S	M	S	S

S- Strong; M-Medium;

## LIST OF PROGRAMS

- Draw basic shapes (points, lines, circles, and rectangles) in C using graphics functions.
- Implement translation of a 2D object (like a line or shape) in the graphics window.
- Implement scaling and rotation of a 2D object.
- Apply shearing and reflection transformations to 2D objects.
- Implement and compare different line drawing algorithms.
- Implement and compare different circle drawing algorithms.
- Implement line clipping algorithms for 2D objects.
- Implement animation techniques and user interaction with graphics.

### **Pedagogy**

Demonstration of working environment / Tools / Software / Program

### **Course Designer**

1. Dr. T. Sangeetha

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDIT
GC25C04	OOPS WITH GRAPHICS	THEORY	73	2	-	3

### Preamble

This course introduces the concepts of Object-Oriented Programming using Java and graphics concepts to explore its features such as classes, inheritance, packages, interfaces, and exception handling. It further emphasizes applets, graphics, AWT, and Swing to build creative and user interactive applications.

### Prerequisite

Students should have basic knowledge of programming fundamentals such as variables, control statements, and functions.

### Course Learning Outcomes

On the successful completion of the course, students will be able to

CLO Number	CLO Statement	Knowledge Level
CLO1	Recall the object-oriented principles and implement Java programs using basic constructs.	K1
CLO2	Apply classes, objects, inheritance, and abstraction to design structured solutions to computational problems.	K2
CLO3	Employ packages, interfaces, string handling, exception handling, and file I/O to develop modular and error-free applications.	K3
CLO4	Design and implement applets, graphics, and GUI applications using AWT and Swing with event handling.	K4

### Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	M	S	S	M
CLO2	S	S	M	S	M
CLO3	S	S	M	S	M
CLO4	S	S	S	M	S

S-Strong; M-Medium;

## OOPS WITH GRAPHICS- GC25C04- 73 HRS

### UNIT I

(14 Hrs)

Introduction to Object Oriented Programming Paradigm and Java Language: Introduction – Object Oriented Programming Paradigm – Evolution of Java – Features of Java Language – Overview of Java platforms – Basics of Java: Keywords- Identifiers - Data Types - Variables – Console I/O - Simple Java program – Executing a Java Program - Basic Debugging – IDE’s (IntelliJ/Eclipse/NetBeans) and Coding conventions.

**UNIT II****(15 Hrs)**

Classes, Objects and Methods: Introduction- Class Definition Instance Variables and Member Methods- Declaration of Objects and Accessing Members – Classification of Members methods - Inheritance: Introduction – Method overriding – Types of Inheritance: Single level Inheritance – Multi-level Inheritance –Hierarchical Inheritance -Hybrid Inheritance- Constructors and Inheritance – Abstract classes and methods.

**UNIT III****(15 Hrs)**

Packages - Packages and Member Access - Importing Packages -Interfaces - Exception Handling Exception Types - Using Try and Catch - Nested Try - Throw - Throws - String Handling - String Operations - Character Extraction - String Comparison - Searching String - Modifying String - I/O Basics -Byte & Character Streams- Reading Console Input –Writing Console Output – Reading and Writing Files.

**UNIT IV****(14 Hrs)**

Introduction to Applet Programming – Building applet code – Applet life cycle – Applet tag – Adding applet to HTML file – Running the Applet – Introducing Graphics programming – Graphics Class – Lines and Rectangles – Circles and Ellipses – Drawing arcs -Drawing Polygons - Line Graphs – Drawing Bar charts.

**UNIT V****(15 Hrs)**

Introducing AWT Controls - AWT Control fundamentals - Labels - Using Buttons – Applying Check Boxes - Choice Controls - Using List - Using Text field & Text area – Introducing GUI Programming with Swing - Two Key Swing Features - Components and Containers – Swing Packages – A Simple Swing application - Event Handling - Painting in Swing - Painting example – Compute the Paintable area - A Paint Example.

**Text Book**

S.No	Authors	Title	Publishers	Year and Edition
1.	Herbert Schildt	Java : The Complete Reference	McGraw Hill Education	2022, 12 <sup>th</sup> Edn
2.	E. Balaguruswamy	Programming with JAVA	McGraw Hill Professional	2015, 6 <sup>th</sup> Edn

**Books for Reference**

S.No	Authors	Title	Publishers	Year and Edition
1.	David M. Geary	Graphic Java 2: Swing	Prentice Hall Professional, 1999	1999, 3 <sup>rd</sup> Edn
2.	Amro SOLIMA	Java Swing Complete Comprehensive Guide	Independently published	2020, 1 <sup>st</sup> Edn

**Pedagogy**

- PowerPoint Presentations, Group Discussion, Seminar, Quiz Assignment, Experience Discussion

**Course Designer**

1. Dr. P. Parvathi

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDIT
IN23C05	DATA STRUCTURE AND ALGORITHM	THEORY	58	2	-	3

### Preamble

To provide an overview of data structures and algorithm design methods for programming and problem-solving process.

### Course Learning Outcomes

On the successful completion of the course, students will be able to

CLO Number	CLO Statement	Knowledge Level
CLO1	Recall about the concepts of Arrays, Stack, Queue, Link List, Trees and Graph.	K1
CLO2	Understand sorting, searching and hashing algorithm	K2
CLO3	Apply the data structures to solve various computing algorithms and sorting algorithms.	K3
CLO4	Analyze lists, queues, stacks, trees and graph according to the needs of different applications	K4

### Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	M	M	S	S
CLO2	S	M	S	M	M
CLO3	M	M	S	M	S
CLO4	S	S	S	M	S

S- Strong; M-Medium;

## DATA STRUCTURE AND ALGORITHM- IN23C05- 58 Hrs

### UNIT I

(12 Hrs)

Introduction to Data Structure: Definition, Basic Terminology, Elementary Data Organization - Types of Data Structures- Linear & Non-Linear Data Structures-Data Structure Operations. Algorithm Specifications: Performance Analysis and Measurement (Time and space analysis). Abstract Data Types- Advantages of ADT. Array: Representation of arrays, Types of arrays, Applications of arrays, Sparse matrix and its representation.

### UNIT II

(12 Hrs)

Stacks and Queues: Stack-Stack Representation & Implementation-Stack Operations-Applications of Stack. Queue-Queue Representation & Implementation-Queue Operations-Types of Queues.

### UNIT III

(11 Hrs)

Linked List: Linked List as Data Structures- Representation of Linked List-Operations on Linked List-Stack as Linked List-Queue as Linked List-Doubly Linked List-Circular List.

### UNIT IV

(13 Hrs)

Trees: Preliminaries-Binary Trees-B-Trees. Graph: Graph Terminologies-Types of Graphs-Graph Representation. Hashing: Hash Functions. Sorting: Bubble Sort-Selection Sort-QuickSort-Heap Sort-Merge Sort.

### UNIT V

(10 Hrs)

Algorithm Design Techniques: Greedy Algorithms - Prim's Algorithm, Kruskal's Algorithm. Divide and Conquer: Running Time of Divide and conquer algorithms. Decrease and Conquer- Depth First Search and Breadth First Search. Backtracking Algorithms - n Queens Problem, Branch and Bound – Traveling Salesman Problem.

#### Text Books

S.No.	Authors	Title	Publishers	Year and Edition
1.	Rajesh K. Shukla	Data Structures using C & C++	Wiley India	2009, 1 <sup>st</sup> Edn
2.	Seymour Lipschutz, G A Vijayalakshmi Pai	Data Structures	Tata McGraw-Hill	2014, 1 <sup>st</sup> Edn

#### Books for Reference

S.No.	Authors	Title	Publishers	Year and Edition
1.	Anany Levitin	Introduction to Design and Analysis of Algorithms	Pearson Education	2009, 3 <sup>rd</sup> Edn
2.	Wisnu Anggoro	C++ Data Structures and Algorithms	Packt Publishing	2018, 1 <sup>st</sup> Edn
3.	Yedidyah Langsam, Moshe J. Augenstein, aron M. Tenenbaum	Data Structures using C & C++	PHI Learning, 2 <sup>nd</sup> Edition	2009, 2 <sup>nd</sup> Edn

#### Pedagogy

- Chalk & talk, PPT, Group Discussion, Assignment, Demo, Quiz, Role play.

#### Course Designer

Dr. R. Jeevitha

<b>COURSE CODE</b>	<b>COURSE TITLE</b>	<b>CATEGORY</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>CREDIT</b>
<b>GC25CP2</b>	<b>OOPS WITH GRAPHICS LAB</b>	<b>PRACTICAL</b>	-	-	<b>75</b>	<b>3</b>

### **Preamble**

This lab course provides hands-on experience in Object-Oriented Programming using Java, focusing on classes, inheritance, interfaces, and file handling. It emphasizes graphics programming, applets, AWT, and Swing to develop interactive and visually engaging applications.

### **Prerequisite**

Students should have a basic understanding of programming concepts such as variables, control statements, and functions.

### **Course Learning Outcomes**

On the successful completion of the course, students will be able to

<b>CLO Number</b>	<b>CLO Statement</b>	<b>Knowledge Level</b>
<b>CLO1</b>	Implement basic Java programs using variables, control statements, classes, and objects to solve simple computational problems.	<b>K1</b>
<b>CLO2</b>	Apply object-oriented concepts such as inheritance, polymorphism, abstraction, and interfaces to develop modular Java programs.	<b>K2</b>
<b>CLO3</b>	Utilize string handling, packages, exception handling, and file I/O operations to build robust and reusable Java applications.	<b>K3</b>
<b>CLO4</b>	Design and develop interactive graphical applications using Applets, 2D Graphics, AWT, and Swing with event handling and custom painting.	<b>K4</b>

### **Mapping with Programme Learning Outcomes**

<b>CLOs</b>	<b>PLO1</b>	<b>PLO2</b>	<b>PLO3</b>	<b>PLO4</b>	<b>PLO5</b>
<b>CLO1</b>	S	S	M	S	M
<b>CLO2</b>	S	S	S	S	S
<b>CLO3</b>	S	S	S	S	M
<b>CLO4</b>	S	S	M	S	S

S-Strong; M-Medium;

## OOPS WITH GRAPHICS LAB - GC25CP2 – 75 Hrs

### Program List

- Basic Java Programs (variables, operators, control statements, and console I/O).
- Classes and Objects (Implementation of classes, objects, and methods with real-world examples)
- Inheritance and Polymorphism (single, multilevel, hierarchical, and hybrid inheritance)
- Abstract Classes and Interfaces (abstraction and multiple inheritance via interfaces)
- String Handling – (string operations: searching, comparison, extraction, and modification)
- Packages and Access Control (Creating and importing user-defined packages with member access)
- File I/O Operations (Reading from and writing to files using byte and character streams)
- Applet Programming – Creating simple applets, implementing applet lifecycle, and embedding in HTML.
- 2D Graphics Programming – Drawing lines, rectangles, circles, ellipses, arcs, polygons, and charts.
- AWT Controls – Implementing labels, buttons, check boxes, choice controls, lists, text fields, and text areas.
- Swing GUI Applications (Designing GUI with containers, components, and event handling)
- Painting in Swing (Programs demonstrating custom painting and handling paintable areas)
- Developing a small interactive graphical application (e.g., paint app, chart generator, or simple game)

### Pedagogy

- Demonstration of working environment/Tools/Software/Program

### Course Designer

1. Dr. P. Parvathi

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDIT
IN23C06	DATABASE MANAGEMENT SYSTEM	Theory	58	2	-	3

### Preamble

*This course provides an insight on the basics of database, database design, relational model and querying a database. It also gives an overview of NoSQL databases and storing and accessing data in a key/value database MongoDB.*

### Course Learning Outcomes

On the successful completion of the course, students will be able to

CLO Number	CLO Statement	Knowledge Level
CLO1	Recall the basic concepts of database management and NoSQL Databases	K1
CLO2	Understand DDL, DML SQL statements and PL/SQL programming	K2
CLO3	Apply various queries, PL/SQL program to store and retrieve data from databases	K3
CLO4	Analyze the working of SQL, PL/SQL program, NoSQL database to solve real-world problems	K4

### Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	M	S	M	S	M
CLO2	S	M	M	S	M
CLO3	M	S	S	S	S
CLO4	S	S	S	S	S

S- Strong; M-Medium;

### DATABASE MANAGEMENT SYSTEM – IN23C06 ( 58 Hrs)

#### Syllabus

#### Unit – I

12 Hrs

Database Concepts: Introduction -Relationships - **DBMS** -Relational data model - Integrity rules -**Theoretical relational languages**. Database Design: Data modeling -**Dependency** - Database design -- Normal forms - **Dependency diagrams** – **De normalization**.

#### Unit – II

12 Hrs

Structured Query Language (SQL): Introduction – DDL - Naming rules and conventions – Data types **Constraints** - Creating table- Displaying table information - **Altering an existing table– Dropping, renaming, and truncating table** - Table type. Working with tables: DML - adding a newrow/record – updating and deleting existing rows/records - Retrieving data from table.

#### Unit-III

12Hrs

**Functions and Grouping: Built-in functions** - Grouping data. Joins and Views: **Join -Join types**. Views: Views - **Creating a view - Removing a view - Altering a view**. PL/SQL: Fundamentals - Block structure - comments - Data types – Other data types - Variable declaration – Assignment operation.

**Unit – IV****12 Hrs**

Control Structures and Embedded SQL: Control structures - Nested blocks - SQL in PL/SQL - Data manipulation - **Transaction control statements**. PL/SQL Cursors: **Cursors -Implicit & explicit cursors and attributes** - cursor FOR loops - Records - Tables - **Procedures -Functions – Triggers**

**Unit – V****10 Hrs**

An overview of NoSQL - **Characteristics of NoSQL – NoSQL storage types** - Advantages and Drawbacks - Mongo DB Introduction – **Creating database and Dropping database - Creating collection and Dropping collection** – Insert, query and update document.

**Text Books**

S. No	Author	Title of the Book	Publisher	Year and Edition
1.	Nilesh Shah	Database Systems Using Oracle	PHI	2016, 2 <sup>nd</sup> Edn
2.	Gaurav Vaish	Getting Started with NoSQL	Packt	2013, 1 <sup>st</sup> Edn

**Reference Books**

S. No	Author	Title of the Book	Publisher	Year and Edition
1	Rajesh Narang	Database Management Systems	Prentice Hall of India,	2011, 2 <sup>nd</sup> Edn,
3	Kristina Chodorow	MongoDB: DefinitiveGuide	Oreilly	2015, 2 <sup>nd</sup> Edn,

**Pedagogy**

- Chalk and talk PPT, Discussion, Assignment, Demo, Quiz, Flipped mode.

**Course Designers****Dr. G. SANGEETHA**

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDIT
GC25C07	2D GRAPHICS AND ILLUSTRATION	THEORY	58	2	-	3

### Preamble

*This course introduces students to digital image editing, vector graphics, and layout design using industry-standard tools. It emphasizes hands-on practice in creating, editing, and enhancing visual content through various graphical techniques and enables students to apply design principles to develop effective and creative multimedia applications.*

### Course Learning Outcomes

On the successful completion of the course, students will be able to

CLO Number	CLO Statement	Knowledge Level
CLO1	Recall the fundamental tools, menus, and workspace components of image editing and design software.	K1
CLO2	Explain the concepts of layers, selections, masks, and vector drawing techniques used in digital graphics.	K2
CLO3	Apply image editing, vector drawing, and layout techniques to create basic graphics and designs.	K3
CLO4	Analyze graphical requirements to select appropriate tools and techniques for image manipulation and design tasks.	K4

### Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	M	M	S	S
CLO2	S	M	S	S	M
CLO3	M	S	S	M	S
CLO4	S	S	S	M	S

S- Strong; M-Medium;

### 2D GRAPHICS AND ILLUSTRATION – GC25C07 (58Hrs)

#### Syllabus

#### UNIT I:

12 hrs

**Getting to Know the Work Area:** Adobe Photoshop interface -Menus – Panels -Toolbox - Navigation and workspace. **Basic Photo Corrections** -straightening and cropping image – brush tool - clone stamp tool - **Working with Selections:** Selection tools - Magic wand tool -Lasso tool -Magnetic Lasso tool.

#### UNIT II:

12 hrs

**Layer Basics: Layers panel -Rearranging layers** – Applying a layer style **-Quick Fixes :** Adjusting facial features with Liquify – Content -Aware Tool – Masks and Channels: Working with masks and channels – Typographic Design: Creating type on a path – Warping point type – **Designing paragraphs of type.**

**UNIT III:****12 hrs**

**Vector Drawing Techniques: Drawing with the Pen tool** – Importing smart object -Adding color and depth to a shape using layer styles – Advanced compositing: **Arranging layers** -Smart filters – Painting a layer – Adding a background -**Painting with the Mixer brush** – Selecting brush settings - Mixing colors with photographs.

**UNIT IV:****11 hrs**

Introduction to Adobe Illustrator CC – **Working with documents** – **Creating basic shapes** – Fill and Stroke -Create a Logo -Creating blends – Blending two objects – Pen and Pencil Tools – Brushes

**UNIT V:****11 hrs**

Introducing the Workspace - Getting to know InDesign – Working with styles – Working with graphics - **Working with objects** - **Working with pages** – Creating new document - Working with parent pages – Working with layers -Creating and modifying text frames – Flowing text - **Working with colors**

**Text Books**

S.No.	Authors	Title	Publishers	Year and Edition
1	Faulkner, Andrew, and Conrad Chavez	Adobe Photoshop CC Classroom in a Book	Adobe Press	2018, 1 <sup>st</sup> Edition
2	Wilson, Dena, Peter Lourekas, and Rob Schwartz	Learn Adobe Illustrator CC for Graphic Design and Illustration	Adobe Press	2016, 1 <sup>st</sup> Edition
3	Cruise, John, and Kelly Kordes Anton	Adobe InDesign CS6 Classroom in a Book	Adobe Press	2012, 1 <sup>st</sup> Edition

**Reference Books**

S.No.	Authors	Title	Publishers	Year and Edition
1	Adobe Creative Team	Adobe Photoshop CS5 Classroom in a Book.	Adobe Press	2011, 1 <sup>st</sup> Edn
2	Adobe Creative Team	Adobe Illustrator CS5 Classroom in a Book	Adobe Press	2012, 1 <sup>st</sup> Edn
3	Adobe Creative Team	Adobe InDesign CS5 Classroom in a Book.	Adobe Press	2011, 1 <sup>st</sup> Edn

**Pedagogy**

Chalk & talk PPT, Group Discussion, Assignment, Demo, Quiz, Role play.

**Course Designer**

**Dr.P.Parvathi**

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDIT
GC25CP3	2D GRAPHICS AND ILLUSTRATION LAB	PRACTICAL	-	-	75	3

### Preamble

*This practical course develops hands-on skills in digital image editing, vector illustration, and layout design using industry-standard tools and to apply graphical techniques and enhance creative design abilities. The course prepares learners to create effective digital media outputs for real-world applications.*

### Course Learning Outcomes

On the successful completion of the course, students will be able to

CLO Number	CLO Statement	Knowledge Level
CLO1	Understand basic tools, panels, and features used in Photoshop, Illustrator, and InDesign.	K2
CLO2	Gain knowledge on image editing, vector drawing, and layout design tasks.	K2
CLO3	Apply appropriate tools and techniques to perform image editing, vector illustration, and page layout exercises.	K3
CLO4	Analyze design requirements to select suitable tools and workflows for creating digital graphics, illustrations, and layout designs.	K4

### Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	M	S	S	M
CO2	S	M	S	S	S
CLO3	M	S	S	M	S
CLO4	S	S	M	S	S

S- Strong; M-Medium.

### 2D GRAPHICS AND ILLUSTRATION LAB - GC25CP3 (75 hrs)

#### Program List

#### Adobe Photoshop Exercises

- Image Enhancement
- Background Removal
- Poster Design
- Photo Manipulation
- Digital Painting

### **Adobe Illustrator Exercises**

- Basic Shape Design
- Logo Design
- Typography Design
- Vector Tracing
- Infographic Design

### **Adobe InDesign Exercises**

- Brochure Design
- Magazine Page Layout
- Newsletter Creation

### **Pedagogy**

Demonstration of working environment/Tools/Software/Program

### **Course Designer**

Dr. P. Parvathi

Course Code	Course Title	Category	L	T	P	Credit
CS23SBGP	Gen-AI	Theory	44	1	-	3

### Preamble

The objective of this course is to understand the breadth and depth of Generative Artificial Intelligence (Gen AI) and to impart knowledge on its ethical implications, practical applications, and emerging trends.

### Course Learning Outcomes

On the successful completion of the course, students will be able to

CLO Number	CLO Statement	Knowledge Level
CLO1	Understand the fundamental concepts and ethical considerations of Generative AI.	K2
CLO2	Apply AI principles in practical settings using basic AI tools and platforms	K3
CLO3	Develop advanced skills in specialized AI applications such as text analysis, natural language processing, and image recognition.	K3
CLO4	Explore emerging trends in AI, integrating advanced AI tools into diverse professional practices.	K4

### Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	S	S	S	M
CLO2	S	S	S	S	S
CLO3	S	S	M	S	S
CLO4	S	M	S	M	S

S- Strong; M-Medium.

### SBS I: Gen-AI - CS23SBGP (45Hrs)

#### Unit 1: Introduction to Gen AI

9 hours

Understanding Gen AI: Definition and scope of Gen AI - Overview of its applications in various fields - Introduction to essential skills needed for Gen AI. Ethical Considerations: Discussion on ethical guidelines and responsible use of AI - Understanding the impact of AI on society and individuals.

#### Hands-on Activity: Exploring AI Tools

- Working with appropriate content creation Gen-AI tools to engage with ChatGPT to explore various subjects, simulate interviews, or create imaginative written content.
- Working with appropriate writing and rephrasing Gen-AI tools to drafting essays on designated topics and refining the content with improved clarity, coherence, and correctness.

#### Unit 2: Basic AI Concepts

8 hours

Introduction to AI: Basic concepts and terminology of artificial intelligence - Examples of AI in everyday life - Real-world examples of AI applications in different domains. Machine Learning Basics: Understanding the principles of machine learning - Overview of supervised and unsupervised learning.

#### Hands-on Activity: Simple AI Projects

- Working with appropriate educational content creation Gen-AI tools to generate quizzes and flashcards based on classroom material.
- Working with appropriate language learning Gen-AI tools to practice and enhance language skills through interactive exercises and games across multiple languages.

### **Unit 3: AI in Practice**

**9 hours**

Text Analysis and Natural Language Processing (NLP): Introduction to NLP concepts and techniques - Hands-on exercises analyzing text data and extracting insights. Image Recognition and Processing: Basic of image recognition algorithms and techniques - AI Tools for Text and Image Processing

**Hands-on Activity:** Text and Image Projects

- Working with appropriate image processing Gen-AI tools to experiment with AI-generated images.
- Working with appropriate object recognition Gen-AI tools to identify various objects such as text, images, products, plants, animals, artworks, barcodes, and QR codes.

### **Unit 4: AI for Productivity and Creativity**

**9 hours**

AI-enhanced Productivity and creativity Tools: Overview of productivity and creativity tools enhanced with AI capabilities - Tips for integrating AI into daily tasks and workflows. AI and Jobs: Exploring how AI impacts jobs and industries - Discussion on opportunities and challenges - Exploration of AI-powered creative tools and applications.

**Hands-on Activity:** Productivity and Creativity

- Working with appropriate content creation Gen-AI tools to generate interactive videos / blog posts / art / drawing / music and storytelling experience.
- Working with appropriate resume generation Gen-AI tools to create professional resumes efficiently.

### **Unit 5: Future of Gen AI and Final Project**

**9 hours**

Emerging Trends in Gen AI - Applications of Generative AI - Ethical and Societal Impact of Gen AI - Future Directions and Challenges - Case Studies in Generative AI.

**Hands-on Activity:** Trends in Gen AI

- Working with appropriate speech generation Gen-AI tools to customize synthetic speech for virtual assistance across different applications.
- Working with appropriate data analysis Gen-AI tools to perform data analysis, visualization, and predictive modeling tasks.
- Working with appropriate Gen-AI design tools to simplify the creation of visually appealing presentations.
- Working with appropriate website builder Gen-AI tools to develop professional websites with AI assistance.

### **Pedagogy**

Demonstration of AI Tools, Lectures and Case studies.

### **Course Designer**

Dr.S.Devipriya

### **Evaluation pattern for Gen-AI**

Quiz : 50 Marks (5 quizzes with each 10 marks) Case study : 25 Marks  
 Online Exam : 25 Marks (Departments to plan and conduct the exam) Total : **100 Marks**