



**PSGR
Krishnammal College for Women**



Affiliated to Bharathiar University | Autonomous | College of Excellence | Accredited with A++ Grade | Ranked 9th in NIRF

DEPARTMENT OF INFORMATION TECHNOLOGY

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

BACHELOR OF INFORMATION TECHNOLOGY

2025-2028 BATCH



PSGR
Krishnammal College for Women



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

PROGRAMME LEARNING OUTCOMES (PLO's)

After Completion of the programme, the student will be able to

PLO1: Design, implement, and evaluate a computing-based solution to meet the industry standards.

PLO2: Apply computing theory and programming principles to real-time software design and development.

PLO3: Explore Current and emerging techniques and technologies to formulate solutions for systems and organizations.

PLO4: Pursue higher studies in the specialized area and also promote life-long learning for professional development.

PLO5: Recognize as world class professionals in IT and produce women entrepreneurs to increase employability.

PROGRAMME SPECIFIC OUTCOMES (PSO's)

The students at the time of graduation will

PSO1: Professionally be equipped in the areas of programming, Cloud Infrastructure, Internet of Things, Mobile Application Development and to be ease with the recent technologies of various domains.

PSO2: Apply the knowledge of technology and soft skills to carry out societal software development.

PSO3: Analyze modern computer languages and applications for their successful Career, to create platforms to become an entrepreneur and a relish for higher studies.



Bachelor of Information Technology
Choice Based Credit System (CBCS)
Learning Outcomes Based Curriculum Framework LOCF)
Syllabus & Scheme of Examination
2025 -2028 Batch

Semester	Part	Course Code	Title of the Course	Course Type	Instruction Hours / Week	Contact Hours	Tutorial Hours	Duration of Examination	Examination Marks			Credits
									CA	ESE	Total	
I	I	TAM2501A/ HIN2501A/ FRE2501A	Tamil Paper I/ Hindi Paper I/ French Paper I	L	4	58	2	3	25	75	100	3
I	II	ENG2501A	English Paper I	E	4	58	2	3	25	75	100	3
I	III	CY25C01	Programming in C	CC	4	58	2	3	25	75	100	3
I	III	PP22C02	Computational and Algorithmic Thinking for Problem Solving	CC	3	45	-	-	100	-	100	3
I	III	AP24C03	Operating Systems Fundamentals - Linux	CC	4	58	2	3	25	75	100	3
I	III	TH24A03	Numerical and Statistical Techniques	GE	6	88	2	3	25	75	100	5
I	III	IN24CP1	Programming in C Lab	CC	3	45	-	3	15*	35*	50	2
I	IV	NME25B1/ NME25A1	Basic Tamil I / Advance Tamil I	AEC	2	28	2	-	100	-	100	2

I	IV	NME23ES	Introduction to Entrepreneurship	AEC	2	30	-	-	100	-	100	
I-II	VI	NM25GAW	General Awareness	AECC	SS	-	-	-	100	-	100	Gr.
I-II	VI	COM25SER	Community Services 30 Hours	GC	-	-	-	-	-	-	-	-
I-V	VI	24BONL1	Online Course I	ACC	-	-	-	-	-	-	-	-
		24BONL2	Online Course II									
		24BONL3	Online Course III									
II	I	TAM2502A/ HIN2502A/ FRE2502A	Tamil Paper II/ Hindi Paper II/ French Paper II	L	4	58	2	3	25	75	100	3
II	II	ENG2502A	English Paper II	E	4	58	2	3	25	75	100	3
II	III	IN25C04	OOPs with C++	CC	5	73	2	3	25	75	100	3
II	III	IN23C05	Data Structure and Algorithm	CC	4	58	2	3	25	75	100	3
II	III	IN25CP2	OOPs with C++Lab	CC	5	75	-	3	15 [#]	35 [#]	50	3
II	III	TH24A11	Discrete Mathematics	GE	6	88	2	3	25	75	100	5
II	IV	NM25UHR	Universal Human Values and Human Rights	AEC	2	30	-	-	100	-	100	2
II	IV	*NME25B2 / NME25A2	Basic Tamil II / Advanced 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 II	ACC	-	-	-	-	-	-	-	-

III	I	TAM2303A/ HIN2303A/ FRE2303A	Tamil Paper III/ Hindi Paper 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 System	CC	4	58	2	3	25	75	100	3
III	III	IN23C07	Digital Logic and circuits	CC	4	58	2	3	25	75	100	3
III	III	IN23CP3	DBMS lab	CC	5	75	-	3	15*	35*	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

CA: Continuous Assessment

GE: Generic Elective

ESE : End Semester Examination

AEC: Ability Enhancement Course

ACC: Additional Credit Course

SS: Self Study

AECC: Ability Enhancement Compulsory Course

GC: General Course

PROGRAMMING IN C – CY25C01

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

COMPUTATIONAL AND ALGORITHMIC THINKING FOR PROBLEM SOLVING - PP22C02

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

PROGRAMMING IN C LAB -IN24CP1

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

OPERATING SYSTEMS FUNDAMENTALS - LINUX –AP24C03

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

OOPs with C++-IN23C04

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

DATA STRUCTURE AND ALGORITHM- IN23C05

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

OOPs with C++ LAB –IN25CP2

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

DATABASE MANAGEMENT SYSTEM- IN23C06

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

DIGITAL LOGIC AND CIRCUITS- IN23C07

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

DBMS LAB - IN23CP3

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

Gen-AI - CS23SBGP

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

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDIT
CY25C01	PROGRAMMING IN C	Theory	58	2	-	3

Preamble

This course introduces fundamental programming constructs in C. It covers the concepts such as arrays, functions, structures, pointers and file handling. It provides comprehensive coverage on industry 4.0.

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Recall the programming constructs and structure of C programming and Industry 4.0 technologies	K1
CLO2	Understand the purpose of arrays, strings, structures, pointers and files to solve problems	K2
CLO3	Apply functions to solve problems using procedure oriented approach	K3
CLO4	Analyze the problems and solve it by applying appropriate logic	K4

Mapping with Programme Learning Outcomes

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

S- Strong; M-Medium

PROGRAMMING IN C – CY25C01

58 Hrs

Syllabus

Unit I

12 Hrs

Overview of C - Constants, Variables and Data types - Operators and Expressions - Managing Input and Output Operations -**Sulba Sutras-Decision Making and Branching - Decision Making and Looping.**

Unit II

12 Hrs

Shloka Arrays: One-Dimensional - Two Dimensional - Multidimensional Arrays- Character Arrays and Strings: Declaring and Initializing String Variables - Reading Strings from Terminal - Writing Strings to Screen - String Handling Functions.

Unit III

12 Hrs

Chandas -User-Defined Functions: Need - Return Values and Types - Function Calls - Function declaration - Category of Functions - No Arguments and No Return Values - Arguments but No Return Values - Arguments with Return Values - Recursion - Scope Visibility and Life time of Variables

Structures and Unions-Definition: Structure Initialization - Comparison of Structure Variables - Arrays of Structures - Arrays within Structures-Unions.

Unit IV**12 Hrs**

Pointers: Understanding Pointers - Accessing the Address of a Variable - Declaring and Initializing Pointers - Accessing a Variable through its Pointers - **Pointers and Arrays**. File Management in C: Defining and Opening a File - Closing File - **I/O Operations on Files** - Dynamic Memory allocation MALLOC,CALLOC,REALLOC.

Unit V**10 Hrs**

Introduction to Industry 4.0 - Need - Reasons for Adopting Industry 4.0 - Definition - Goals and Design Principles - **Technologies of Industry 4.0** - Skills required for Industry 4.0 - Advancements in Industry - **Impact of Industry 4.0 on Society, Business, Government and People** - **Introduction to 5.0**.

Text Book

S. No	Author	Title of the Book	Publisher	Year and Edition
1	E. Balagurusamy	Programming In ANSI C	Tata Mc Graw Hill	2019,8 th Edn
2	P. Kaliraj, T. Devi	Higher Education for Industry 4.0 and Transformation to Education 5.0	CRC Press - Taylor & Francis Group	2021,1 st Edn

Reference Books

S. No	Author	Title of the Book	Publisher	Year and Edition
1	Byron Gottfried	Programming with C	Tata McGraw Hill	2018,4 th Edn
2	Yashwvant Kanetkar	Let Us C: Authentic Guide to C Programming Language	BPB Publications	2020,17 th Edn

Pedagogy

- Lectures, Group discussions, Demonstrations

Course Designer**Dr. S. Beula Princy**

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 st Edn
2	Paolo Ferragina, Fabrizio Luccio	Computational Thinking First Algorithms	Springer	2018, 1 st Edn
3	Karl Beecher	Computational Thinking – A beginner's guide to problem solving	BSC publication	2017, 1 st Edn

Pedagogy

- Lectures, Group discussions, Demonstrations, Case studies

Course Designer**Dr. V. Deepa****Evaluation Pattern:**

Assessment	Number	Marks
Quiz (online or offline)	5	50
Class Activity	5	25
Group Project (Domain Specific)	1	25
Total		100

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDIT
IN24CP1	PROGRAMMING IN C lab	PRACTICAL	-	-	45	2

Preamble

- The course gives hands-on experience on C Programming and improves the practical skillset.
- The learner will be able to develop the logic for the given problem, recognize and understand the syntax and construction of C code.
- The course involved in compiling, linking and debugging C code and developing some complex programs.

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Identify the basic terminologies of C programming such as data types, conditional statement, looping statements and functions.	K1
CLO2	Develop programs with implementation of arrays, string handling functions and parameter passing techniques.	K2
CLO3	Construct programs with features of Structure and Pointers.	K3
CLO4	Develop readable programs with files for reading input and storing the output with perform operations	K4

Mapping with Programme Outcomes

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

S- Strong; M-Medium;

PROGRAMMING IN C LAB- IN24CP1

45 Hrs

Program List

- Basic Operations Statement.
- Control Structures.
- Arrays.
- Structure.
- Arrays within structure
- String handling functions.

- User defined functions.
- Pointers.
- File operations.

Pedagogy

- Demonstration of working environment/Tools/Software/Program

Course Designer

Dr.R.Jeevitha

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDIT
AP24C03	OPERATING SYSTEMS FUNDAMENTALS – LINUX	THEORY	58	2	-	3

Preamble

- This subject is designed to provide the students with a thorough discussion of the fundamentals of operating system.
- To explore the various memory management scheme and to perform administrative task on LINUX servers.

Course Learning Outcomes

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

CLOs Number	CLO Statement	Knowledge Level
CLO1	Recall the basic concepts with functions of operating systems and Linux system.	K1
CLO2	Understand the operating systems objectives and functionality along with system programs and system calls.	K2
CLO3	Compare and contrast various memory management schemes.	K2
CLO4	Demonstrate deadlock, prevention and avoidance algorithms, storage management, various scheduling algorithms and shell programming.	K3

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;

SYLLABUS

OPERATING SYSTEMS FUNDAMENTALS - LINUX –AP24C03

(58 hours)

UNIT I

12 Hrs

Introduction: What is operating systems do - **Computer System Architecture - Operating- System Operations.** Process Management: **Process Concept** - Process Scheduling - Interprocess communication.

UNIT II

12 Hrs

Process Scheduling: **Basic Concepts- Preemptive and Nonpreemptive Scheduling** - Scheduling Algorithms (FCFS, SJF & Round Robin only). Synchronization: **Back ground-The Critical Section Problem- Peterson's Solution- Semaphores- Deadlock: Deadlock Characterization** - Methods Handling Deadlocks - Recovery from Deadlock.

UNIT III

11 Hrs

Memory Management Strategies: **Background-Contiguous Memory Allocation-Paging.** Virtual Memory Management: Demand Paging - Page Replacement - Basic Page Replacement, **FIFO Page Replacement**, Optimal Page Replacement.

UNIT IV**11 Hrs**

What Linux Is – Becoming a Linux Power User : About Shells and Terminal Windows- Choosing your shell - **Running Commands** - **Recalling Commands Using Command History** - Connecting and Expanding Commands -Using Shell Variables.

UNIT V**12 Hrs**

Moving Around the File system : Using Basic File system Commands - Using Meta characters and Operators - **Listing Files and Directories** - Moving, Copying, and Removing Files.

Text Books

S.no	Author	Title of book	Publisher	Year and Edition
1	Abraham Silberschatz, Peter Baer Galvin, G Gagne	OPERATING SYSTEMS CONCEPTS	Wiley Publishers	2018 ,10 th Edn
2	Christopher Negus	LINUX BIBLE	Wiley	2020 , 10 th Edn

Reference Books

S.no	Author	Title of book	Publisher	Year and Edition
1	Archer J harries	Operating System	Tata Mc Graw Hill	2011, 2 nd Edn
2	Williams E. Shotts	The Linux Command Line: A Complete Introduction	John Wiley & Sons	2019, 2 nd Edn
3	Jason Cannon	Linux for Beginners	Createspace Independent Pub	2014 ,1 st Edn

Pedagogy

Demonstration of working environment/Tools/Software/Program

Course Designer

Mrs. G. Rubadevi

COURSECODE	COURSE TITLE	CATEGORY	L	T	P	CREDIT
IN25C04	OOPs with C++	Theory	73	2	-	3

Preamble

The course Object-Oriented Programming with C++ introduces students to the principles and practices of problem solving using the object-oriented paradigm. With the growing complexity of software systems, traditional procedural programming approaches often face challenges in modularity, reusability, and maintainability.

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Apply object-oriented concepts such as classes, objects, abstraction, and encapsulation in C++ programming.	K1
CLO2	Demonstrate the use of constructors, destructors, function overloading, operator overloading, inheritance, and polymorphism.	K2
CLO3	Implement templates, exception handling, and file handling for creating efficient and reusable C++ programs.	K3
CLO4	Design and develop real-world applications using object-oriented principles with emphasis on robustness and maintainability.	K4

Mapping with Programme Learning Outcomes

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

S- Strong; M-Medium;

OOPs with C++ -IN25C04 - 73Hrs

UNIT I

(14 Hrs)

OOPs Foundations & C++ Basics: Need for OOP vs. POP- objects, classes, abstraction, encapsulation, inheritance, polymorphism, message passing-Advantages and applications of OOP-C++ overview: Program structure- namespaces- Identifiers,-basic types- literals, const, operators, type casting-control structures: basic I/O with cin, cout, manipulators.

UNIT II

(15 Hrs)

Functions, Classes & Objects: Functions in C++-Prototypes-Call by value and reference- Inline functions, Default arguments- Function Overloading- Static and Storage classes, scope and visibility-Classes & objects: data and function members- Access Specifiers- This pointer-Static members, Friend functions- Constructors and its types-destructors.

UNIT III

(15 Hrs)

Operator Overloading & Inheritance: Operator overloading: rules & restrictions- Overloading unary and binary operators- Overloading stream operators- type conversion.

Inheritance: purpose and design: single, multiple, multilevel, hierarchical, hybrid; constructors, destructors and Inheritance- Overriding & Name hiding-Virtual base classes.

UNIT IV

(14 Hrs)

Pointers, Runtime Polymorphism, Exceptions & Templates: Pointers and dynamic memory (new/delete)-Pointers to objects-. Virtual functions- Abstract classes- Runtime polymorphism and late binding. Exception handling: try, catch, throw, standard exceptions, custom exceptions. Templates: function & class templates- basics of generic programming.

UNIT V

(15 Hrs)

Streams, Files & STL: Streams & file handling: text/binary files-Opening modes, reading/writing-fstream, Error handling-Random access-Standard Template Library: overview of containers (vector, list, map)- Iterators, using STL with user-defined types.

Text Book

Sno	Author	Title of the Book	Publisher	Year and Edition
1	E. Balagurusamy	Object-Oriented Programming with C++	McGraw-Hill publication	2020,8 th Edn
2	Ashok N Kamthane	Object oriented Programming with ANSI & Turbo C++	Pearson Education	2022,3 rd Edn

Books for Reference

S.No	Authors	Title	Publishers	Year and Edition
1	Reema Thareja	Object Oriented Programming with C++	Oxford University Press (OUP India)	2025, 2nd Edn
2	Ronald Mak	Object-Oriented Software Design in C++	Python Software Foundation, Network Theory Ltd	2024, 1st Edn
3	Wayne Murphy	C++ Cookbook: How to Write Great Code with the Latest C++ Releases	O'Reilly Media	2024, 1st Edn

Pedagogy

- Chalk and Talk PPT, Discussion, Assignment, Demo, Quiz, Case study.

Course Designer

Dr.V.DEEPA

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDIT
IN23C05	DATA STRUCTURE ANDALGORITHM	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-Quick Sort-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 st Edn
2.	Seymour Lipschutz, G A Vijayalakshmi Pai	Data Structures	Tata McGraw-Hill	2014,1 st 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 rd Edn
2.	Wisnu Anggoro	C++ Data Structures and Algorithms	Packt Publishing	2018, 1 st Edn
3.	YedidyahLangsam, Moshe J.Augentein, aron M.Tenenbaum	Data Structures using C & C++	PHI Learning, 2 nd Edition	2009, 2 nd Edn

Pedagogy

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

Course Designer**Dr. R. JEEVITHA**

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDIT
IN25CP2	OOPs with C++ LAB	PRACTICAL	-	-	75	3

Preamble

The Object-Oriented Programming with C++ Laboratory is designed to complement the theoretical concepts of object-oriented programming by providing students with practical, hands-on experience in implementing C++ programs.

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Apply the principles of object-oriented programming to design and implement programs using C++.	K1
CLO2	Develop modular solutions through the use of classes, objects, constructors, and operator overloading	K2
CLO3	Implement inheritance and polymorphism to build reusable and extensible applications.	K3
CLO4	Demonstrate proficiency in file handling, exception handling, and practical debugging techniques.	K4

Mapping with Programme Learning Outcomes

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

S- Strong; M-Medium;

OOPs with C++ LAB - IN25CP2- 75Hrs

Program List

- Basic C++ Program Structure (namespace, identifiers, constants, operators, type casting).
- Control Structures (if-else, switch, loops).
- User Defined Functions (inline, default arguments, function overloading).
- Classes & Objects (data members, access specifiers, constructors, destructors).
- Friend Functions & Static Members.
- Operator Overloading (unary, binary, stream operators).

- Inheritance (single, multiple, multilevel, hierarchical, hybrid).
- Pointers (basic, pointer to object, dynamic memory allocation).
- Virtual Functions & Runtime Polymorphism.
- Exception Handling (built-in and user-defined).
- Templates (function and class templates).
- File Operations (text file, binary file, random access).
- Standard Template Library (vector, list, map, algorithms).

Pedagogy

Demonstration of working environment/Tools/Software/Program

Course

**Designer Dr.
V.DEEPA**

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 Book

S. No	Author	Title of the Book	Publisher	Year and Edition
1.	Nilesh Shah	Database Systems Using Oracle	PHI	2016, 2 nd Edn
2.	Gaurav Vaish	Getting Started with NoSQL	Packt	2013, 1 st 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 nd Edn,
3	Kristina Chodorow	MongoDB: Definitive Guide	Oreilly	2015, 2 nd 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
IN23C07	DIGITAL LOGIC AND CIRCUITS	THEORY	58	2	-	3

Preamble

To impart the knowledge on simulation of digital system and functionality of Combinational circuits Boolean Algebra and flip flops.

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Recall the principles of binary number system and basic logic gates.	K1
CLO2	Understand the operations on Boolean laws and Theorems and Karnaugh Map	K2
CLO3	Applying the basic principles and types of registers, counters and the functionality of Multiplexers and Flip Flops	K3
CLO4	Analyze the concept of Memory Addressing and programmable logic devices	K4

Mapping with Programme Learning Outcomes

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

S- Strong; M-Medium;

DIGITAL LOGIC AND CIRCUITS - IN23C07

(58Hrs)

Syllabus

UNIT I:

12 hrs

Number Systems and Codes: Binary Number system – Binary to Decimal –Decimal to Binary – Hexa Decimal — Excess-3 Code – Gray code- **Error Detection and Correction. DIGITAL LOGIC: The Basic Gates – NOT, OR, AND - Universal Logic Gates – NOR, NAND.**

UNIT II:

12 hrs

Combinational Circuits: Boolean Laws and Theorems - Sum of Products method – Truth table to Karnaugh Map –Don't Care Conditions- Product-of sums method -Product-of sums Simplifications.

UNIT III:

12 hrs

Data Processing Circuits: Multiplexers – Demultiplexers- Encoders –Decoders. **Flip-Flops-RS Flip-Flops - Edge-triggered D Flip-flops--Edge-triggered JK Flip-Flops-JK Master Slave Flip-**

flops.

UNIT IV:

11 hrs

Types of Registers: Serial In-Serial Out – Serial In-Parallel Out – Parallel in Serial Out - Parallel In- Parallel Out – Universal Shift Register. COUNTERS: Ring Counter –Ripple Counter – Asynchronous Counter - Synchronous Counter.

UNIT V:

11 hrs

Memory: Magnetic Memory – optical memory – Memory Addressing – ROM – RAM – EPROM – PROM –Sequential programmable logic devices – Content Addressable memory.

Text Book

S.No.	Authors	Title	Publishers	Year and Edition
1	Donald P Leach, Albert Paul Malvino, Goutam Saha	Digital Principles and Applications	M cGraw-Hill Education,8th Edition	2015, 7 th Edn

Reference Books

S.No.	Authors	Title	Publishers	Year and Edition
1	R.Anantha Natarajan	Digital Design	PHI Learning	2015, 1 st Edn
2	K.Meena	Principles of Digital Electronics	PHI Learning	2013, 1 st Edn

Pedagogy

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

Course Designer

Dr.R.Jeevitha

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDIT
IN23CP3	DBMS LAB	PRACTICAL	-	-	75	3

Preamble

The lab course provides a way to explore storing and accessing data in database through query languages and PL/SQL programming language. It enables to experience a NoSQL key.

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Understand basic SQL query statements	K2
CLO2	Gain knowledge on primary and foreign key constraints	K2
CLO3	Apply functions and joins on data	K3
CLO4	Demonstrate PL/SQL programming on databases and differentiate Key/value store database from relational database	K4

Mapping with Programme Learning Outcomes

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

S- Strong; M-Medium.

DBMS LAB - IN23CP3

75 Hrs

Program List

- Different data types and operators.
- ER diagram with entities , attribute ,keys and relations.
- Integrity constraints
- Built-in functions and views.
- Create, insert, update and alter table.
- Implement PL/SQL Block.

- Control Structures and Embedded SQL
- Splitting and Joining the table
- PL/SQL Functions
- PL/SQL Procedure
- A case study and formulate the problem statement on a specify project.

Pedagogy

- Demonstration of working environment/Tools/Software/Program

Course Designers

Dr. V. Deepa

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: Basics

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**