Department of B.Sc. Computer Science (Artificial Intelligence)

CHOICE-BASED CREDIT SYSTEM (CBCS)

&

LEARNING OUTCOME BASED CURRICULUM FRAMEWORK (LOCF)

SYLLABUS

B.Sc. Computer Science (Artificial Intelligence)

2025 – 2028 Batch

Programme Learning Outcomes (PLO)

After completion of the Programme, the students will be able to
PLO1: Exhibit technical and technological knowledge in core areas of computer science and Artificial Intelligence.
PL02: Apply technical, problem solving skills and critical thinking to provide solutions for real world complex problems.
PLO3: Acquire professional proficiency to accomplish employability and entrepreneurship
PLO4: Advance skills to gain global competency and innovate in developing and deploying AI applications
PLO5: Acquire holistic development with strong emphasis on values and ethics
PLO6: Uphold social responsibilities in alignment with their roles

Programme Specific Outcomes (PSO)

The students at the time of graduation will
PSO1: Apply technical skills attained through laboratory exercises, projects, internships and value added programmes to solve multi-disciplinary problems
PSO2: Analyze a problem, identify and define the requirements appropriate to obtain solution
PSO3: Design AI experiments, carry out analysis and interpretation of data, to provide valid conclusions for decision making
PSO4: Adapt to emerging technologies to design and implement solutions for societal needs
PSO5: Create systems by applying modern tools for the complex activities
PSO6: Apply ethical principles and responsibilities in all the activities they involve
PSO7: Function effectively as an individual, and as a member or leader in diverse teams
PSO8: Recognize the need and have the ability to engage in independent and life-long learning in the broadest context of technological changes

B.Sc. Computer Science (Artificial Intelligence)

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	TAM2301A/ HIN2301A/ FRE2301A	Language I	Language	4	58	2	3	25	75	100	3
	II	ENG2301A	English Paper I	English	4	58	2	3	25	75	100	3
	III	AI24C01	Java Programming	CC	4	58	2	3	25	75	100	3
	III	AI24CP1	Java Programming Lab	CC	3	45	-	3	15	35	50*	2
	III	PP22C02	Computational and Algorithmic Thinking for Problem Solving	CC	3	45	-	-	100	-	100#	3
	III	AP24C03	Operating System Fundamentals - Linux	CC	4	58	2	3	25	75	100	3
	III	TH24A04	Linear Algebra	GE	6	88	2	3	25	75	100	5
I-II	VI	NM23GAW	General Awareness	AEC	SS	-	-	-	100	-	100	Gr
I	IV	**Students with Tamil as Language**										
		NME23ES	Introduction to Entrepreneurship	AEC	2	30	-	-	100	-	100#	
		Non-Tamil Students										
		NME23A1/ NME23B1	Advanced Tamil I / Basic Tamil I	AEC	2	28	2	2	100	-	100#	2
	VI	COM15SER	Community Services 30 Hours	GC	-	-	-	-	-	-	-	
I-V	VI	24BONL1/ 24BONL2/ 24BONL3	Online Course 1 Online Course 2 Online Course 3	ACC	-	-	-	-	-	-	-	
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	AI24C04	Python Programming	CC	4	58	2	3	25	75	100	4
	III	AI23C05	Data Structures	CC	4	58	2	3	25	75	100	3
	III	AI24CP2	Python Programming Lab	CC	3	45	-	3	15	35	50#	2
	III	AI23CP3	Statistical Tools for AI	CC	3	45	-	3	15	35	50#	2

	III	TH24A13	Statistics for Computer Science	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	-	28	2	-	100	-	100	Gr
I-II	VI	NM25GAW	General Awareness	AEC	SS	-	-	-	100	-	100	Gr
I-V	VI	COM25SER	Community Services 30 Hours	GC	-	-	-	-	-	-	-	Gr
I-V	VI	24BONL1/ 24BONL2/ 24BONL3	Online Course I Online Course II Online Course III	ACC	-	-	-	-	-	-	-	-

L – Language
E – English
CC- Core Course
AEC – Ability Enhancement Course
GE – Generic Elective
ACC - Advanced Learned Course
SS-Self Study
CA - Continuous Assessment
ESE - End Semester Examination,

CA conducted for 25 converted to 15, ESE conducted for 75 converted to 35.

*After Class Hours

QUESTION PAPER PATTERN

CORE & ALLIED PAPERS

CA Question Paper Pattern and distribution of marks UG Core and Allied - (First 3 Units) Question from each unit comprising of (Semester I to II)

SECTION	MARKS	TOTAL
A – 3 X 2 Marks (No Choice)	06	45
B – 3 X 5 Marks (Internal Choice at the same CLO level)	15	
C - 3 X 8 Marks (Internal Choice at the same CLO level)	24	

End Semester Examination: 5 x 15 = 75 Marks (Semester I to II)

SECTION	WORD LIMIT	MARKS	TOTAL
A - 5 x 2 Marks (No Choice)	One or Two Sentences	10	75
B – 5 x 5 Marks (Internal Choice at same CLO Level)	300	25	
C – 5 x 8 Marks (Internal Choice at same CLO Level)	600-800	40	

WEIGHTAGE ASSIGNED TO VARIOUS COMPONENTS OF CONTINUOUS INTERNAL

ASSESSMENT (Semester I and II)

Theory

	CIA Test	Model Exam	Seminar/Assignment/ Quiz	Class Participation	Attendance	Max. Marks
Core / Allied	5	7	5	5	3	25

Practical

	Model Exam	Lab Performance	Regularity in Record Submission	Attendance	Maximum Marks
Core / Allied	10	7	5	3	25

*Departments can plan the above pattern according to their course as Test 1 & 2 - Theory / one theory and one practical / both as practical / one theory or practical with one project.

RUBRICS Assignment/ Quiz /

Seminar Maximum - 20 Marks

(converted to 4 marks)

Criteria	4 Marks	3 Marks	2 Marks	1 Mark
Focus Purpose	Clear	Shows awareness	Shows little awareness	No awareness
Main idea	Clearly presents a main idea.	Main idea supported throughout	Vague sense	No main idea
Organization: Overall	Well planned	Good overall organization	There is a sense of organization	No sense of organization
Content	Exceptionally well presented	Well presented	Content is sound	Not good
Style: Details and Examples	Large amounts of specific examples and detailed description	Some use of examples and detailed descriptions	Little use of specific examples and details	No use of examples

CLASS PARTICIPATION

Maximum - 20 Marks (Converted to 5 marks)

Criteria	5 Marks	4 Marks	3 Marks	2 Marks	1 Mark	Points scored
Level of Engagement in Class	Student proactively contributes to class by offering ideas and asks questions more than once per class.	Student proactively contributes to class by offering ideas and asks questions once per class	Student contributes to class and asks questions occasionally	Student rarely contributes to class by offering ideas and asking no questions	Student never contributes to class by offering ideas	

Listening Skills	Student listens when others talk, both in groups and in class. Student incorporates or builds off of the ideas of others.	Student listens when others talk, both in groups and in class.	Student listens when others talk in groups and in class occasionally	Student does not listen when others talk, both in groups and in class.	Student does not listen when others talk, both in groups and in class. Student often interrupts when others speak.	
Behavior	Student almost never displays disruptive behavior during class	Student rarely displays disruptive behavior during class	Student occasionally displays disruptive behavior during class	Student often displays disruptive behavior during class	Student almost always displays disruptive behavior during class	
Preparation	Student is almost always prepared for class with required class materials	Student is usually prepared for class with required class Materials	Student is occasionally prepared for class with required class materials	Student is rarely prepared for class with required class materials	Student is almost never prepared for class.	
					Total	

MAPPING OF PLOs WITH CLOs

COURSE	PROGRAMME LEARNING OUTCOMES					
	PLO1	**PLO2**	**PLO3**	**PLO4**	**PLO5**	**PLO6**
COURSE- AI24C01						
CLO1	S	S	S	M	L	L
CLO2	S	S	S	M	L	L
CLO3	S	S	S	M	L	L
CLO4	S	S	S	M	L	L
COURSE – AI24CP1						
CLO1	M	M	S	S	L	L
CLO2	M	M	S	M	M	S
CLO3	S	M	M	S	S	M
CLO4	M	M	S	S	L	S
COURSE - PP22C02						
CLO1	M	S	S	S	S	S
CLO2	S	S	S	M	S	S
CLO3	S	M	S	S	S	S
CLO4	S	S	M	S	S	S
COURSE - AP24C03						
CLO1	M	M	S	S	S	M
CLO2	S	S	S	S	S	S
CLO3	S	S	S	S	S	S
CLO4	S	S	M	S	S	S
AI24C04						
CLOs	**PLO1**	**PLO2**	**PLO3**	**PLO4**	**PLO5**	**PLO6**
CLO1	S	S	S	M	S	L
CLO2	S	S	M	S	M	L
CLO3	M	S	S	S	S	M
CLO4	S	M	S	S	S	M
AI23C05						
CLOs	**PLO1**	**PLO2**	**PLO3**	**PLO4**	**PLO5**	**PLO6**
CLO1	S	S	S	M	L	L
CLO2	S	S	S	M	L	L
CLO3	S	S	S	M	L	L
CLO4	S	S	S	M	L	L

AI24CP2						
CLOs	**PLO1**	**PLO2**	**PLO3**	**PLO4**	**PLO5**	**PLO6**
CLO1	S	S	M	S	M	L
CLO2	S	S	S	S	S	M
CLO3	S	S	S	S	M	M
CLO4	S	S	M	S	S	M
AI24CP3						
CLOs	**PLO1**	**PLO2**	**PLO3**	**PLO4**	**PLO5**	**PLO6**
CLO1	S	S	S	M	L	L
CLO2	S	S	S	M	L	L
CLO3	S	S	S	M	L	L
CLO4	S	S	S	M	L	L

SEMESTER I

Course Number	Course Name	Category	L	T	P	Credit
AI24C01	**JAVA PROGRAMMING**	**Theory**	**58**	**2**	**-**	**3**

PREAMBLE

This course introduces object-oriented programming concepts and also java programming. It covers the concept of loops, arrays, input/output structures, events, exceptions and threads using Java.

PREREQUISITE

- Programming Language
- Basics of computers

COURSE LEARNING OUTCOMES

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Remember the principles of object-oriented programming, Java language syntax and semantics	K1
CLO2	Understand the concepts of object-oriented programming and java	K2
CLO3	Apply the principles of inheritance, packages and interfaces in simple java applications	K3
CLO4	Analyze the working features of java language	K4

MAPPING WITH PROGRAMME OUTCOMES

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6
CLO1	S	S	S	M	L	L
CLO2	S	S	S	M	L	L
CLO3	S	S	S	M	L	L
CLO4	S	S	S	M	L	L

S- Strong; M-Medium; L-Low

SYLLABUS

UNIT I **(11 Hrs.)**

Fundamentals of Object-Oriented Programming: Object-Oriented Paradigm, Basic Concepts of Object-Oriented Programming, **Benefits of Object-Oriented Programming, Application of Object-Oriented Programming.** Java Evolution: History, Features, Comparison of Java with C and C++. Java and Internet, Java and World Wide Web, Web Browsers. Overview of Java: Simple Java program, Structure, Java Tokens, Statements, Java Virtual Machine.

UNIT II **(12 Hrs.)**

Constants, Variables, Data Types **- Operators and Expressions** – Decision Making and Branching: if, if...Else, nested if, switch, ?: operator. Decision Making and Looping: while, do, for – **Labelled loops.** Classes, objects and methods: Introduction **- Defining a class** - method declaration **- creating objects -** accessing class methods - method overloading **- nesting of methods** – inheritance - overriding methods

UNIT III **(12 Hrs.)**

Interfaces: Multiple Inheritance: Introduction **-** Defining Interfaces - Extending interfaces-implementing interfaces - **Accessing interface variables** – packages - Introduction-using system packages-**java API packages**- creating packages-accessing a package- **multi threaded** – creating Thread- Life cycle of a Thread

UNIT IV **(11 Hrs.)**

Exception-Exception handling code- **multiple catch statements**-using finally statements-managing Input and Output files- Introduction – creation of files-Reading /Writing character- Reading/Writing bytes- **Concatenating and Buffering Files** – **Random Access File**

UNIT V **(12 Hrs)**

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

TEXTBOOKS

S.NO	AUTHOR	TITLE OF THE BOOK	YEAR OF PUBLICATION	PUBLISHERS\ EDITION
1.	E. Balaguruswamy	Programming with JAVA	2015	A Primer, Mc-Graw Hill Professional, 6th Edition

REFERENCE BOOKS

S.NO	AUTHOR	TITLE OF THE BOOK	YEAR OF PUBLICATION	PUBLISHERS\ EDITION
1.	R.G. Dromey	How to solve it by Computer	2008	Pearson Education, 3rd Edition
2.	Walter Savitch,	Java: An Introduction to Problem Solving and Programming	2019	Pearson Education Ltd, 8th Edition.
3.	Cay.S.Horstmann	Core Java Volume I—Fundamentals	2018	Pearson Education, 11th Edition.
4.	Herbert Schildt	Java: A Beginner's Guide	2018	McGraw Hill Education, 8th Edition.

PEDAGOGY

Chalk & Board, Lectures, Case Studies, Demonstrations

COURSE DESIGNERS

1. Dr. S. Meera
2. Mrs. M. Loganayaki

Course Number	Course Name	Category	L	T	P	Credit
AI24CP1	JAVA PROGRAMMING LAB	Practical	-	-	45	2

PREAMBLE

This course provides hands-on training to implement Object Oriented programming concept using basic syntaxes of control Structures, strings and functions. It demonstrates inheritance, interfaces and packages It also explores different exception handling mechanisms and concept of multithreading.

PREREQUISITE

Basics of programming
Object oriented principles

COURSE LEARNING OUTCOMES

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Identify the logic for the given problem, recognize and understand the syntax and construct JAVA code	K1
CLO2	Understand the java programming constructs and methods	K2
CLO3	Apply OOPs concepts and implement java programs	K3
CLO4	Analyse and implement advanced java programming techniques	K4

MAPPING WITH PROGRAMME LEARNING OUTCOMES

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6
CLO1	M	M	S	S	L	L
CLO2	M	M	S	M	M	S
CLO3	S	M	M	S	S	M
CLO4	M	M	S	S	L	S

S- Strong; M-Medium; L-Low

LIST OF EXERCISES:

1. Exercises using classes and objects
2. Exercises using control statements
3. Exercises using different inheritance
4. Exercises using interfaces
5. Exercises using packages
6. Exercises using string functions
7. Exercises using mouse events
8. Exercises using thread methods
9. Exercises to implement Exception Handling
10. Exercises to implement files using Read and Write methods

PEDAGOGY

Demonstrations

COURSE DESIGNERS

1. Dr. S. Meera
2. Mrs. Loganayaki. M

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
PP22C02	COMPUTATIONAL AND ALGORITHMIC THINKING FOR PROBLEM-SOLVING	Theory	45	-	-	3

Preamble

This course aims to kindle young minds to think like computer scientists 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 behaviour 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, and 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	PLO6
CLO1	M	S	S	S	S	S
CLO2	S	S	S	M	S	S
CLO3	S	M	S	S	S	S
CLO4	S	S	M	S	S	S

S - Strong; M - Medium; L – Low

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: Flow Algorithm 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

TEXTBOOKS

S. NO	AUTHOR	TITLE OF THE BOOK	YEAR OF PUBLICATION	PUBLISHERS\ EDITION
1.	David Riley and Kenny Hunt	Computational Thinking for Modern Solver	2014	Chapman & Hall/CRC, 1st Edition
2.	Paolo Ferragina, Fabrizio Luccio	Computational Thinking First Algorithms	2018	Springer,1st Edition
3.	Karl Beecher	Computational Thinking – A beginner's guide to problem-solving	2017	BSC publication, 1st Edition.

PEDAGOGY

Lectures, Group discussions, Demonstrations, Case studies

Course Designers

1. Mrs.T.S.Anushya Devi
2. Mrs.S.Kavitha
3. Mrs.V.Bharathi

Evaluation Pattern

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

COURSE NUMBER	COURSE NAME	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; L-Low

SYLLABUS

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 THE BOOK	PUBLISHERS	EDITION / YEAR OF PUBLICATION
1	Abraham Silberschatz,Peter Baer Galvin, Gagne	Operating System Concepts	Wiley Publishers.	10th Edition, 2018
2	Christopher Negus	LINUX Bible	Wiley Publishers	10th Edition, 2020

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS	EDITION / YEAR OF PUBLICATION
1	Archer J harries	Operating System	Tata Mc Graw Hill	2nd Edition, 2011
2	Williams E. Shotts	The Linux Command Line: A Complete Introduction	John Wiley & Sons	2nd Edition, 2019
3	Jason Cannon	Linux for Beginners	Create space Independent Pub	1st Edition, 2014

Pedagogy

Lectures, Group discussions, Demonstrations, Case studies

Course Designers

- Mrs.T.S.Anushya Devi
- Dr.R.Suriyagrace

SEMESTER II

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDIT
AI24C04	PYTHON PROGRAMMING	THEORY	58	2	-	4

Preamble

- To Provide advanced programming knowledge in python environment
- To Make interactive Python programs.
- To develop GUI based applications
- To utilize libraries and APIs for rapid application development

Prerequisite

- Computer Programming

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Recall the technical strengths, Python Interpreter, and program execution.	K1
CLO2	Understand the purpose of operations, strings, lists, and tuples to solve problems.	K2
CLO3	Apply functions to solve problems using the 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	PLO6
CLO1	S	S	S	M	S	L
CLO2	S	S	M	S	M	L
CLO3	M	S	S	S	S	M
CLO4	S	M	S	S	S	M

S- Strong; M-Medium; L-Low

PYTHON PROGRAMMING – AI24C04 (58 Hours)

UNIT I **(10 Hrs)**

Introduction: Why do people use Python- Python a scripting language- Uses of Python- Need of Python Python's Technical Strengths- How Python runs programs: Introducing the Python Interpreter- Program Execution-Execution Model Variation: Python Implementation Alternatives.

UNIT II **(12 Hrs)**

Types & Operations: Numbers Types: Numeric type basics, Numbers in action, Other numeric types Strings Fundamentals: String Basics, String Literals, Strings in action, String Methods – Lists and Dictionaries-Tuples- Files.

UNIT III **(12 Hrs)**

Control Flow: Statements & Syntax: Assignment - Expressions & Print- if tests – While & for loops. Functions: Function Basics: Why use functions- Coding Functions- Definition & Calls. Scopes: Python Basics-Global Statement-Scopes Nested functions. Arguments: Arguments passing Basics- Special Arguments Matching Modes.

UNIT IV **(14 Hrs)**

Classes & OOP: OOP: Introduction-Class Coding Basics- Class Coding details: Class statement-Methods - Inheritance. Designing with classes: Python and OOP-OOP Inheritance, Composition, Delegation- Methods and Classes act as Objects-Multiple Inheritance.

UNIT V **(10 Hrs)**

Modules & Packages: Introduction to Modules, Importing and Creating Modules, Using Python Standard Library. Exception Handling: Try-Except Blocks, Raising and Catching Exceptions. File Handling: Reading and Writing Files, Working with CSV Files. Introduction to Python for Data Processing and Web Applications.

Text Book

S. No	Authors	Title	Publishers	Year and Edition
1.	Mark Lutz	Learning Python	O'Reilly Publication	2013 and Reprint

Books for Reference

S. No	Authors	Title	Publishers	Year and Edition
1.	Mark Summerfield	Programming in Python 3	Pearson Education	2009 and Reprint
2.	Mark Pilgrim	Dive into Python 3	A Press Publication	2011 and Reprint
3.	Richard L. Halterman	Fundamentals of Python Programming	uthern Adventist University	2017 and Reprint

Pedagogy

- Lectures, Case Studies, Demonstrations

Course Designers

1. Dr. S. Meera
2. Dr. R. Suriyagrace

S.NO	LEARNING METHODS	PERCENTAGE
1	PARTICIPATORY LEARNING	37%
2	EXPERIENTIAL LEARNING	21%
3	PROBLEM BASED LEARNING	42%

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDIT
AI23C05	DATA STRUCTURES	Theory	58	2	-	3

Preamble

- To define the basic concepts of algorithms and analyze the performance of algorithms.
- To discuss various algorithm design techniques for developing algorithms.
- To analyze various searching, sorting and graph traversal algorithms.
- To discuss various advanced topics on algorithms.

Prerequisite

- Data structures and Algorithms

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Remember primitive and non-primitive data structures and their operations	K1
CLO2	Understand the principles and operations of various data structures	K2
CLO3	Apply the techniques and algorithms of data structures in solving simple tasks	K3
CLO4	Analyze data structures algorithms suitable for appropriate applications	K4

Mapping With Programming Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6
CLO1	S	S	S	M	L	L
CLO2	S	S	S	M	L	L
CLO3	S	S	S	M	L	L
CLO4	S	S	S	M	L	L

S- Strong; M-Medium; L-Low

DATA STRUCTURES (AI23C05) – [58 Hrs]

UNIT I **(12 Hrs.)**

Introduction and Overview: - Introduction - Basic Terminology: Elementary Data Organization - Data Structures - Data structure operations - Algorithms: Complexity, Time-Space Trade-off. Preliminaries: Algorithmic Notation - Control Structures, Variables, Data Types. Arrays, Records, and Pointers: Introduction - Linear Arrays - Representation of Linear Arrays in Memory - Traversing Linear Arrays - Inserting and Deleting.

UNIT II **(11 Hrs.)**

Linked Lists: Introduction - Linked Lists - Representation of Linked Lists in Memory- Traversing a Linked List – Searching a Linked List- Memory Allocation-Garbage Collection – Insertion into a Linked List- Deletion from a Linked List.

UNIT III **(11 Hrs.)**

Stack, Queues, Recursion: Introduction – Stacks - Array Representation of Stacks -Linked Representation of Stacks - Arithmetic Expressions - Polish Notation - Recursion-Towers of Hanoi - Implementation of Recursive Procedures by Stacks – Queues - Linked Representation of Queues – Dequeue - Priority Queues.

UNIT IV **(12 Hrs.)**

Trees: Introduction - Binary Trees - Representing Binary Trees in Memory-Traversing binary trees- Binary search Trees-Searching-Inserting-Deleting in a Binary Search Trees-Graphs: Terminology– Sequential Representation of Graphs-Adjacency Matrix, Path Matrix.

UNIT-V **(12 Hrs.)**

Sorting and Searching: Introduction – Sorting – Bubble Sort-Insertion Sort - Selection Sort - Merging - Merge Sort - Radix Sort - Searching and Data Modification –Searching: Linear Search - Binary Search.

Text Book

S. No	Authors	Title	Publishers	Year and Edition
1.	Seymour Lipschutz	Data Structures	Tata McGraw Hill Company, Revised First Edition.	Reprint 2017

Books for Reference

S. No	Authors	Title	Publishers	Year and Edition
1.	Ellis Horowitz, Sartaj Sahni	Fundamentals of Data Structures	Galgotia Book Source	Reprint 2014 & 2nd Edn
2.	K. Sharma	Data Structures using C	Pearson education	Reprint 2014
3.	Rajdew Tiwari and Nagesh Sharma	Design and Analysis of Algorithms	Pearson education	Reprint 2014

Pedagogy

- Lectures**,** Demonstrations, Discussions

Course Designers

1. Dr. S. Meera
2. Dr. R. Suriyagrace

S. NO	LEARNING METHODS	PERCENTAGE
1	PARTICIPATORY LEARNING	45 %
2	EXPERIENTIAL LEARNING	35 %
3	PROBLEM BASED LEARNING	20 %

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDIT
AI24CP2	PYTHON PROGRAMMING LAB	PRACTICAL	-	-	45	2

Preamble

- To Provide advanced programming knowledge in python environment
- To Make interactive Python programs.
- To develop GUI based applications
- To utilize libraries and APIs for rapid application development
- To use python as an analytical tool for different mathematical models

Prerequisite

- Python Programming basics and advanced concepts
- GUI Application development

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 Python programming such as data types, conditional statements, looping statements, and functions.	K1
CLO2	Develop programs with the implementation of operators & I/O operations	K2
CLO3	Construct programs with features of Lists, Strings.	K3
CLO4	Develop readable programs with files for Exception handling concepts.	K4

Mapping with Programming Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6
CLO1	S	S	M	S	M	L
CLO2	S	S	S	S	S	M
CLO3	S	S	S	S	M	M
CLO4	S	S	M	S	S	M

S- Strong; M-Medium; L-Low

LIST OF EXERCISES

1. Exercise programs on basic control structures & loops.
2. Exercise programs on operators & I/O operations.
3. Exercise programs on Python Script.
4. Exercise programs on Lists.
5. Exercise programs on Strings.
6. Exercise programs on functions.
7. Exercise programs on recursion & parameter passing techniques.
8. Exercise programs on Tuples.
9. Exercise programs on file.
10. Exercise programs on Exception handling concepts.
11. Exercise programs for packages and modules.

Pedagogy

- Lectures, Case Studies, Demonstrations

Course Designers

1. Dr. S. Meera
2. Dr. R. Suriyagrace

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDIT
AI24CP3	STATISTICAL TOOLS FOR AI	PRACTICAL	-	-	45	2

Preamble

- To Understand the fundamental concepts of statistics and their relevance to AI.
- To Develop skills to summarize and visualize data using statistical methods and tools.
- To Learn to apply statistical techniques for model building, evaluation, and validation.
- To Gain a working knowledge of probability theory and how it underpins machine learning algorithms.

Prerequisite

- Basic statistics

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Recall the excel operations like pivot tables, scenarios, goal seek, lookup and advanced filters	K1
CLO2	Understand the features of PSPP and the advanced features in excel	K2
CLO3	Apply the descriptive and inferential statistical techniques using PSPP and excel	K3
CLO4	Analyze and interpret various descriptive tests in PSPP to supplement decision making in business scenario	K4

Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6
CLO1	S	S	S	M	L	L
CLO2	S	S	S	M	L	L
CLO3	S	S	S	M	L	L
CLO4	S	S	S	M	L	L

S- Strong; M-Medium; L-Low

STATISTICAL TOOLS FOR AI – (AI24CP3) – [45 Hrs]

List of Exercises:

1. Exercises to implement measures of statistical analysis using a tool
2. Exercises to implement data exploratory analysis using a tool
3. Exercises to implement correlation analysis using a tool
4. Exercises to implement regression analysis using a tool
5. Exercises to implement T-Test & Chi Square Test
6. Exercises to implement data extraction in advanced excel.
7. Exercises to implement data validation in advanced excel.
8. Exercises to implement goal seek setup & Gantt Chart in advanced excel.
9. Exercises to implement Vlookup & Hlookup and Pivot table chart in advanced excel.
10. Exercises to implement macro & dashboard creation in advanced excel.

Pedagogy

- Demonstrations

Course Designers

1. Dr. R. Suriyagrace
2. Ms. M. Loganayaki