PSGR Krishnammal College for Women

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

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) 2024 – 2027 Batch

**PSGR
Krishnammal College for Women KCW**

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

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

CHOICE BASED CREDIT SYSTEM (CBCS) & LEARNING OUTCOME BASED

CURRICULUM FRAMEWORK (LOCF)

Curriculum and Scheme of Examination (2024 - 2027 BATCH Onwards)
SEMESTER – I - IV

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
	IV		**Students with Tamil as Language**									2
		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#	
I-V	VI	24BONL1 /24BONL 2/24BONL3	Online Course 1 Online Course 2 Online Course 3	ACC	-	-	-	-	-	-	-	
II	I	TAM2302A/ HIN2302A/ FRE2302A	Tamil Paper II/ Hindi Paper II/ French Paper II	L	4	58	2	3	25	75	100	3
	II	ENG2302A	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

II	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	NM24UHR	Universal Human Values and Human Rights	AEC	2	30	-	-	100	-	100	2
	IV	NME23B2/ NME23A2*	Basic Tamil II / Advance Tamil II	AEC	-	28	2	-	100	-	100	Gr
I-II	VI	NM23GAW	General Awareness	AEC	SS	-	-	-	100	-	100	Gr
I-V	VI	COM15SER	Community Services 30 Hours	GC	-	-	-	-	-	-	-	Gr
I-V	VI	24BONL1/ 24BONL2/ 24BONL3	Online Course1 Online Course2 Online Course 3	ACC	-	-	-	-	-	-	-	-
III	I	TAM2303A/ HIN2303A/ FRE2303A	Language III	L	4	58	2	3	25	75	100	3
	II	ENG2303A	English III	E	4	58	2	3	25	75	100	3
	III	AI23C06	**Core 4:** Principles of Artificial Intelligence	CC	4	58	2	3	25	75	100	3
	III	AI24C07	**Core 5:** Computer Networks	CC	4	58	2	3	25	75	100	3
	III	AI24CP4	**Programming Lab 4:** DBMS Lab	CC	5	75	-	3	15	35	50*	4
	III	TH23A27	**Allied A3:** Discrete Mathematics	GE	4	58	2	3	25	75	100	3
III/ IV	III	CS23SBGP/	**Skill Based Subject I:** Gen AI	SEC	3	44/ 45	1/-	-	100	-	100	3
	IV	NM23DTG	Design Thinking	AEC	2	30	-	-	100	-	100	2
III	IV	NM22UHR	**Foundation Course II:** Universal Human Values and Human Rights (Self Study)	AECC	Self-Study	-	-	-	100	-	100#	Gr
III & IV	IV		**Job Oriented Course** (Amazon Web service / Cisco Certified Network Associate/ Microsoft windows server administration / Microsoft Power BI)	-	-	-	-	-	-	-	-	Gr
I-V	VI	24BONL1/ 24BONL2/ 24BONL3	Online Course 1 / Online Course 2 / Online Course 3	-	-	-	-	-	-	-	-	-

IV	I	TAM2304A/ HIN2304A/ FRE2304A	Tamil Paper IV / Hindi Paper IV / French Paper IV	L	4	58	2	3	25	75	100	3
	II	ENG2404A	English Paper IV	E	4	58	2	3	25	75	100	3
	III	AI23C08	Big Data Framework	CC	4	58	2	3	25	75	100	3
	III	AI23C09	Data Mining	CC	3	43	2	3	25	75	100	3
	III	AI23CP5	Big Data Framework Lab	CC	3	45	-	3	15	35	50*	2
	III	AI23CP6	Data Mining Lab	CC	3	45	-	3	15	35	50*	2
	III	AP23A01/ CS23A02	Digital Marketing / M-Commerce	GE	4	58	2	3	25	75	100	3
	IV	AI23SCE1	IBM Applied AI	SEC	3	45	-	-	100	-	100	3
	IV	NM23EII	Entrepreneurship and Innovation (IgniteX)	AECC	2	30	-	-	100	-	100	2
	IV	NM24EVS	Environmental Studies	AECC	SS	-	-	-	100	-	100	Gr.
	V	COCOACT	Co-Curricular Activities	GC	-	-	-	-	-	-	100	1
I-V	VI	24BONL1/ 24BONL2/ 24BONL3	Online Course I Online Course II Online Course III	ACC	-	-	-	-	-	-	-	-

L – Language AEC – Ability Enhancement Course SS-Self Study
E – English GE – Generic Elective CA - Continuous Assessment
CC- Core Course ACC – Additional Credit Course 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	
B – 3 X 5 Marks (Internal Choice at the same CLO level)	15	45
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	
B – 5 x 5 Marks (Internal Choice at same CLO Level)	300	25	75
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 - III)
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

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
COURSE- AI24C04						
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 – AI24C05						
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 – AI24CP2					
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 - AI24CP3					
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

COURSE – AI24C05					
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 - AI23C06					
CLO1	S	S	S	M	M	L
CLO2	S	S	S	S	L	L
CLO3	S	S	S	M	L	L
CLO4	S	S	S	S	L	M

COURSE - AI24C07					
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 - AI24CP4					
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 - CS23SBGP					
CLO1	S	S	S	S	M	S
CLO2	S	S	S	S	S	S
CLO3	S	S	M	S	S	S
CLO4	S	M	S	M	S	S

COURSE - AI23C08					
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 - AI23C09					
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 - AI23CP5					
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 - AI23CP6					
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 - AP23A01					
CLO1	S	M	S	S	S	L
CLO2	S	S	M	S	M	L
CLO3	S	S	S	M	M	L
CLO4	S	S	S	M	S	L
COURSE - CS23A02					
CLO1	S	M	S	S	S	L
CLO2	S	S	M	S	M	L
CLO3	S	S	S	S	M	L
CLO4	S	S	S	M	S	L

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 BOOK

S.NO.	AUTHOR	TITLE OF THE BOOK	YEAR OF PUBLICATION	PUBLISHERS\ EDITION
1.	R.G. Dromey	How to solve it by Computer	2008	PearsonEducation 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. Mrs Loganayaki. M
2. Mrs K. Geethalakshmi

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. Mrs Loganayaki. M
2. Mrs K. Geethalakshmi

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

Course Code	Course Name	Course Type	L	T	P	Credits
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

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	AUTHOR	TITLE OF THE BOOK	YEAR OF PUBLICATION	PUBLISHERS\ EDITION
1.	Mark Lutz	Learning Python	2013	O'Reilly Publication, 5th Ed.

REFERENCE BOOK

S.NO	AUTHOR	TITLE OF THE BOOK	YEAR OF PUBLICATION	PUBLISHERS\ EDITION
1.	Mark Summerfield	Programming in Python 3	2009	Pearson Education
2.	Mark Pilgrim	Dive into Python 3	2011	A Press Publication
3.	Richard L. Halterman	Fundamentals of Python Programming	2017	Southern Adventist University

PEDAGOGY

Lectures, Case Studies, Demonstrations

COURSE DESIGNERS

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

Course Code	Course Name	Course Type	L	T	P	Credits
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.	AUTHOR	TITLE OF THE BOOK	YEAR OF PUBLICATION	PUBLISHERS\ EDITION
1.	Seymour Lipschutz	Data Structures	2017	Tata McGraw Hill Company, Revised First Edition.

REFERENCE BOOK

S.NO	AUTHOR	TITLE OF THE BOOK	YEAR OF PUBLICATION	PUBLISHERS\ EDITION
1.	Ellis Horowitz, SartajSahni	Fundamentals of Data Structures	2014	Galgotia Book Source, 2nd Ed.
2.	K.Sharma	Data Structures using C	2014	Pearson education
3.	Rajdew Tiwari and Nagesh Sharma	Design and Analysis of Algorithms	2014	Pearson education

PEDAGOGY

Lectures, Demonstrations, Discussions

COURSE DESIGNERS

1. Dr. R. Suriyagrace
2. Mrs.S.Shanthi

Course Code	Course Name	Course Type	L	T	P	Credits
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 Name	Course Type	L	T	P	Credits
AI23CP3	**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 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

Dr.R.Suriyagrace

Course Number	Course Name	Category	L	T	P	Credit
AI23C06	**PRINCIPLES OF ARTIFICIAL INTELLIGENCE**	Theory	58	2	-	3

Preamble

- This course introduces the concepts of Artificial Intelligence and the various methods of solving problems using Artificial Intelligence.

- It also provides insights into AI techniques and its applications.

Prerequisite

- Principles of Problem-solving

- Discrete Structures

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Recall the fundamental principles of Artificial Intelligence	K1
CLO2	Understand problem-solving techniques for complex problems	K2
CLO3	Apply AI knowledge for reasoning, planning and decision making	K3
CLO4	Analyse various real-world problems to find suitable solutions	K4

Mapping with Programme Learning Outcomes

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

S- Strong; M-Medium; L-Low

SYLLABUS

UNIT I (12 hrs)

Artificial Intelligence Introduction – Intelligent Systems – Foundations of AI – Tic-Tac-Toe Game Playing - Problem Solving: State Space Search and Control Strategies – Introduction – General Problem Solving – **Characteristics of Problem - Exhaustive Searches – Heuristic Search Techniques.**

UNIT II (12 hrs)

Knowledge Representation: Introduction – Approaches to Knowledge Representation – Knowledge Representation Using Semantic Work – Extended Semantic Networks for KR – **Uncertainity Measure: Probability Theory - Bayesian Belief Networks.**

UNIT III (12 hrs)

Logic and Inferences: Formal Logic – History of Logic and Knowledge – Propositional Logic – First Order Logic – Forward Chaining – Resolution Refutation in FOL – Deductive Retrieval – **Complexity of Resolution Method in FOL – Backward Chaining – Second Order Logic.**

UNIT IV (11 hrs)

Expert System & Applications: Introduction – Phases in Building Expert Systems – Expert System Architecture – Application of Expert System. Fuzzy Sets and Fuzzy Logic : Introduction – Fuzzy Sets – Fuzzy Set Operations- **Fuzzy Logic-Inference Rules for Fuzzy Propositions.**

UNIT V (11 hrs)

Natural Language Processing: Basic NLP Techniques – Applications – Natural Language Generation. Machine Learning: Naïve Bayes Classifiers – **Hidden Markov Models – Decision Trees – The K-Means Clustering Algorithm** – Artificial Neural Network.

TEXTBOOKS

S.NO	AUTHOR	TITLE OF THE BOOK	YEAR OF PUBLICATION	PUBLISHERS\ EDITION
1.	Saroj Kaushik	Artificial Intelligence	2019	Cengage Learning India Pvt. Ltd, 1st Edition.
2.	Pak Khemani	First Course in Artificial Intelligence	2022	Graw Hill Publications,

REFERENCE BOOK

S.NO	AUTHOR	TITLE OF THE BOOK	YEAR OF PUBLICATION	PUBLISHERS\ EDITION
1.	Patrick Henny Winston	Artificial Intelligence	2012	Pearson Publications, Third Edition,

2.	George F Luger	Artificial Intelligence Structures and Strategies for Complex Problem Solving	2020	Pearson Publications, Fifth Edition
3.	Elaine Rich, Kevin Knight & Shivashankar B Nair	Artificial Intelligence	2017	Mc Graw Hill, Third Edition.

PEDAGOGY

Chalk & Board, Demonstration, Lecture, Group Discussion

COURSE DESIGNERS

1. Mrs. S. Shanthi

2. Ms. M. Loganayaki

Course Number	Course Name	Category	L	T	P	Credits
AI24C07	COMPUTER NETWORKS	Theory	58	2	-	3

PREAMBLE

This course provides basic concepts of computer networks and its applications. This course provides an understanding of different components of computer networks, layers, various protocols and their applications.

PREREQUISITES

Computer Hardware and Networking

COURSE LEARNING OUTCOMES

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Recall the different building blocks of computer networks and its architecture	K1
CLO2	Understand the fundamental concepts of computer networking, Protocols, architectures and applications.	K2
CLO3	Apply the principles of network architecture in data communication	K3
CLO4	Analyze the protocols available in different layers of computer network architecture	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

UNIT I (11 Hrs)

Introduction: Uses of Computer networks - Types of Computer Networks: Broadband Access Networks - Mobile and Wireless Access Networks - Content Provider Network - Transit Network- Network Hardware: PAN, LAN, MAN, WAN, Internetworks. Examples of Networks - Network Protocols - Reference Models: OSI reference model, TCP/IP reference model. - Policy, Legal and Social Issues: Online Speech - Net Neutrality - Security - Privacy - Disinformation.

UNIT II (12 Hrs)`

Physical Layer: Guided Transmission media: Magnetic media, Twisted Pairs, Coaxial Cable, Power Lines, Fiber Optics, Fiber cables. Wireless Transmission: The Electromagnetic Spectrum - Ultra-Wideband Communication. Using the Spectrum for Transmission: Radio Transmission - Microwave Transmission - Infrared Transmission - Light Transmission. The Public Switched Telephone Network: Structure - The Local Loop - Trunks, Multiplexing, Switching. Cellular Networks: Common Concepts - 1G, 2G, 3G, 4G, 5G, GSM.

UNIT III (12 Hrs)

Data Link Layer: Data Link Layer Design Issues - Error Detection and Correction - Elementary Data Link Protocols: Initial Simplifying Assumptions - Basic Transmission and Receipt - Simplex Link-Layer Protocols. The Medium Access Control Sublayer: Multiple Access Protocols - Ethernet - Wireless LANS - Bluetooth Architecture - Data Link Layer Switching.

UNIT IV (12 Hrs)

Network Layer: Network Layer Design Issues - Routing Algorithms in a Single Network: The Optimality Principle - Shortest Path Algorithm - Flooding - Distance Vector Routing. Quality of Services and Applications: Applications QoS Requirement - Packet Scheduling. The Network Layer in the Internet: IP Addresses.
Transport Layer: The Transport Service - Elements of Transport Protocols - Congestion Control - The Internet Transport Protocols: TCP.

UNIT V (11 Hrs)

Application Layer: The Domain Name System (DNS) - Electronic Mail - The World Wide Web (WWW) - Streaming Audio and Video - Content Delivery. Network Security: Fundamentals of Network Security - Firewalls and Intrusion Detection Systems - Cryptography - Symmetric Key Algorithms - Public Key Algorithms - Digital Signatures.

TEXTBOOKS

S.NO	AUTHOR	TITLE OF THE BOOK	YEAR OF PUBLICATION	PUBLISHERS\ EDITION
1.	Andrew S Tanenbaum, Nick Feamster, David. J, Wetherall	Computer Networks	2022	6th Edition, Pearson Education

REFERENCE BOOK

S.NO	AUTHOR	TITLE OF THE BOOK	YEAR OF PUBLICATION	PUBLISHERS\ EDITION

1.	Behrouz A. Forouzan	Data Communications and Networking	2019	Tata McGraw Hill Companies, 5th Edition.
2.	Jim Kurose and Keith Ross	Computer Networking: A Top-Down Approach	2020	Pearson Publications, 5th Edition,

PEDAGOGY

Chalk & Board, Demonstration, Lecture, Group Discussion

COURSE DESIGNERS

1. Ms. S. Shanthi
2. Dr. R. Suriyagrace

Course Number	Course Name	Category	L	T	P	Credit
AI24CP4	**DBMS LAB**	**Practical**	-	-	75	4

Preamble

The lab course provides a way to explore storing and accessing data in a database through query languages and PL/SQL programming language. It enables to learn database functionality on real-time projects.

Course Learning Outcomes

Upon 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 of primary and foreign key constraints	K2
CLO3	Apply functions and joins to data	K3
CLO4	Demonstrate PL/SQL programming on databases and differentiate Key/value store databases from a relational database	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

LIST OF EXERCISES:

1. A Case study and formulate the problem statement on a specific project.

2. Draw ER Diagrams with entities, attributes, keys, and relationships between entities, and cardinalities.

3. Draw tables with Normalization

4. Perform Data Definition Language statements

5. Perform Data Manipulation Language statements

6. Perform Transaction Control Language and Data Control Language statements

7. Perform Data Integrity Constraints Operations

8. Perform Aggregate Function and Sorting

9. Perform Joins Operations

10. Implement Sub Queries

11. Write PL/SQL program to perform Function

12. Write PL/SQL program to perform Procedure

13. Write a program to perform Triggers in PL/SQL

14. Write a program to perform Cursor operation in PL/SQL

PEDAGOGY

Demonstrations of working environment / Tools / Software / Program

COURSE DESIGNERS

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

Course Number	Course Name	Category	L	T	P	Credit
CS23SBGP	**SKILL-BASED SUBJECT I: GEN AI LAB**	Practical	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 Completion of the course, the students should 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; L - Low

Syllabus

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 flash cards 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

    Mrs. S. Ponmalar

Evaluation Pattern for Gen-AI

    Quiz   : 50 Marks

    (5 quizzes with each 10 marks)

    Case study   : 25 Marks Online

    Exam : 25 Marks

    Total   : 100 Marks

Course Number	Course Name	Category	L	T	P	Credits
AI23SCE1	**COURSERA: IBM APPLIED AI**	**Practical**	**45**	**-**	**-**	**3**

COURSERA-IBM AI Developer (IBM Applied AI)- AI23SCE1

S. NO.	COURSE NAME	COURSE LINK	HOURS
1	Introduction to Artificial Intelligence	https://www.coursera.org/learn/introduction-to-ai?specialization=applied-artifical-intelligence-ibm-watson-ai	8
2	Generative AI: Introduction & Applications	https://www.coursera.org/learn/generative-ai-introduction-and-applications?specialization=applied-artifical-intelligence-ibm-watson-ai	6
3	Generative AI: Prompt Engineering Basics	https://www.coursera.org/learn/generative-ai-prompt-engineering-for-everyone?specialization=applied-artifical-intelligence-ibm-watson-ai	7
4	Introduction to HTML, CSS & Javascript	https://www.coursera.org/learn/introduction-html-css-javascript?specialization=applied-artifical-intelligence-ibm-watson-ai	10
5	Building Generative AI-Powered Applications with Python	https://www.coursera.org/learn/building-gen-ai-powered-applications?specialization=applied-artifical-intelligence-ibm-watson-ai	14
		TOTAL HOURS	**45**

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDIT
AI23C08	**BIG DATA FRAMEWORK**	**Theory**	**58**	**2**	**-**	**3**

Preamble

- This course introduces big data tools, techniques and Hadoop ecosystem. It also includes the concepts of Map Reduce, PIG, Spark and Hive.

Prerequisites

- Database management systems.

- Data mining

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge level
CLO1	Recall the big data tools, techniques and Hadoop components	K1
CLO2	Understand the architectures of big data framework in processing big data	K2
CLO3	Apply big data tools and techniques to solve big data problems	K3
CLO4	Analyze various big data models suitable for handling different types of big data	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.

BIG DATA FRAMEWORK (AI23C08) – [58 Hrs]

UNIT I **(12 Hrs)**

Big Data: Big Data Overview, Evolution of Big Data, Definition of Big Data, Challenges with Big Data- State of practice in Analytics, Key roles for new Big Data Ecosystem, Data Analytics Lifecycle overview, discovery, data preparation, model planning, model building, communicate results, operationalize.

UNIT II **(12 Hrs)**

HDFS: The design of HDFS, HDFS concepts, HDFS federation, The command line interface-Hadoop file systems. The Hadoop Eco System: Pig, Hive, Hbase, Mahout. Hadoop operations: Setting up a Hadoop cluster- cluster specification, cluster setup and installation- Hadoop configuration.

UNIT III **(12 Hrs)**

MapReduce: Introduction- Anatomy of a MapReduce Job Run- Failures- Shuffle and Sort. MapReduce types and formats: Types – Input formats – output formats. MapReduce Features: Counters- Sorting- Joins.

UNIT IV **(11 Hrs)**

Spark: Installing Spark – examples –Spark Philosophy - History of Spark - Running Spark- Spark Architecture - Data Frames - Transformations - End to end example –Spark Toolset - Spark run on cluster - Developing spark Applications - Deploying Spark.

UNIT V **(11 Hrs)**

Hive: Introduction- Installing Hive – Running Hive- Comparison with traditional databases- HiveQL-Tables - User Defined functions.

Text Book

S.No	Authors	Title	Publishers	Year and Edition
1.	Tom White	Hadoop: The Definitive Guide	O`Reilly Publishers, USA	Reprint 2015

Books for Reference

S. No	Authors	Title	Publishers	Year and Edition
1.	Manoel Carlos Ramon	API Features and Arduino Projects for Linux Programmers	Apress	Reprint 2014
2.	Data‖, John	EMC Education Services, ―Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting	Wiley & Sons, New Delhi	Reprint 2015
3.	Bill Chambers Matei Zaharia	Spark: Guide The Definitive	O'Reilly Media	Reprint 2018

Pedagogy:

- Lectures, Demonstrations, Group discussions

COURSE DESIGNERS

1. Dr. R.Suriyagrace

2. Mrs. T.Prabha Kumari

S. NO	LEARNING METHODS	PERCENTAGE
1	PARTICIPATORY LEARNING	41 %
2	EXPERIENTIAL LEARNING	33 %
3	PROBLEM BASED LEARNING	26 %

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDIT
AI23C09	**DATA MINING**	**Theory**	**43**	**2**	**-**	**3**

Preamble

- This course introduces basic concepts of data mining. It includes techniques like classification, clustering, association rule mining. The course covers various applications of data mining and its tools.

Prerequisite

- Database concepts
- Statistics

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge level
CLO1	Recall the concepts of data mining and its applications	K1
CLO2	Understand the techniques and algorithms of data mining	K2
CLO3	Apply data mining tasks on real-time datasets	K3
CLO4	Analyze various data mining algorithms for solving complex problems	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.

DATA MINING (AI23C09) – [43 Hrs]

UNIT I   (8 Hrs)

Introduction: What is data mining? - An essential step in knowledge discovery - Diversity of data types for data mining - Mining various kinds of knowledge - Confluence of multiple disciplines - Data Mining and Applications - Data Mining and Society (Major Issues).

UNIT II   (9 Hrs)

Data, Measurements and Data Preprocessing: Data Types - Statistics of Data: Measuring the Central Tendency and Dispersion of data, Covariance and Correlation - Data Quality, Data Cleaning, and Data Integration - Data Transformation. Pattern Mining: Frequent item sets, closed item sets, and association rules - Frequent itemset mining methods: Apriori algorithm, Pattern-growth approach, mining frequent item sets using the vertical data format.

UNIT III   (9 Hrs)

Classification: What is classification, General approach to classification - Decision Tree Induction Bayes Classification Methods – K-nearest neighbor classifiers - Model Evaluation and Selection: Metrics for evaluating classifier performance, Holdout method and random subsampling, cross validation, Bootstrap - Techniques to improve classification accuracy (Ensemble Methods).

UNIT IV   (9 Hrs)

Cluster Analysis: Cluster Analysis - Partitioning Methods - Hierarchical Methods: Basic concepts of hierarchical clustering, Agglomerative hierarchical clustering, and Divisive hierarchical clustering Density-based methods: DBSCAN, DENCLUE - Evaluation of Clustering.

UNIT V (8 Hrs)

Data Mining trends and research frontiers: Mining rich data types - Data Mining Applications - Case Studies.

Text Book

S.No	Authors	Title	Publishers	Year and Edition
1.	Jiawei Han, Jian Pei, Hanghang Tong	Data Mining: Concepts and Techniques	Morgan Kaufmann Publishers, San Francisco	Reprint 2011 & 4th Edn

Books for Reference

S.No	Authors	Title	Publishers	Year and Edition
1.	Jiawei Micheline Jian Pei Han, Kamber,	Data Mining Concepts and Techniques	3/e, Morgan Kaufmann Publishers, San Francisco	Reprint 2011

2.	David Hand, Heikki Mannila and Padhraic Smyth	Principles of Data Mining	Prentice Hall of India, New Delhi	Reprint 2001
3.	Mark A. Hall, Ian H. Witten, Eibe Frank	Data Mining: Practical Machine Learning Tools and Techniques	3/e, Morgan Kaufmann Publishers, San Francisco	Reprint 2011
4.	Arun K. Pujari	Data Mining Techniques	Universities Press, Hyderabad	Reprint 2001
5.	Soman KP	Data mining from theory to practice	2/e, PHI Learning Pvt. Ltd	Reprint 2005

Pedagogy

- Lectures, Case Studies, Demonstrations

Course Designers

1. Mrs. M. Loganayaki
2. Mrs. T. Prabha Kumari

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
AI23CP5	BIG DATA FRAMEWORK LAB	PRACTICAL	-	-	45	2

Preamble

- This course provides implementation of the Hadoop components like Hive and Spark. This course also provides various exercises to implement the components in the distributed environment through MapReduce programming.

Prerequisite

- Big data framework
- NoSQL concepts

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Recall the components of big data framework, tools and technologies for big data processing	K1
CLO2	Understand the techniques of bid data framework for solving big data problems	K2
CLO3	Apply concepts of big data models and tools to process simple tasks	K3
CLO4	Analyze various big data models suitable for handling different types of big data	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

BIG DATA FRAMEWORK LAB (AI23CP5) – [45 Hrs]

LIST OF EXERCISES:

1. Setting up a Hadoop environment

2. Exercises to implement file management tasks like adding files, retrieving files, deleting files

   and directories using Hadoop

3. Exercises to implement Map reduce program that mines weather data.

4. Exercises to implement Hive Scripts to create, alter, drop databases, tables, views, functions

   and indexes.

5. Exercises to implement HiveQL to sort, order, group, distribute and cluster.

6. Exercises to implement partitioning and bucketing in Hive.

7. Exercises to create joins, views and indexes in Hive.

8. Exercises to implement simple processing tasks in Spark

9. Exercises to implement basic operations in Spark SQL

Pedagogy
- Demonstrations

Course Designers
1. Dr. R. Suriyagrace
2. Dr. S. Sakila

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDIT
AI23CP6	DATA MINING LAB	PRACTICAL	-	-	45	2

Preamble

- This lab provides hands on training in implementing data mining techniques using Knime, Weka and Rapid Miner.

Prerequisite

- Programming basics (preferably Python).

- SQL knowledge.

- Statistics fundamentals.

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge level
CLO1	Recall the data mining functionalities and concepts of machine learning	K1
CLO2	Understand different data mining techniques, algorithms and their usage in real time applications	K2
CLO3	Apply various data mining techniques and algorithms for solving real time problems	K3
CLO4	Analyze classification and clustering models to give solution for complex problems	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

DATA MINING LAB (AI23CP6) – [45 Hrs]

List of Exercises:

1. Exercises to implement data cleaning and normalization techniques
2. Exercises to implement feature extraction and feature selection techniques
3. Exercises on frequent mining patterns
4. Exercises on classification techniques
5. Exercises to implement regression techniques
6. Exercises on clustering techniques
7. Exercises to implement time series data analysis

Pedagogy

- Demonstration, Lecture, Group Discussion

Course Designers

1. Dr S. Meera

2. Ms. M. Loganayaki

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDIT
AP23A01	DIGITAL MARKETING	THEORY	58	2	-	3

Preamble

- This course provides an overall understanding of the various digital marketing platforms and tools available for creating an effective digital marketing strategy. It provides technical skills to design and develop an integrated digital marketing plan for an organization.

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Recall the role of digital marketing in marketing strategy	K1
CLO2	Understand the key elements of a digital marketing strategy	K2
CLO3	Apply the role that social marketing plays in the digital marketing	K3
CLO4	Analyze common digital marketing tools such as SEO and Social media and apply conceptual frame works of digital marketing	K4

Mapping With Programme Learning Outcomes

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

S- Strong; M-Medium; L-Low.

DIGITAL MARKETING (AP23A01) – [58 Hrs]

UNIT – I   (12 Hrs)

Introduction to Digital Marketing: Introduction - Original and Development of Digital Marketing - Internet Users: Penetration and Kind of Internet Use - Digital Marketing strategy – Digital Advertising Marketing Plan - Ethical and legal of framework of Digital Marketing - Skills Required in Digital Marketing - Digital Advertising: Introduction - Concept of display advertising - Digital Metrics. Types of Digital Ad - Targeting in digital marketing - Challenges faced by display marketing.

UNIT – II   (11 Hrs)

Search Engine Advertising: Introduction – Why pay for search advertising? – Understanding Ad Placement – Understanding Ad Ranks – Why is the Ad rank important? – Create your first Ad Campaign – Google Ads Account – Best practices for creating effective Ads - Enhance your Ad Campaign – Performance Reports – E-Commerce

UNIT – III   (12 Hrs)

Facebook Marketing: Introduction – Organic Marketing – Paid Marketing – Facebook Insights LinkedIn: Introduction - LinkedIn Strategy - Content Strategy - LinkedIn Native Videos - LinkedIn Analytics - Asset Copying - LinkedIn Sales Navigator - Emerging Platforms: Instagram

UNIT – IV   (12 Hrs)

Search Engine Optimization: Introduction – Search Engine – The Concept of SEO – SEO Phases – Website Audit – Content – Social Media Reach – Maintenance – Local Search SEO – SEO Visual Search – Voice Change will change the SEO Industry – Sub domains vs Subfolders – Website Navigation - External Links – Pop-ups – Advanced Website Features.

UNIT – V   (11 Hrs)

Mobile Marketing: Introduction – Mobile Advertising – Mobile Marketing Toolkit – Mobile Marketing Features – Mobile Analytics. Digital Analytics: Introduction – Data Collection – Key Metrics – Experience Analysis – Making Web Analytics Actionable – Types of Tracking Code – Competitive Intelligence.

Text Book

S.No	Authors	Title	Publishers	Year and Edition
1.	Seema Gupta	Digital Marketing	McGraw Hill Education	2018 & 2nd Edn

Books for Reference

S. No	Authors	Title	Publishers	Year and Edition
1.	Simon Kingsnorth	Digital Marketing Strategy: An Integrated Approach to Online Marketing	Kogan Page	2019 & 2nd Edn
2.	Dave Chaffey	Digital Marketing	Pearson Publication	2019 & 7th Edn

3.	Stephanie Diamond	Digital Marketing All-in- One for Dummies, For Dummies	Pearson Publication	2019 & 1st Edn
4.	Kevin Hartman	Digital Marketing Analytics: In Theory and In Practice	Ostmen Bennett Bridge Publishing Services	2020 & 2nd Edn

Pedagogy

- Lectures, Group Discussions, Demonstrations, Case Studies

Course Designer

1. Mrs. M Selvanayaki
2. Dr. R. Hepziba Gnanamalar

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDIT
CS23A02	M-COMMERCE	THEORY	58	2	-	3

Preamble

- This course provides an insight on M-Commerce principles and business models. It also explores the concept of mobile commerce technologies, applications, mobile payment methods, security, and ethics.

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 concept of E- commerce and process of business models	K1
CLO2	Understand the architecture and applications of M-Commerce	K2
CLO3	Illustrate the risks, issues, legal and security aspects in M-Commerce	K3
CLO4	Analyze the infrastructure, fraud prevention and payment methodologies and examine the legal and ethical issues in mobile commerce	K4

Mapping with Programme Learning Outcomes

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

S- Strong; M-Medium; L-Low.

M-COMMERCE (CS23A02) – [58 Hrs]

UNIT – I   **(12 Hrs)**

Introduction to E- commerce: Introduction - E-commerce - E-business - Categories of E-Commerce applications - Traditional and Electronic commerce - Advantages and disadvantages of E-commerce. Business Models of E-commerce: Introduction - Business models of E-commerce- Business to Consumer (B2C) - Business to Business (B2B) - Difference between B2C and B2B - C2C: Definition - Characteristics and Applications of C2C EC.

UNIT – II   **(11 Hrs)**

Mobile commerce and WAP: Introduction to Mobile commerce - Application - Advantages of M-commerce - Wireless Application Protocol - WAP Browser - Features of WAP 2.0 - Technologies of M- commerce.

UNIT – III   **(12 Hrs)**

Mobile commerce Risk, Security and Payment Methods: Introduction - Security and Payment Methods - Mobile Commerce Security - Security Mechanism - Mobile Security - Network Infrastructure and Security- X - WAP and Security - Mobile commerce payment methods - Mobile payment operations.

UNIT – IV   **(12 Hrs)**

Mobile Money Infrastructure and Fraud Prevention for M- Payment: Introduction - Requirement for authentication infrastructure for M-commerce - Trust relationship - Requirement for Mobile commerce - Password based authentication for mobile users with support for public key technology - M - payment value chain - Life cycle - Operational Issues in M-Commerce payment - Mobile payment systems - General analysis of the payment solutions.

UNIT – V(11 Hrs)

Legal and Ethical Issues: Introduction - Issues related to E- commerce - Legal issues - Taxation and E- commerce - Cyber Laws: Introduction - Cyber laws in India - Salient Provisions of Cyber Law - Contracting and contract Enforcement - IT act 2000.

Text Book

S.No	Authors	Title	Publishers	Year and Edition
1.	Dr. U.S.Pandey, Er. Saurabh Shukla	E- Commerce and Mobile Commerce Technologies	S.Chand Company Pvt. Ltd,	Reprint 2014 & 2nd Edn.

Books for Reference

S.No	Authors	Title	Publishers	Year and Edition
1.	Karabi Bandyopadhya	Mobile Commerce	Prentice Hall India Learning Private Limited	Reprint 2013

2.	Paul May	Mobile Commerce: Opportunities, Applications and Technologies of Wireless Business	Cambridge University Press	Reprint 2001
3.	Norman Sadeh	M-Commerce: Technologies Services, and Business	John Wiley & Sons	Reprint 2003

Pedagogy
- Lectures, Group discussions, Demonstrations, Case studies

Course Designer

1. Ms. P. Parvathi

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDIT
AI23SCE1	IBM APPLIED AI	PRACTICAL	-	-	45	3

AI Application Development (IBM Applied AI)

S. NO.	COURSE TITLE	COURSE LINK	HOURS
1	Introduction to Artificial Intelligence	https://www.coursera.org/learn/introduction-to-ai?specialization=applied-artifical-intelligence-ibm-watson-ai	8
2	Generative AI: Introduction & Applications	https://www.coursera.org/learn/generative-ai-introduction-and-applications?specialization=applied-artifical-intelligence-ibm-watson-ai	6
3	Generative AI: Prompt Engineering Basics	https://www.coursera.org/learn/generative-ai-prompt-engineering-for-everyone?specialization=applied-artifical-intelligence-ibm-watson-ai	7
4	Introduction to HTML, CSS & Javascript	https://www.coursera.org/learn/introduction-html-css-javascript?specialization=applied-artifical-intelligence-ibm-watson-ai	10
5	Building Generative AI-Powered Applications with Python	https://www.coursera.org/learn/building-gen-ai-powered-applications?specialization=applied-artifical-intelligence- ibm-watson-ai	14
	TOTAL HOURS		**45**