B.Sc. Computer Science (Artificial Intelligence)

CHOICE-BASED CREDIT SYSTEM (CBCS)

AND

LEARNING OUTCOMES BASED CURRICULUM FRAMEWORK (LOCF)

CURRICULUM AND SCHEME OF EXAMINATION

SYLLABUS

2023 – 2026
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

PSGR Krishnammal College for Women

B.Sc. Computer Science (Artificial Intelligence)

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

Curriculum and Scheme of Examination

BACHELOR OF COMPUTER SCIENCE (ARTIFICIAL INTELLIGENCE)

SEMESTER I to V (2023 - 2026 Batch onwards)

Semester	Part	Subject Code	Title of the Course	Category	Instruction Hours / Week	Contact Hours	Tutorial Hours	Duration of Examination	Examination Marks			Credits
									CA	ESE	Total	
I	I	TAM2301A/ HIN2301A/ FRE2301A	Language Paper 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	IN23C01	**Core 1:** Computer Programming	CC	4	58	2	3	25	75	100	3
	III	AI23CP1	**Programming Lab 1:** Computer Programming Lab	CC	3	45	-	3	15	35	50	2
	III	PP22C02	**Core 2:** Computational and Algorithmic Thinking for Problem Solving	CC	3	45	-	-	100#	-	100	3
	III	AP23C03	**Core 3:** Operating Systems Fundamentals - Linux	CC	4	58	2	3	25	75	100	3
	III	TH23A25	**Allied A1:** Linear Algebra	GE	6	88	2	3	25	75	100	5
	IV	NME23ES	Introduction to Entrepreneurship	AEC	2	30	-	-	100#	-	100	2
		NME23A1/ NME23B1	Advanced Tamil 1 / Basic Tamil 1	AEC	2	28	2	-				
	I	TAM2302A/ HIN2302A/ FRE2302A	Language II	Language	4	88	2	3	25	75	100	3

II	II	ENG2302A	English Paper II	English	4	73	2	3	25	75	100	3
	III	AI23C04	**Core 4:** Java Programming	CC	4	58	2	3	25	75	100	4
	III	AI23C05	**Core 5:** Data Structures	CC	4	58	2	3	25	75	100	3
	III	AI23CP2	**Core Practical Lab II:** Java Programming Lab	CC	3	45	-	3	25	25	50	2
II	III	AI23CP3	**Core Practical Lab III:** Statistical Tools for AI	CC	3	45	-	3	50	50	50	2
	III IV	TH23A26	**Allied A2:** Statistics for Computer Science	GE	6	88	2	3	25	75	100	5
			Online Course – Self Study	AEC	-	-	-	-	-	-	-	Grade
	V	23PEPS1	Professional English for Physical sciences	AEC	2	25	5	-	100	-	100#	2
	IV	NME23A2/ NME23B2	Advanced Tamil II / Basic Tamil II (Outside Class Hours)	AEC	2	-	-	-	100	-	100	Grade
	VI	NM23GAW	General Awareness	Self-Study			OT	-	100	-	-	Grade
III	I	TAM2303A/ HIN2303A/ FRE2303A	Language III	Language	4	58	2	3	25	75	100	3
	II	ENG2303A	English III	English	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	AI23C07	**Core 5:** Computer Networks	CC	4	58	2	3	25	75	100	3
	III	AI22CP4	**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/ AI23SCE1	**Skill Based Subject I:** Gen AI / **Coursera**: IBM Applied AI	SEC	3	44/ 45	1/-	-	100	-	100	3
III	IV	NM23DTG	Design Thinking	AEC	2	30	-	-	100	-	100	2
	IV	NM22UHR	**Foundation Course II:** Universal Human Values and Human Rights (Self-Study)	AECC	Self-Study	-	-	-	100	-	100#	Grade
III & IV	IV		**Job Oriented Course** (Amazon Web service / Cisco Certified Network Associate/ Microsoft windows server administration / Microsoft Power BI)	-	-	-	-	-	-	-	-	Grade

I-V	VI	16BONL1/ 16BONL2/	Online Course-Online Course-II	ACC	-	-	-	-	-	-	-	
IV	I	TAM2304A/ HIN2304A/ FRE2304A	Tamil Paper IV / Hindi Paper IV / French Paper IV	L	4	58	2	3	25	75	100	3
	II	ENG2304A	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	CS23SBGP/ AI23SCE1	Gen AI / IBM Applied AI	SEC	3	41	45	-	100	-	100	3
	IV	NM23EII	Entrepreneurship and Innovation (IgniteX)	AECC	2	30	-	-	100	-	100	2
	IV	NM23EVS	Environmental Studies	AECC	SS	-	-	-	100	-	100	Gr.
	V	COCOACT	Co-Curricular Activities	GC	-	-	-	-	-	-	100	1
I-V	VI	COM15SER	Community Services 30 Hours	GC	-	-	-	-	-	-	-	Gr.
I-V	VI	16BONL1/ 16BONL2/	Online Course 1 Online Course 2	ACC	-	-	-	-	-	-	-	-
V	III	AI23C10	Machine Learning	CC	5	73	2	3	25	75	100	4
	III	AI23C11	Modern Artificial Intelligence	CC	4	58	2	3	25	75	100	3
	III	AI23C12	Software Engineering	CC	4	58	2	3	25	75	100	3
	III	AI23CP7	Artificial Intelligence Lab–I	CC	4	60	-	3	15	35	50*	3
	III	AI23CP8	Machine Learning Lab	CC	3	45	-	3	15	35	50*	2
	III	AI23E01/ AI23E02	**Elective:** Internet of Things / Natural Language Processing	DSE	5	73	2	3	25	75	100	3
	III	AI23SBP1	**SBS:** Data Visualization Tools	SEC	3	45	-	-	100	-	100	3
	III	AI21AC1 / AI21AC2	**ALC:** Business Domains for Artificial Intelligence **ALC**: Business Intelligence	ACC	-	-	-	3	25	75	100*	5
	IV	NM21CS1	Cyber Security	AECC	2	30	-	-	100	-	100	Grade
	IV	AI22INST	Field work / Institutional Training	DSE	-	-	-	-	100	-	100	2
	VI	AI22COM	Comprehensive Exam	GC	-	-	-	1	-	100	100	Grade
I-V	VI	16BONL1 16BONL2	Online Course -I Online Course -II	ACC	-	-	-	-	-	-	-	-
V	VI	COM15SER	Community Service	GC	-	-	-	-	-	-	-	-

VI	III	AI23C13	Deep Learning	CC	5	73	2	3	50	50	100	3
	III	AI23E03 / AI23E04	Elective 1: Cloud Computing Elective 2: Ethics for Artificial Intelligence	CC	5	73	2	3	50	50	100	3
	III	AI22CP09	Deep Learning Lab	CC	5	75	-	3	25	25	50*	3
	III	AI22CP10	Full Stack Development Lab	CC	5	75	-	3	25	25	50*	3
	III	AI21PROJ	Project and Viva-Voce	CC	7	-	-	-	50	50	100	5
	IV	AI21SBCE /AI22SBP4	IBM Applied AI / Data Analytics Tools	SEC	3	45 /41	-/ 4	-	100	-	100	3
	III	AI21AC3/ AI23AC4	ALC : AI for Analytics / Fundamentals of Prompt Engineering	ACC	SS	-	-	3	25	75	100	5
I-V	VI	16BONL1/ 16BONL2/	Online Course I Online Course II	ACC	-	-	-	-	-	-	-	-
I-VI										Total	4100	140

L – Language
E – English
CC : Core Course
GE : Generic Elective
SS-Self Study
ESE : End Semester Examination
AECC - Ability Enhancement Compulsory Course
GC – General Course
ACC – Additional Credit Course
SEC – Skill Enhancement Course
CA : Continuous Assessment

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

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 V)

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 V)

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	

VALUE EDUCATION AND HUMAN RIGHTS / ENTREPRENEURSHIP / DESIGN THINKING

QUIZ	ASSIGNMENT	PROJECT / CASE STUDY	TOTAL
50 Marks	25 Marks	25 Marks	100 Marks

WEIGHTAGE ASSIGNED TO VARIOUS COMPONENTS OF CONTINUOUS INTERNAL ASSESSMENT (Semester I to V)

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.

SKILL BASED SUBJECT PRACTICAL – [100 MARKS]

Test 1 (Theory/Practical)	50 marks
Test 2 (Theory/Practical/Project)	50 marks
Total	100 marks

*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- IN23C01						
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
COURSE – AI23CP1						
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
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 - AP23C03						
CLO1	M	M	S	S	S	L
CLO2	S	S	S	S	S	L
CLO3	S	S	S	S	S	L
CLO4	S	S	M	S	S	M
COURSE – AI23C04						
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 - AI23C05						
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 – AI23CP2						
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 - AI23CP3						
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 - 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 – AI23C07						
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 - AI22CP4						
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	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 - 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	M	L
CLO2	S	S	S	S	L	L
CLO3	S	S	S	M	L	L
CLO4	S	S	S	S	L	M
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	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 – CS23A02						
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 – AI23SCE1						
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 – AI23C10						
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 – AI23C11						
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 – AI23C12						
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 – AI23CP7						
CLO1	S	S	M	M	L	M
CLO2	S	S	M	S	M	L
CLO3	S	S	M	M	L	L
CLO4	S	S	M	S	L	L
COURSE – AI23CP8						
CLO1	S	S	M	M	L	M
CLO2	S	S	M	S	M	L
CLO3	S	S	M	M	L	L
CLO4	S	S	M	S	L	L
COURSE – AI23E01						
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 – AI23E02						
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 – AI21AC1						
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 – AI21AC2						
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 – AI23C13						
CLO1	S	S	S	L	L	M
CLO2	S	S	S	M	L	L
CLO3	S	S	S	M	L	L
CLO4	S	S	S	S	M	L
COURSE – AI23E03						
CLO1	S	L	L	L	L	S
CLO2	M	S	L	L	M	S
CLO3	L	M	S	M	M	S
CLO4	L	S	S	S	S	S
COURSE – AI23E04						
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 – AI21AC2						
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 – AI23CP09						
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 – AI23CP10						
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 – AI22SBP4						
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 – AI21AC3						
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 – AI23AC4						
CLO1	M	M	S	L	S	L
CLO2	M	S	M	M	S	L
CLO3	S	M	S	M	S	L
CLO4	S	S	M	S	S	L

SEMESTER-I

COURS E NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
IN23C01	**COMPUTER PROGRAMMING**	**Theory**	**58**	**2**	**-**	**3**

Preamble

The course covers basic knowledge of Python Programming. It defines the Conditional Statements & Loops, Functions, Tuples, Python data structures, and Exception & its tools.

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

COMPUTER PROGRAMMING (IN23C01) – [58 Hrs]

UNIT I **(10 Hrs)**

Introduction: Why do people use Python- Python a scripting language- **Users 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)**

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

Text Books

1. Mark Lutz, Learning Python, O'Reilly Publication, 5th edition, 2013 (Unit I - IV).
2. P. Kaliraj, T. Devi, Higher Education for Industry 4.0 and Transformation to Education 5.0, CRC Press – Taylor and Francis Group, 1st Edition, 2021 (Unit V).

Reference Books

1. Mark Summerfield, Programming in Python 3, Pearson Education 2009.
2. Mark Pilgrim, Dive into Python 3, A press publication 2011.
3. Richard L. Halterman, Fundamentals of Python, Programming Southern Adventist University, 2017.

Pedagogy

Lectures, Group discussions, Demonstrations

Course Designer

1. Mrs.M.Selvanayaki
2. Ms. A.Deepika

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
AI23CP1	COMPUTER PROGRAMMING LAB	PRACTICAL	-		45	2

Preamble

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

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Identify the basic terminologies of Python programming such asdata 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

COMPUTER PROGRAMMING LAB (AI23CP1) – [45 Hrs]

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 program to Hash Encryption and Decryption giving data.

PEDAGOGY

Demonstration of working environment/Tools/Software/Program

COURSE DESIGNER

1. Mrs. M. Selvanayaki
2. Ms. A. Deepika

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
PP22C02	COMPUTATIONAL AND ALGORITHMIC THINKING FOR PROBLEM-SOLVING	Theory	5	-	-	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 behavior that draws on concepts fundamental to computer science.

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Define the basic principles of Logical reasoning, Problem Solving in Computational Thinking.	K1
CLO2	Understanding the applications of propositional logic, Problem representation, and techniques.	K2
CLO3	Apply algorithmic thinking to problem-solving using tools Flow algorithm, Scratch, and iPython.	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

COMPUTATIONAL AND ALGORITHMIC THINKING FOR PROBLEM-SOLVING (PP22C02)

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

TEXTBOOK

1. David Riley and Kenny Hunt, Computational Thinking for Modern Solver, Chapman & Hall/CRC, 2014.
2. Paolo Ferragina, Fabrizio Luccio, Computational Thinking First Algorithms, Springer, 2018.
3. Karl Beecher, Computational Thinking – A beginner's guide to problem-solving, BSC publication, 2017.

PEDAGOGY

Lectures, Group discussions, Demonstrations, Case studies

COURSE DESIGNER

Mrs. R. Jayasree

EVALUATION PATTERN

ASSESSMENT	NUMBER	MARKS
Quiz (online or offline)	5	50
Class Activity	5	25
Group Project (Domain Specific)	1	25
TOTAL		100

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
AP23C03	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 tasks on LINUX servers.

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Recall the basic concepts with functions of operating systems and Linux systems.	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	PLO6
CLO1	M	M	S	S	S	L
CLO2	S	S	S	S	S	L
CLO3	S	S	S	S	S	L
CLO4	S	S	M	S	S	M

S- Strong; M-Medium; L-Low

OPERATING SYSTEMS FUNDAMENTALS – LINUX (AP23C03) – [58 Hrs]

UNIT I **(12 Hrs)**

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

UNIT II **(12 Hrs)**

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

UNIT III **(11 Hrs)**

Memory Management Strategies: **Background - Contiguous Memory Allocation -** Paging- Basic Method. Virtual Memory Management: Demand Paging-Page Replacement - Basic Page Replacement, **FIFO Page Replacement**, Optimal Page Replacement, LRU Page Replacement, Counting-Based 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**-Understanding File Permissions and Ownership-Moving, Copying, and Removing Files.

Text Books

1. Abraham Silberschatz, Peter Baer Galvin, G Gagne, OPERATING SYSTEM CONCEPTS, Wiley Publishers, 10th Edition, 2018.
2. Christopher Negus, LINUX BIBLE, Wiley,10th Edition 2020.

Reference Books

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, 2014.

Pedagogy:

Lectures, Discussion, Quiz, PPT

Course Designers

1. Mrs. S. Mohanapriya
2. Mrs. T.S. Anushya Devi
3. Dr. R. Hepziba Gnanamalar

SEMESTER II

Course Number	Course Name	Category	L	T	P	Credit
AI23C04	**JAVA PROGRAMMING**	**III**	**58**	**2**	**-**	**4**

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

JAVA PROGRAMMING - (AI23C04) – [58 Hrs]

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.

UNIT III **(12 Hrs.)**

Classes, objects and methods: Introduction-Defining a class-method declaration-creating objects-accessing class methods-method overloading-nesting of methods-inheritance-overriding methods

UNIT IV **(11 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 V **(12 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

TEXT BOOK

1. E. Balaguruswamy, Programming with JAVA – 6th Edition A Primer, Mc-Graw Hill Professional, 2015.

REFERENCE BOOKS

1. R.G. Dromey, "How to solve it by Computer", Pearson Education, 2008.
2. Walter Savitch, Java: An Introduction to Problem Solving and Programming, Eighth Edition, Pearson Education Ltd, 2019.
3. Core Java Volume I—Fundamentals, Cay.S.Horstmann, 11th Edition, 2018, Pearson Education
4. Herbert Schildt - Java: A Beginner's Guide, 8th Edition, McGraw Hill Education, 2018.

PEDAGOGY

Lectures, Case Studies, Demonstrations

COURSE DESIGNERS

1. Mrs Loganayaki. M
2. Mrs K. Geethalakshmi

Course Number	Course Name	Category	L	T	P	Credit
AI23C05	DATA STRUCTURES	III	58	2	-	3

PREAMBLE

This course covers various data structures, including arrays, structures, stacks, queues, linked lists and trees. It also includes sorting and searching techniques.

PREREQUISITE

- Programming
- Operating System

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.

TEXTBOOK

1. Seymour Lipschutz, Data Structures Tata McGraw Hill Company, Revised First Edition, Tenth Reprinted 2017

REFERENCE BOOKS

1. Ellis Horowitz, Sartaj Sahni, Fundamentals of Data Structures, Galgotia Book Source, 2003, Reprinted 2014.
2. K. Sharma, Data Structures using C, Pearson education 2014.
3. Rajdew Tiwari and Nagesh Sharma, Design and Analysis of Algorithms, Pearson education 2014.

PEDAGOGY

Lectures**,** Demonstrations, Discussions

COURSE DESIGNERS

1. Dr. J. Athena
2. Ms. A. Sheela Rini

Course Number	Course Name	Category	L	T	P	Credit
AI23CP2	JAVA PROGRAMMING LAB	III	-	-	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

1. Basics of programming
2. 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

JAVA PROGRAMMING LAB – (AI23CP2) – 45 Hrs

LIST OF EXERCISES:

- Exercises using classes and objects
- Exercises using control statements
- Exercises using different inheritance
- Exercises using interfaces
- Exercises using packages
- Exercises using string functions
- Exercises using mouse events
- Exercises using thread methods
- Exercises to implement Exception Handling
- 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
AI23CP3	STATISTICAL TOOLS FOR AI	III	-	-	45	2

PREAMBLE

This course provides hands on training in data analysis methods using statistical analysis software package PSPP. It also covers statistical methods in Excel to perform data analysis and forecasting.

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 – (AI23CP3) – [45 Hrs]

LIST OF EXERCISES:

- Exercises to Introduction: Statistical Analysis in MS-Excel to Understand and Identify the basic statistical concepts
- To experiment Diagrammatic representation of Data – Bar Diagram, Pie Diagram to understand the data in an easier manner.
- To experiment Diagrammatic Representation of Data – Histogram and Ogives to understand the data in an easier manner.
- Exercises to implement correlation analysis
- Exercises to implement regression analysis
- Exercises to implement T-test
- Exercises to implement F-test
- Exercises to implement Chi-square test
- Exercises to One way or Two way ANOVA to analyze the numerical data
- Exercises to implement Advanced Filters in Excel
- Exercises to implement Data Validation in Excel
- Exercises to implement Scenarios, Goal seek
- Exercises to implement Vlookup, Hlookup in Excel
- Exercises to implement Pivot Tables and Pivot Charts in Excel
- Exercises to implement Timeline using Gantt chart
- Exercises to implement Macros in Excel
- Exercises to implement Dashboards in Excel

PEDAGOGY
Demonstrations

COURSE DESIGNERS
Dr C. R. Parvathy

SEMESTER III

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	Analyze 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
AI23C07	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

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

SYLLABUS

UNIT I **(11 Hrs)**

Introduction: Uses of Computer networks: Business Applications, Home Applications, Mobile Users- **Network Hardware: PAN, LAN, MAN, WAN, Internetworks.** Network Software: Protocol Hierarchies, Design Issues for the layers, **Connection – oriented Vs. Connectionless services**. Service Primitives. OSI reference model, TCP/IP reference model.

UNIT II **(12 Hrs)`**

Physical Layer: Guided Transmission media: Magnetic media, Twisted Pairs, Coaxial Cable, Power Lines, Fiber Optics, Fiber cables – Digital Modulation and Multiplexing-**Baseband Transmission,** Passband Transmission**, Frequency Division Multiplexing**, Time Division Multiplexing, Code division Multiplexing. Public switched telephone network-Structure of the Telephone System. **Mobile Telephone System-First Generation, Second Generation and Third Generation.**

UNIT III **(12 Hrs)**

Data link layer: Design Issues- Error Detection and Correction- Elementary data link protocols- A Utopian Simplex Protocol, A Simplex Stop-and-Wait Protocol for an Error -Free Channel, A Simplex Stop-and -Wait Protocol for a Noisy Channel**. Sliding window protocol.** A One Bit Sliding Window Protocol, A Protocol Using Go-Back-N-A Protocol Using Selective Repeat. **Bluetooth-Architecture, Application, Protocol Stack, Radio Layer, Link Layers, Frame Structure.**

UNIT IV **(12 Hrs)**

Network Layer: Design Issues-Store and Forward Packet Switching, Services Provided to the Transport Layer, Implementation of Connectionless Service, Implementation of Connection - Oriented Service, **Comparison of Virtual -Circuit and Datagram Networks.** Routing Algorithms- The Optimality Principle, Shortest Path Algorithm. Congestion Control Algorithm-Approaches to Congestion Control, Admission Control, Traffic Aware Routing. **Internetworking-How Networks Differ. IPV4 Protocol.**

UNIT V **(11 Hrs)**

Transport Layer: Services –Transport Service Primitives. -Elements of Transport Protocols-Addressing, Connection Establishment, Connection Release, Error Control and Flow Control, Multiplexing, Crash Recovery.**, UDP-Remote Procedure Call, TCP-TCP service Model protocols**. Application Layer: DNS, **Electronic mail.**

TEXTBOOKS

S.NO	AUTHOR	TITLE OF THE BOOK	YEAR OF PUBLICATION	PUBLISHERS\ EDITION
1.	Andrew S Tanenbaum	Computer Networks	2014	Pearson Education, 5th Edition

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. Ms. T. Prabakumari

Course Number	Course Name	Category		T	P	Credit
AI22CP4	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 an 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**

SEMESTER IV

Course Code	Course Name	Course Type	L	T	P	Credits
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.	AUTHOR	TITLE OF THE BOOK	YEAR OF PUBLICATION	PUBLISHERS\ EDITION
1.	Tom White	Hadoop: The Definitive Guide‖	2015	O`Reilly Publishers, USA

REFERENCE BOOK

S.NO	AUTHOR	TITLE OF THE BOOK	YEAR OF PUBLICATION	PUBLISHERS\ EDITION
1.	Manoel Carlos Ramon	API Features and Arduino Projects for Linux Programmers	2014	Apress
2.	Data‖, John	EMC Education Services, ―Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting	2015	Wiley & Sons, New Delhi
3.	Bill Chambers and Matei Zaharia	Spark: The Definitive Guide	2018	O'Reilly Media

PEDAGOGY:

Lectures, Demonstrations, Group discussions

COURSE DESIGNERS

1. Dr. R.Suriyagrace
2. Mrs. T.Prabhakumari

Course Code	Course Name	Course Type	L	T	P	Credits
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 itemsets, closed itemsets, and association rules - Frequent itemset mining methods: Apriori algorithm, **Pattern-growth approach**, Mining frequent itemsets 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	AUTHOR	TITLE OF THE BOOK	YEAR OF PUBLICATION	PUBLISHERS\ EDITION
1.	Jiawei Han, Jian Pei, Hanghang Tong	Data Mining: Concepts and Techniques	2011	Fourth Edition, Morgan Kaufmann Publishers, San Francisco

REFERENCE BOOK

S.NO	AUTHOR	TITLE OF THE BOOK	YEAR OF PUBLICATION	PUBLISHERS\ EDITION
1.	Jiawei Micheline Jian Pei Han, Kamber,	Data Mining Concepts and Techniques	2011	3/e, Morgan Kaufmann Publishers, San Francisco
2.	David Hand, Heikki Mannila and Padhraic Smyth	Principles of Data Mining	2001	Prentice Hall of India, New Delhi
3.	Mark A. Hall, Ian H. Witten, Eibe Frank	Data Mining: Practical Machine Learning Tools and Techniques	2011	3/e,Morgan Kaufmann Publishers,San Francisco
4.	Arun K. Pujari	Data Mining Techniques	2001	Universities Press, Hyderabad
5.	Soman KP	Data mining from theory to practice	2005	2/e, PHI Learning Pvt. Ltd

PEDAGOGY

Lectures, Case Studies, Demonstrations

COURSE DESIGNERS

1. Dr S. Meera
2. Mrs. S.Shanthi

Course Code	Course Name	Course Type	L	T	P	Credits
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

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. S. Meera
2. Mrs. S.Shanthi

Course Code	Course Name	Course Type	L	T	P	Credits
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

Data Mining Programming

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. Mrs. S.Shanthi

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

Face book 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	AUTHOR	TITLE OF THE BOOK	YEAR OF PUBLICATION	PUBLISHERS\ EDITION
1.	Seema Gupta	Digital Marketing	2018	McGraw Hill Education, 2nd Edition

REFERENCE BOOK

S.NO	AUTHOR	TITLE OF THE BOOK	YEAR OF PUBLICATION	PUBLISHERS\ EDITION
1.	Simon Kingsnorth	Digital Marketing Strategy: An Integrated Approach to Online Marketing	2019	Kogan Page, 2nd Edition
2.	Dave Chaffey	Digital Marketing Pearson	2019	Pearson, 7th Edition
3.	Stephanie Diamond	Digital Marketing All-in-One for Dummies, For Dummies	2019	1st Edition, Pearson

4.	Kevin Hartman	Digital Marketing Analytics: In Theory and In Practice	2020	Ostmen Bennett Bridge Publishing Services, 2nd Edition

PEDAGOGY

Lectures, Group discussions, Demonstrations, Case studies

COURSE DESIGNER

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

Course Code	Course Name	Course Type	L	T	P	Credits
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.	AUTHOR	TITLE OF THE BOOK	YEAR OF PUBLICATION	PUBLISHERS\ EDITION
1.	Dr. U.S.Pandey and Er. Saurabh Shukla	E- Commerce and Mobile Commerce Technologies	2014	S. Chand & Company Pvt. Ltd 2nd Revised Edition.

REFERENCE BOOK

S.NO	AUTHOR	TITLE OF THE BOOK	YEAR OF PUBLICATION	PUBLISHERS\ EDITION
1.	Karabi Bandyopadhya	Mobile Commerce	2013	Prentice Hall India Learning Private Limited
2.	Paul May	Mobile Commerce: Opportunities, Applications and Technologies of Wireless Business	2001	Cambridge University Press; 1st Edition
3.	Norman Sadeh	M-Commerce: Technologie Services, and Business	2003	John Wiley & Sons

PEDAGOGY

Lectures, Group discussions, Demonstrations, Case studies

COURSE DESIGNER

Ms. P. Parvathi

Course Number	Course Name	Category	L	T	P	Credits
AI23SCE1	IBM APPLIED AI	PRACTICAL	-	-	45	3

AI Application Development (IBM Applied AI)

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**

SEMESTER V

Course Number	Course Name	Category	L	T	P	Credit
AI23C10	**MACHINE LEARNING**	**Theory**	**73**	**2**	**-**	**4**

Preamble

This course introduces the fundamentals of Machine Learning and its algorithms. It also covers various supervised and unsupervised learning algorithms used for classification, prediction and clustering.

Pre-requisite

- Linear Algebra
- Data Mining

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Recall the basics of machine learning techniques	K1
CLO2	Understand the techniques of machine learning.	K2
CLO3	Apply supervised and unsupervised learning algorithms for classification, prediction and clustering	K3
CLO4	Analyze the efficiency of machine learning algorithms suitable for applications.	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.

SYLLABUS

UNIT I **(14 Hrs.)**

The Machine Learning Landscape: Introduction to Machine Learning - Why Use Machine Learning? - Examples of Applications - Types of Machine Learning systems – Main Challenges of Machine Learning – Testing and Validating - Classification and Prediction - **The Role of Python in Machine Learning - Anaconda in Python - Python Libraries.**

UNIT II **(15 Hrs.)**

Classification: MNIST - Training a Binary Classifier - Performance Measures: Measuring Accuracy Using Cross-Validation - Confusion Matrix - Precision and Recall - Precision/Recall Trade-off - The ROC Curve. Multiclass Classification - Multilabel Classification - Multi Output Classification – Classification Tree. **Advanced Machine Learning: Scikit-Learn Library for Machine Learning** - Cross-Validation. **Support Vector Machine: Linear SVM Classification – Nonlinear SVM Classification.**

UNIT III **(15 Hrs.)**

Linear Regression: Simple Linear Regression – Steps in Building a Regression Model – Building Simple Linear Regression Model – Multiple Linear Regression: Developing Multiple Linear Regression Model Using Python – **Categorical Encoding Features - Splitting the Dataset into Train and Validation Sets - Building the Model on a Training Dataset** – Logistic Regression.

UNIT IV **(14 Hrs.)**

Unsupervised Learning Techniques: Clustering – K-Means Clustering – Limits of K-Means – Clustering for Image Segmentation - Clustering for Preprocessing - Clustering for Semi-Supervised Learning – DBSCAN – **Other Clustering Algorithm**. **Creating Product Segments Using Clustering - Hierarchical Clustering.**

UNIT V **(15 Hrs.)**

Forecasting: Forecasting Overview - Components of Time-Series Data. Recommender Systems: Overview – Association Rules – Applying Association Rules. Text Analytics: Overview – Sentiment Classification - **Naïve-Bayes Model for Sentiment Classification**. **Introduction to Artificial Neural Networks with Keras: From Biological to Artificial Neurons**. Deep Computer Vision Using Convolutional Neural Networks: Convolutional Layers.

TEXT BOOK

S.NO.	AUTHOR	TITLE OF THE BOOK	YEAR OF PUBLICATION	PUBLISHERS\ EDITION
1.	Manaranjan Pradhan, U Dinesh Kumar	Machine Learning using Python	2019	Wiley India, First edition
2.	Aurelien Geron	Hands-On Machine Learning with Scikit Learn, Keras and Tensorflow Concepts Tools and Techniques to Build Intelligent Systems	2019	OReilly Media, Second Edition

REFERENCE BOOK

S.NO.	AUTHOR	TITLE OF THE BOOK	YEAR OF PUBLICATION	PUBLISHERS\ EDITION
1.	Tom M Mitchell	Machine Learning	2017	Tata McGraw-Hill, New Delhi, 1st Edition

2.	Anuradha Srinivasa Raghavan, Vincy Joseph	Machine Learning	2019	Wiley India, First Edition
3.	Zsolt Nagy	Artificial Intelligence and Machine Learning Fundamentals	2018	Packt publisher, First Edition
4.	Dr. S Sridhar, Dr. M Vijayalakshmi	Machine Learning	2021	Oxford University Press, 1st Edition

PEDAGOGY:

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

COURSE DESIGNERS:

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

Course Number	Course Name	Category	L	T	P	Credit
AI23C11	MODERN 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 concepts. It also provides insights on AI techniques and its applications.

PREREQUISITE

AI concepts, techniques and applications for solving problems

COURSE LEARNING OUTCOMES

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

CLO Number	CLO Statement	Knowledge level
CLO1	Recall the principles of Artificial Intelligence	K1
CLO2	Understand problem solving techniques for complex problems	K2
CLO3	Apply decision making, machine learning, NLP and computer vision techniques in real time applications	K3
CLO4	Analyze various real-world problems to find suitable AI solutions	K4

MAPPING WITH PROGRAMME LEARNING OUTCOMES

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

S- Strong; M-Medium; L-Low

SYLLABUS

UNIT I **(12 hrs)**

Artificial Intelligence: **Introduction- What is AI – Foundations of AI** - Problem-solving: Solving problems by searching: Problem-solving agents – Uninformed Search Strategies – Informed Search Strategies-Beyond classical Search: Local Search Algorithms and Optimization Problems. Knowledge Reasoning and Planning: Logical Agents - Game Theory - **Knowledge Based Agents - Logic-Propositional Logic-Knowledge Representation: Categories & Objects.**

UNIT II **(12 hrs)**

Uncertain Knowledge and reasoning: Acting under uncertainty – Basic Probability Notation –Bayes Rule and its use – Probabilistic Reasoning: Representing knowledge in the uncertain domain –the semantics of Bayesian Networks – **Probabilistic Reasoning over time: Time and uncertainty – Inference in temporal models** – Hidden Markov models – **Kalman filters**.

UNIT III **(12 hrs)**

Learning from Examples: Forms of Learning - Supervised Learning - Decision Trees - Linear Regression and Classification - ANN – **Non-Parametric Models** - Learning Probabilistic Models: Statistical Learning - Reinforcement Learning: Passive and Active Reinforcement Learning - **Applications of Reinforcement Learning.**

UNIT IV **(11 hrs)**

Robotics: Introduction to Robots - Robot Hardware - Robotic perception – Planning and Control - Planning to Move - Planning uncertain movements – Moving - Reinforcement learning in robotics - **Humans and Robots** - Alternative Robotic Framework - **Application Domains.**

UNIT V **(11 hrs)**

Computer Vision: Introduction - Image Formation - **Simple Image Features** - Classifying Images - Detecting Objects - **The 3D World** - Using Computer Vision - The Future of AI: AI Components - AI Architectures.

TEXT BOOK

S.No.	AUTHOR	TITLE OF THE BOOK	YEAR OF PUBLICATION	PUBLISHERS \ EDITION
1.	Stuart J. Russell, Peter Norvig	Artificial Intelligence: A Modern Approach	2022	4th edition, Pearson Publishing

REFERENCE BOOK

S.NO	AUTHOR	TITLE OF THE BOOK	YEAR OF PUBLICATION	PUBLISHERS\ EDITION
1.	Ian Good fellow, Yoshua Bengio, Aaron Courville	Deep Learning	2016	MIT Press, 1st Edition
2.	Tom M. Mitchell	Machine Learning	1997	Tata McGraw-Hill,New Delhi, 1st Edition
3.	Suresh Samudrala	Demystifying Machine Learning, Neural Networks and deep learning	2019	Notion Press, 1st Edition
4.	Bernard Marr	Artificial Intelligence in Practice	2019	Wiley Publications, 1st Edition

PEDAGOGY

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

COURSE DESIGNERS

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

Course Number	Course Name	Category	L	T		Credit
AI23C12	SOFTWARE ENGINEERING	Theory	58	2		3

Preamble

This course includes the basic concepts of software engineering to design a high-quality new software project. This course also covers the fundamental techniques of software requirements, analysis and design.

Prerequisite

Database

Course Learning Outcomes

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

CLO NO	CLO Statement	Knowledge Level
CLO1	Remember the principles, models and various phases of software engineering	K1
CLO2	Understand the appropriate software architectures and patterns to carry out high-level design of a system and be able to critically compare alternative choices.	K2
CLO3	Apply the design and testing principles to software project development.	K3
CLO4	Analyze the principles to software project development and various processes used in all the phases of the software products	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

SYLLABUS

UNIT I **(12 Hrs)**

Software and Software Engineering: The Nature of Software –The Software Process-**Software Engineering Practice-** Process Models: Prescriptive Process Models-**Product and Process**. Agility and Process – What is an Agile Process? – Scrum – Other Agile Frameworks

UNIT II **(12 Hrs)**

Understanding Requirements: Requirements Engineering-Establishing the Groundwork- Requirements Gathering - **Developing Use Cases-Building the Analysis Model**-Negotiating Requirements- Validating Requirements. Requirements Modeling: **Requirement Analysis-Scenario-Based Modeling.**

UNIT III **(12 Hrs)**

Design Concepts: The Design Process –Design Concepts -The Design Model. Architectural Design: Software Architecture **Quality Concepts: What is Quality? -Achieving Software Quality.** Software Quality Assurance: Elements of Software Quality Assurance.

UNIT IV **(11 Hrs)**

Software Testing – Component Level: A Strategic Approach to Software Testing- White-Box Testing – Black –Box Testing- Integration Testing- Validation Testing. **Product Metrics: Metrics for the Requirements Model-Metrics for Design model – Design metrics for conventional software & object-oriented software.**

UNIT V **(11 Hrs)**

Risk Management: Software Risks-Risk Identification- Risk Projection - Risk Refinement. Software Maintenance– Maintenance Types- Maintenance Tasks - **Reverse Engineering- Software Process Improvement: What is SPI? -The SPI Process -SPI Trends.**

TEXT BOOK

S.NO.	AUTHOR	TITLE OF THE BOOK	YEAR OF PUBLICATION	PUBLISHERS\ EDITION
1.	Roger Pressman and Bruce Maxim	Software Engineering – A Practitioner's Approach	2020	MC-Graw Hill Publication, 9th Edition

REFERENCE BOOK

S.NO	AUTHOR	TITLE OF THE BOOK	YEAR OF PUBLICATION	PUBLISHERS\ EDITION
1.	Ian Somerville	Software Engineering	2017	Pearson Education,10th Edition
2.	Richard Fairley	Software Engineering concepts	2017	MC –Graw Hill, 3rd Edition

Web Resource :

1. https://link.springer.com/book/10.1007/978-3-030-89247-0, Fundamentals of Software Engineering, 9th International Conference, FSEN 2021,Virtual Event, May 19–21, 2021, Revised Selected Papers

PEDAGOGY

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

COURSE DESIGNERS

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

Course Number	Course Name	Category	L	T	P	Credit
AI23CP7	ARTIFICIAL INTELLIGENCE LAB - I	Practical	-	-	60	3

PREAMBLE

This course provides exercises to implement artificial intelligence techniques using Python. The lab covers the following exercises.

PREREQUISITE

- AI Concept
- Neural Network Techniques

COURSE LEARNING OUTCOMES

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Remember the programming concepts of AI	K1
CLO2	Understand logical concepts of AI to solve puzzles and searching problems	K2
CLO3	Apply AI mechanism to create various gaming applications, Chatbots and Recommender System applications	K3
CLO4	Analyze real-time problems and identify suitable AI solution	K4

MAPPING WITH PROGRAMME LEARNING OUTCOMES

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

S- Strong; M-Medium; L-Low

ARTIFICIAL INTELLIGENCE LAB – I (AI22CP7)

LIST OF EXERCISES

1. Creation of AI-powered Chatbots application
2. Construction of AI Recommender System using Python
3. Exercise on Spam Identification using AI
4. Creation of Handwriting Recognizer using Computer Vision in AI
5. Implementation of Image Recognition System using CNN
6. Exercises to implement Speech Emotion Recognition system using AI
7. Exercises to build genetic models using bioinformatics data
8. Exercises to implement sentimental analysis on text data

PEDAGOGY

Demonstration, Lecture, Group Discussion

COURSE DESIGNERS

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

Course Number	Course Name	Category	L	T	P	Credits
AI23CP8	MACHINE LEARNING LAB	Practical	-	-	45	2

Preamble

This course introduces sci-kit learn, the machine learning library in Python. It also provides exercises to implement machine learning and deep learning algorithms using Keras and Tensorflow

Pre-requisites

- Python Programming
- ML Techniques

Course Learning Outcomes

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

CLO Number	CO Statement	Knowledge level
CLO1	Remember in-built libraries and packages in python, basic concepts and techniques of machine Learning and deep learning algorithms	K1
CLO2	Understand the process of Machine Learning and deep learning algorithms	K2
CLO3	Implement machine learning and deep learning algorithms for Artificial Intelligence problems	K3
CLO4	Analyze the suitable machine learning algorithms for different applications.	K4

Mapping with Programme Learning Outcomes

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

S- Strong; M-Medium; L-Low

LIST OF EXERCISES:

1. Exercises to extract features from datasets using Sci-kit
2. Exercises to implement feature selection methods using Sci-kit
3. Exercises to implement various Regression Techniques using Sci-kit
4. Exercises to implement Classification Techniques using Sci-kit
5. Exercises to implement Clustering Algorithms using Sci-kit
6. Exercises to implement multilayer Perceptrons and Artificial Neural Networks using Keras and Tensor flow
7. Exercises to implement ANN Algorithms using Keras and Tensor flow

PEDAGOGY

Demonstrations

COURSE DESIGNERS

1. Ms.S.Shanthi
2. Ms.T.Prabakumari

Course Number	Course Name	Category	L	T	P	Credit
AI23E01	ELECTIVE PAPER 1: INTERNET OF THINGS	Theory	73	2	-	3

Preamble

This course introduces the fundamentals of IoT, gives insight into the application areas of IoT and deals with the IoT protocols. It includes the IoT strategy and protocol. This Course also covers Web of Things and Cloud of Things.

Prerequisites

- Computer Networks
- Computer Hardware

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Identify building blocks of Internet of Things and its characteristics	K1
CLO2	Understand the Smart Objects and IoT Architectures	K2
CLO3	Apply the Concept of Internet of Things in the real-world scenario	K3
CLO4	Analyze the benefits IoT based systems	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

SYLLABUS

UNIT I **(15 Hrs.)**

Introduction to IoT: Defining Internet of Things (IoT), Pillars of IoT: M2M, RFID, WSN and SCADA. IoT Strategy: Device, Connect and Manage (DCM) Strategy, **Communication Middleware's for IoT.**

UNIT II **(15 Hrs.)**

Protocol Standardization: IoT Protocol Standardization, Unified Data Standards. **IoT Levels & Deployment Templates.** Prototyping Embedded Design: Arduino, RaspberryPi.

UNIT III **(14 Hrs.)**

Web of Things (WoT): Introducing Web of Things (WoT), Platform Middlewares, Unified Multitier WoT Architecture, **WoT Portals and Business Intelligence.**

UNIT IV **(14 Hrs.)**

Cloud of Things (CoT): Cloud Computing Basic, IoT and Cloud Computing, Mobile Cloud Computing, **Cloud of Things Architecture**

UNIT V **(15 Hrs.)**

Case Study and Real World IoT Applications: Home Automation, Cities, Environment, Energy, Retail, **Logistics, Agriculture,** Industry, Health and Life Style, Intelligent Transport Systems, **Smart Grid, Smart Buildings**

TEXT BOOK

S.NO	AUTHOR	TITLE OF THE BOOK	YEAR OF PUBLICATION	PUBLISHERS\ EDITION
1.	Honbo Zhou	The Internet of Things in the Cloud: A Middleware Perspective	2012	CRC Press, First Edition.
2.	Arshdeep Bahga, Vijay Madisetti	Internet of Things: A Hands-on Approach	2015	Universities Press, First Edition.

REFERENCE BOOK

S.NO.	AUTHOR	TITLE OF THE BOOK	YEAR OF PUBLICATION	PUBLISHERS\ EDITION
1.	Adrian McEwen, Hakim Cassimally	Designing the Internet of Things	2014	Wiley Publications, First Edition.

PEDAGOGY

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

COURSE DESIGNERS

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

Course Number	Course Name	Category	L	T	P	Credit
AI22E02	ELECTIVE PAPER 2: NATURAL LANGUAGE PROCESSING	Theory	73	2	-	3

Preamble

This course introduces the methods in Natural Language Processing (NLP). This course includes the various algorithms used in NLP. This course also covers various NLP tools and techniques

Prerequisite

- Data mining
- Machine Learning

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge level
CLO1	Recall the principles and concepts of Natural Language Processing	K1
CLO2	Understand the techniques of text processing	K2
CLO3	Apply NLP methods and tools for real time applications	K3
CLO4	Analyze the issues in text data processing and identifying suitable methods	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 **(15 Hrs.)**

Introduction: Brief History of NLP - Significance of NLP – Early NLP Systems – Role of Knowledge in NLP – Phases of NLP – Evaluation of NLP Processing Systems. Speech Processing – Programming Languages used for NLP. **Basic English Concepts: Fundamental Terminologies of English Grammar. Advanced Grammars: Feature Grammars.**

UNIT II **(15 Hrs.)**

Classical Approaches to NLP: Context – Classical Tool Kit – Text Processing: Introduction – Challenges of Text Processing – Language Dependence – Tokenization – Sentence Segmentation. Lexical Analysis: Introduction – Finite State Morphology – **Isomorphism Problems – Contiguity Problems – Paradigm Based Lexical Analysis.**

UNIT III **(15 Hrs.)**

Syntactic Parsing: Introduction – Context-Free Grammars – Syntax Trees – **Other Grammar Formalisms – Basic Concepts in Parsing** – The Cocke-Kasami-Younger Algorithm – Handling Unary Rules – Parsing as Deduction - Bottom-Up - Left Corner Parsing – Top-Down Earley Style Parsing – LR Parsing – **Constraint Based Grammars - Issues in Parsing.**

UNIT IV **(14 Hrs.)**

Semantic Analysis: Basic Concepts and Issues in Natural Language Semantics – Theories and Approaches to Semantic Representation – Relational Issues in Lexical Semantics. Fine-Grained Lexical Semantic Analysis – Three Case Studies. Natural Language Generation: Generation Compared to Comprehension – **Examples of Generated Texts from Complex to Simple and Back Again – The Linguistic Component – The Cutting Edge.**

UNIT V **(14 Hrs.)**

Corpus Creation: Corpus Size – Balance, Representativeness and Sampling – Data Capture and Copyright – Corpus Markups and Annotations – Multilingual Corpora – Multimodal Corpora – **BioNLP: Basic Domains – Biomedical Text Mining – Case Studies – Tools.**

TEXT BOOK

S.NO.	AUTHOR	TITLE OF THE BOOK	YEAR OF PUBLICATION	PUBLISHERS\ EDITION
1.	Ela Kumar	Natural Language Processing	2011	IK International Publishing House Pvt. Ltd, 1st Edition
2.	Nitin Indurkhya, Fred J.Damerau	Handbook of Natural Language Processing	2010	Chapman & Hall,CRC Press 3rd Edition

REFERENCE BOOK

S.NO.	AUTHOR	TITLE OF THE BOOK	YEAR OF PUBLICATION	PUBLISHERS\ EDITION
1.	Lan H Written and Elbef,MarkA.Hall,	Data mining: practical machine learning tools and techniques	2013	MorganKaufman, 2nd Edition
2.	Steven Bird, Ewan Klein, and Edward Loper	Natural Language Processing with Python	2009	O'Reilly, First Edition
3.	NitinIndurkhya, Fred J. Damerau	Handbook of Natural Language Processing	2010	CRC Press, 2nd Edition
4.	Dwight Gunning, Sohom Ghosh	Natural Language Processing Fundamentals	2019	Packt Publishers, Edition :19.

5.	Hobson Lane, Hannes Hapke, and Cole Howard	Natural Language Processing in Action: Understanding, analyzing, and generating text with Python	2019	Manning Publications, First edition

Pedagogy

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

Course Designers

1. Dr. R. Suriyagrace
2. Ms.T.Prabakumari

Course Number	Course Name	Category	L	T	P	Credits
AI23SBP1	SBS : DATA VISUALIZATION TOOLS	III	45	-	-	3

Preamble

This course deals with the exercises for visualizing the data using tools Tableau / Power BI

Prerequisite

- MS Excel
- Data base management systems

Course Learning Outcomes

CLO Number	CLO Statement	Knowledge Level
CLO1	Recall the concepts of data visualization and features of Tableau / Power BI	K1
CLO2	Understand the concepts of exploratory data analysis and visualization in Tableau / Power BI	K2
CLO3	Apply the concepts of exploratory data analysis and data visualization for simple applications	K3
CLO4	Analyze visual presentations of data for effective communication.	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

1. Exercise to create charts and graphs using Tableau/Power BI.
2. Exercise to implement data filtering and Sorting Data using Tableau/Power BI.
3. Exercise to organize data using groups, relationships and perform slicing using Tableau/Power BI.
4. Exercise to map data to detect geographic variations using Tableau/Power BI.
5. Exercise to customize data using calculations in Tableau/ Power BI (DAX).
6. Exercise to build dashboards to reveal data insights using Tableau/Power BI.
7. Exercise to design user-friendly reports in Power BI.

Pedagogy:

Demonstrations

Course Designers

- Dr. R. Suriyagrace
- Dr. S. Meera

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
NM21CS1	CYBER SECURITY 1	THEORY	30	-	-	Grade

Preamble

This course introduces fundamental concepts of Cyber Security in the digital era. It provides knowledge of cybercrimes, cyber laws and also the security of digital devices. It helps to do secure digital transactions and safe usage of social media.

SYLLABUS

UNIT I **(6 Hrs)**

Principles of Cyber security: Introduction to Cyber security - Defining cyberspace - Architecture of cyberspace - Communication and web technology - Internet infrastructure for data transfer and governance - Regulation of cyberspace - Concept of Cyber security - Issue and challenges of cyber security.

UNIT II **(6 Hrs)**

Cyber Crime: Introduction to Cybercrime - Classification of Cyber-crimes – Cyber-crime against women and children – Financial frauds - Social engineering attacks – Malware - Zero day and zero click attacks.

UNIT III **(6 Hrs)**

Cyber Law: Cyber Criminals modus-operandi – Reporting of cybercrimes – remedial and mitigation measures – Legal perspective of cybercrime– IT Act 2000 and its amendments – Organization dealingwith cybercrimes and cyber security in India.

UNIT IV **(6 Hrs)**

Social Media Security: Introduction to social network – Types of social media – Social media platform – Hashtag – Viral content – Security issues related to social media. – **Cyber Security tools:** N map – Introduction to Nmap – Nmap scan types- Nmap command list. **DigitalTransaction:** Introduction to digital payments – Components of digital payments – Modes ofdigital payments – Banking cards – UPI (Unified Payment Interface) – e-Wallets.

UNIT V **(6 Hrs)**

Digital Devices Security: End point device and Mobile phone security – Password policy – Security patch management – Data backup – Device security policy – Cyber security best practices. Installation and configuration of Computer Anti-Virus. **Case studies:** Illustrations of Financial frauds – Digital Signature. Prepare a checklist for secure net banking.

*e-Content will be provided.

*This course is for all final year students of all streams from 2023-24 onwards.

REFERENCE BOOKS

1. Raef Meeuwisse, Cybersecurity for Beginners, Lulu Publishing Services,2nd Edition,2017
2. Scott Augenbaum, The Secret to Cybersecurity-A Simple Plan to Protect Your Family and Business from Cybercrime , Forefront Books Publisher,2019
3. Sunit Belapure and Nina GodBole, Cyber security understanding cybercrimes computer forensics and Legal perspectives, Wiley India Pvt Ltd, 2011
4. Christopher Hadnagy, Social Engineering: The Science of Human Hacking, Wiley Publisher, 2nd Edition,2018
5. Pavan Duggal, Artificial Intelligence, Cybercrimes & Cyberlaw,2018
6. Joe Gray, Practical Social Engineering: A Primer for the Ethical Hacker, 2022
7. Security in the digital age: social media security threats and vulnerabilities by Henry A. Oliver, Create Space Independent publishing platform.

EVALUATION PATTERN

QUIZ	60 MARKS
CASE STUDY	20 MARKS
POSTER	20 MARKS

Course Number	Course Name	Category	L	T	P	Credit
AI21AC1	ADVANCED LEARNERS COURSE 1: PAPER 1: BUSINESS DOMAINS FOR ARTIFICIAL INTELLIGENCE	Theory	-	-	-	5**

Preamble:

This course provides basic domain knowledge in the functional areas of Data Analytics and Artificial Intelligence. Various important functional areas such as Health care analytics, Banking and Finance, Telecommunication, and Retail Analytics are elaborated in this course.

Prerequisite

- Foundations of Data Science

Course Learning Outcomes

On successful completion of this course, students should be able to:

CLO Number	CLO Statement	Knowledge Level
CLO1	Remember various domain areas and their issues	K1
CLO2	Understand the concepts of analytics to make better decisions	K2
CLO3	Apply the use cases for different business domains	K3
CLO4	Analyze the issues in various domains and choose appropriate analytics solutions	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

SYLLABUS

UNIT I

Retail analytics: Understanding the new consumer – Marketing in a consumer-driven era - Managing the brand to drive loyalty

UNIT II

Healthcare analytics: Introduction - Potential contributions - Challenges of healthcare industry - current and future state of healthcare analytics – top healthcare analytics adaptations

UNIT III

Banking and Finance: Systems of Banking – Commercial Banking – New Financial Services: Insurance Services – Types of Insurance – Housing Finance.

UNIT IV

Telecommunication: Introduction - End-User Needs and Demands- Telecom Business

UNIT V

Supply Chain Management: Definition of Supply Chain - Historical Perspective - objectives and importance - Decision phases and process views of a supply chain (SC) - Examples of supply chain - Financial measures and drivers of SC performance – Framework for Structuring Drivers – Facilities – Inventory – Transportation – Information – Sourcing – Pricing.

REFERENCE BOOK

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1.	Jennifer Leclaire, Danielle Dahlstrom, Vivian Braun	Business analytics in Retail for dummies	2nd IBM Limited edition	2014
2.	Dwight McNeill	A Framework for Applying Analytics in Healthcare: What can be Learned from Best Practices in Banking, Retail, Politics and Sports	Pearson Education	2013
3.	Gomez Clifford	Banking and Finance Theory Law and practice	PHI Learning	2011
4.	Anders Olsson	Understanding Changing Telecommunications	Wiley Publications	2004
5.	Sunil Chopra, Peter Meindl and DV Karla	Supply Chain Management: Strategy, planning and operation	5th Edition, Pearson Education	2013

Course Designers:

1. Ms.M.Loganayaki
2. Ms.T.Prabakumari

Course Number	Course Name	Category	L	T	P	Credit
AI21AC2	ADVANCED LEARNERS COURSE 1: PAPER 2: BUSINESS INTELLIGENCE	Theory	-	-	-	5**

Preamble

This course introduces the technical components in Business Intelligence. It also includes web analytic business concepts, data warehouses, operational business intelligence, and applications of data mining in business.

Pre-requisite

- Database Management Systems
- Data Mining

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Remember the function, process, services and tools of BI	K1
CLO2	Understand the knowledge management principles and its architecture, approaches, tools and models	K2
CLO3	Apply business intelligence knowledge to manage BI projects in different domains	K3
CLO4	Analyze the marketing activities with marketing concepts and explore the Knowledge in business intelligence	K4

Mapping with Programme Learning Outcomes

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

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

SYLLABUS

UNIT I

Components of the decision-making process: Business intelligence - Effective and timely decisions, Data, information and knowledge, Role of mathematical models, Business intelligence architectures, Ethics and business intelligence. Decision support systems - Definition of system, Representation of the decision-making process, Evolution of information systems, Definition of decision support system, Development of a decision support system.

UNIT II

Business Intelligence and Information Exploitation – Need for Business Intelligence, Information Asset, Exploiting Information, Business Intelligence and Program Success, Actionable Knowledge. Value of Business Intelligence - Information Asset and Data Valuation, Actionable Knowledge-Return on Investment, Business Intelligence Applications, Intelligence Dashboard, business Intelligence adds Value. Planning for Success - Initiating a Program, Business/Information Technology Partnership, Business Intelligence Success Factors, Team Building, Strategic versus Tactical Planning.

UNIT III

Business Intelligence Environment - Business Case, Business Intelligence Process, System Infrastructure, Information Access, Delivery, and Analysis, Services, Management Issues. Business Models and Information Flow - Business Case, Information Processing and Information Flow, Information Flow Model, Usage in Practice, Modeling Frameworks, Management Issues.

UNIT IV

Data Warehouses, Online Analytical Processing, and Metadata - Business Case, Data Models, Data Warehouse, Data Mart, Online Analytical Processing, Metadata, Management Issues. Business Rules - Business Case, Business Rules Approach, Business Rule, Business Rule System, Sources of Business Rules, Management Issues.

UNIT V

Business intelligence applications: Marketing models - Relational marketing, Salesforce management, Business case studies. Logistic and production models: Supply chain optimization, Optimization models for logistics planning, Revenue management systems, Business case studies.

TEXTBOOKS

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS\ EDITION	YEAR OF PUBLICATION
1.	Carlo Vercellis	Business Intelligence: Data Mining and Optimization for Decision Making	Wiley Publications	2009
2.	David Loshin Morgan, Kaufman	Business Intelligence: The Savvy Manager‟s Guide	Second Edition	2012

REFERENCE BOOK

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1.	Efraim Turban, Ramesh Sharda, Dursun Delen	Decision Support and Business Intelligence Systems	9th Edition, Pearson	2013
2.	M. Raisinghani	Business Intelligence in the Digital Economy - Opportunities, Limitations and Risks	Idea Group publications	2004

COURSE DESIGNERS

- Dr.R.Suriyagrace
- Ms.S.Shanthi

SEMESTER VI

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDIT
AI23C13	DEEP LEARNING	THEORY	73	2	-	3

Preamble

- This course introduces the concepts of Deep Learning and the various methods of solving problems using deep learning. It also provides insights on deep learning techniques and its applications.

Prerequisite

- Machine Learning Concepts

Course learning outcomes

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

CLO Number	CLO Statement	Knowledge level
CLO1	Recall the principles of Deep Learning	K1
CLO2	Understand problem solving techniques for complex problems	K2
CLO3	Apply neural network, recurrent neural network and deep network techniques in real time applications	K3
CLO4	Analyze various real-world problems to find suitable solutions using deep learning.	K4

MAPPING WITH PROGRAMME LEARNING OUTCOMES

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

S- Strong; M-Medium; L-Low

DEEP LEARNING - AI23C13 – 73 HRS

Unit I **(15 Hours)**

A Review of Machine Learning: The Learning Machines - Framing the Questions - The Math Behind Machine Learning - The Math Behind Machine Learning: Statistics - How Does Machine Learning Work? - Logistic Regression - Evaluating Models - Building an Understanding of Machine Learning.

Unit II **(15 Hours)**

Foundations of Neural Networks and Deep Learning - Neural Networks - Training Neural Networks - Activation Functions - Loss Functions - Hyperparameters. Fundamentals of Deep Networks - Common Architectural Principles of Deep Networks - Building Blocks of Deep Networks.

Unit III **(15 Hours)**

Major Architectures of Deep Networks: Unsupervised Pretrained Networks. Convolutional Neural Networks: Biological Inspiration - Intuition - CNN Architecture Overview - Input layers - Convolutional layers - Pooling layers - Fully connected layers - Other Applications of CNN.

Unit IV **(15 Hours)**

Deep Learning for Computer Vision: Introduction to convnets - Training a convnet from scratch to a small dataset. Deep Learning for Text and Sequences: Working with Text data - Understanding Recurrent Neural Networks - Sequence processing with convnets.

Unit V **(13 Hours)**

Generative Deep Learning: Text generation with LTSM - DeepDream - Neural Style transfer. Applications of Deep Learning - Large Scale Deep Learning - Computer Vision - Speech Recognition - Natural Language Processing - Other Applications.

Deep Learning in Indian Music Analysis – Deep Learning for Ayurvedic Medicine Classification and Recommendation.

Text Book

S.No	Authors	Title	Publishers	Year and Edition
1.	Josh Patterson & Adam Gibson	Deep Learning: A Practitioner's Approach (Unit I, II, III)	O'reilly Publications	Reprint 2018
2.	Charu C. Aggarwal	Neural Networks and Deep Learning - A Textbook (Unit IV, V)	Springer	Reprint 2018
3.	Ian Goodfellow, Yoshua Bengio, Aaron Courville	Deep Learning (Unit V)	The MIT Press	Reprint 2016

Books for Reference

S.No	Authors	Title	Publishers	Year and Edition
1.	Charu C. Aggarwal	Neural Networks and Deep Learning: A Textbook	Springer	2018 and 1st edition.
2.	Tomasz Jachimek and Arvind Bhardwaj	Deep Learning with Deep learning: A Practical Approach to Building AI Applications	Packt Publishing	2019 and 1st edition.
3.	Daniel Jurafsky and James H. Martin	Speech and Language Processing.	Pearson Publication	2022 and 3rd edition.

Pedagogy

Demonstration, Lecture, Group Discussion

COURSE DESIGNERS

1. Dr. R. Suriyagrace
2. Mrs. T. Prabha Kumari

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDIT
AI23E03	CLOUD COMPUTING	Theory	73	2	-	4

Preamble

- This course introduces students to the fundamental concepts, service models, deployment models, and applications of cloud computing, equipping them with the knowledge and skills to design, implement, and manage cloud-based solutions in real-world scenarios.

Pre-Requisite

- Computer fundamentals
- Linux basics.
- Basic programming languages

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Remember fundamental concepts, service models, and deployment models of cloud computing.	K1
CLO2	Understand the architecture, characteristics, and benefits of cloud-based systems.	K2
CLO3	Apply cloud service models and tools to solve real-world computing problems.	K3
CLO4	Analyze cloud infrastructure, security challenges, and performance issues to recommend suitable solutions.	K3

Mapping With Programme Learning Outcomes

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

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

CLOUD COMPUTING - AI23E03

UNIT - I **(15 Hours)**

Cloud Computing fundamentals: Essential characteristics, Architectural Influences, Technological Influences, and Operational Influences.

UNIT - II **(15 Hours)**

Cloud Computing Architecture: Cloud Delivery models, The SPI Framework, Cloud Software as a Service (SaaS), Cloud Platform as a Service(PaaS), Cloud Infrastructure as a Service(IaaS), Cloud deployment models, Public Clouds, Community Clouds, Hybrid Clouds, Alternative Deployment models, Expected benefits.

UNIT – III **(15 Hours)**

Cloud Computing Software Security fundamentals: Cloud Information Security Objectives, Confidentiality, Integrity, Availability, Cloud Security Services, Relevant Cloud Security Design Principles, Secure Cloud Software Requirements, Secure Development practices, Approaches to Cloud Software Requirement Engineering, Cloud Security Policy Implementation.

UNIT - IV **(15 Hours)**

Cloud Computing Risk Issues: The CIA Traid, Privacy and Compliance Risks, Threats to Infrastructure, Data and Access Control, Cloud Access Control Issues, Cloud Service Provider Risks. Cloud Computing Security challenges: Security Policy Implementation, Policy Types, and Computer Security Incident Response Team (CSIRT).

UNIT - V **(13 Hours)**

Cloud Computing Security Architecture: Architectural Considerations, General Issues, Trusted Cloud Computing, Secure Execution environments and Communications, Micro architectures, Identity Management and Access Control, Autonomic Security.

Text Book

S.No	Authors	Title	Publishers	Year and Edition
1	Ronald L. Krutz, Russell Dean Vines	Cloud Security - A comprehensive Guide to secure Cloud Computing	Wiley	Reprint 2010

Books for Reference

S.No	Authors	Title	Publishers	Year and Edition
1	John Witinghouse, James F.Ransome	Cloud Computing Implementation, Management and Security	CRC Press	Reprint 2009
2	Borko Furht. Armando Escalante	Handbook of Cloud Computing	Springer	Reprint 2010
3	Charles Badcock	Cloud Revolution	TMH	Reprint 2009

Pedagogy

- Demonstration, Lecture, Group Discussion

Course Designers

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

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDIT
AI23E04	ETHICS FOR ARTIFICIAL INTELLIGENCE	Theory	73	2	-	4

Preamble

- Ethics of AI explores the moral, social, and legal implications of artificial intelligence. This course emphasizes fairness, accountability, transparency, and responsibility in the design and use of AI technologies.

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Remember key ethical concepts, principles, and frameworks in Artificial Intelligence.	K1
CLO2	Understand the implications of fairness, accountability, transparency, and privacy in AI.	K2
CLO3	Apply ethical reasoning frameworks to real-world AI case studies.	K3
CLO4	Analyze ethical risks and challenges in AI applications to suggest improvements.	K3

Mapping With Programme Learning Outcomes

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

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

ETHICS FOR ARTIFICIAL INTELLIGENCE - AI23E04

UNIT I **(15 Hours)**

Introduction to AI Ethics: Introduction – Introduction to Artificial Intelligence – Overview for Law and Regulations – Impacts of AI – Ethics of AI – Approaches in AI Ethics.

UNIT II **(15 Hours)**

Rise of AI Ethics: AI Ethics – Common Themes and Varieties of Questions – Ethical Questions in AI – AI Ethics Now – AI Ethics Law – Case study: An Indigenous AI Report.

UNIT III **(15 Hours)**

Concepts and Issues: Moral frameworks of Justice in AI – Accountability in Computer Systems – Transparency – Responsibility – Concept of Handoff as a Model – Race and Gender – Autonomy – Troubleshooting AI.

UNIT IV **(15 Hours)**

Perspectives and Approaches: Perspectives on Ethics of AI – Computer Science - Engineering – Cognitive Science – Economics – Humanities – Philosophy – Anthropology – Trustworthy AI – Case study of AI for Social Good.

UNIT V **(13 Hours)**

Case Studies and Applications: Ethics of AI – Transport – Military – Biomedical research – Patient care and Public health – Law – Robot teaching – Algorithms and the Social Organization of work – Smart city Ethics.

Text Book

S.No	Authors	Title	Publishers	Year and Edition
1	Markus D. Dubber, Frank Pasquale, Sunit Das	The Oxford Handbook of Ethics Of AI	Oxford University Press	2021
2	Paula Boddington	AI Ethics: A Textbook, Artificial Intelligence: Foundations, Theory, and Algorithms	Springer	2023

Books for References

S.No	Authors	Title	Publishers	Year and Edition
1	Mark Coeckelbergh	AI Ethics	The MIT Press	2020

Pedagogy

- Demonstration, Lecture, Group Discussion

Course Designers

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

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDIT
AI23CP09	DEEP LEARNING LAB	Practical	-	-	75	3

Preamble

- This course provides exercises to implement deep learning techniques using Python. The lab covers the following exercises.

Prerequisite

- Machine Learning
- Concept Neural
- Network Techniques

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Remember the programming concepts of deep learning	K1
CLO2	Understand and examine the fundamental issues with AI and ML applications.	K2
CLO3	Apply machine learning, deep learning, and artificial intelligence approaches to address issues in social computing, healthcare, vision, language processing, speech recognition, and other domains.	K3
CLO4	Analyze real-time problems and identify suitable solution	K4

Mapping With Programme Learning Outcomes

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

S- Strong; M-Medium; L-Low

DEEP LEARNING LAB (AI23CP09)

LIST OF EXERCISES

1. Identify the problem with single unit Perceptron. Classify using Or-, And and Xor-ed data and analyze the result.
2. Design a single unit perceptron for classification of a linearly separable binary dataset without using predefined models. Use the Perceptron () from sklearn.
3. Implement the Backpropagation algorithm by using Artificial Neural Network
4. Implement an Image classification model to classify a dataset of images using Deep Feed Forward.
5. Implement CNNs model.
6. Implement RNNs model for generating a sequence of numbers and predict the next number.
7. Implement Transfer Learning model to train and evaluate the modified model.
8. Using Generative Models implement a simple auto encoder to reconstruct images.
9. Implement the concept of Data Augmentation to increase the data size from a single image.
10. Implement the standard LeNet-5 CNN architecture model to classify multi category images.
11. Implement Hyper parameter Tuning for experiments with different rates.
12. Implement Model Deployment to save a trained model as a file.
13. Implement Generative Adversarial Networks to generate realistic Images.

Pedagogy

- Demonstration, Lecture, Group Discussion

COURSE DESIGNERS

1. Mrs. T. Prabhakumari
2. Dr. S. Meera

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDIT
AI23CP10	Full Stack Development Lab	Practical	-	-	75	3

Preamble

- This lab course is intended to explore concepts into full stack development through HTML, javascript and NetBeans. It makes the students to learn various designing approaches and techniques to provide a robust UI/UX experience using various software tools to implement web pages, style sheets, forms, events, server-side applications.

Prerequisite

- HTML & Programming Concepts

Course Learning Outcome

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Create Web Applications Using HTML, Javascript and Java Servlets	**K1**
CLO2	Apply web design methods to solve problems	**K2**
CLO3	Analyze the web page design requirements and design web pages.	**K3**
CLO4	Design and build web application using HTML,Javascript and NetBeans	**K4**

Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6
CLO1	S	M	S	S	L	L
CLO2	M	S	M	M	L	L
CLO3	S	S	S	S	L	L
CLO4	M	M	S	S	L	L
CLO5	S	S	M	S	L	L

S- Strong; M-Medium; L-Low

Full Stack Development Lab (AI23CP10)

1. Exercise to create a HTML Form for user registration and handle the data using a Java Servlet. Store the submitted data temporarily in a JavaBean.
2. Exercise to create a dynamic web page to display a welcome message dynamically based on user input. Use JSP scripting elements and expressions.
3. Exercise to implement form validation on client-side and server-side for a login page using JavaScript and Java Servlet.
4. Exercise to develop student management system to perform CRUD operations (Create, Read, Update, Delete) on a student database using JDBC.
5. Exercise to create a login system with a database (MySQL) to verify user credentials using Java Servlets and JDBC.
6. Exercise to design a feedback form and store the responses in a database. Retrieve and display the feedback on an admin page using JSP.
7. Exercise to develop a small web application using the Model-View-Controller (MVC) architecture in NetBeans.
8. Exercise to create a web application that allows users to upload files to the server. Display the uploaded files on a webpage.
9. Exercise to implement chatbot integration by using a pre-trained AI chatbot API (e.g., Dialogflow or Rasa) and integrate it with a Java web application using NetBeans.
10. Exercise to build a movie or product recommendation system using collaborative filtering (processing in Python) and integrate it with Java web pages.
11. Exercise to deploy one of the applications (e.g., Student Management System) on Apache Tomcat using NetBeans.

Pedagogy

- Demonstrations

Course Designers

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

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDIT
AI22SBP4	DATA ANALYTICS TOOLS	Practical	-	4	41	3

Preamble

- This course introduces the methods for data preparation and data understanding**.** It covers essential exploratory techniques for understanding multivariate data by summarizing it through statistical methods and graphical methods.

Prerequisite

- Statistics
- 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 basic concepts in python with EDA and Google analytics	K1
CLO2	Understand the fundamentals of Google analytics event tracking and methods of data preprocessing	K2
CLO3	Apply basic statistics in the dataset and visualize the data using basic graphs and plots	K3
CLO4	Analyze the techniques of data exploration for sample data sets by choosing appropriate methods	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

SBS IV: DATA ANALYTICS TOOLS (AI22SBP4)

List of Exercises

Google Analytics

- Exercises to find total number of users, new users, page views, pages per session, average session duration, bounce rate for the given website
- Exercises to find the percent of users that are new visitors versus returning visitors, the number of users and their percentages for the top 3 languages in the specific website
- Generation of data acquisition report for the different channels of the website
- Exercises to analyze the sources / mediums of producing the lowest bounce rate for the website.
- Exercises to find the highest page views in the website.
- Exercises to find the traffic percentage of search items in the website.

Text Analytics using KNIME

- Exercises to implement pre-processing of text data
- Exercises to implement transformation of text data
- Exercises to implement classification of text data
- Exercises to implement visualization of text data
- Exercises to implement clustering of text data

Pedagogy

- Demonstration

Course Designers

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

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDIT
AI21AC3	AI FOR ANALYTICS	Theory	-	-	-	5**

Preamble

- To expose the student to gain knowledge in the fundamental concepts of Artificial Intelligence and its applications.

Prerequisite

- Machine Learning
- Foundation of data science

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Remember various domain areas and identify the scope of predictive analytics	K1
CLO2	Understand the concepts and techniques of AI and predictive analytics in various domain areas	K2
CLO3	Apply the techniques of AI and perform predictive analytics for simple applications	K3
CLO4	Analyze the challenges in various applications domains	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

AI FOR ANALYTICS (AI21AC3)

UNIT I

Analytics and AI Strategy for Business Transfer: Re-engineering Business to think AI and Analytics – Robust Data Monetization Strategy – Accelerated Decision-making with Real-Time Analytics – Analytics as a Service Model – Analytics-Led Enterprise Transformation.

UNIT II

Banking Industry Transformed by Analytics and AI: Redefining Banking Industry – AI powered financial services – Fraud Mitigation through AI – Reorienting Customer Retention and Risk Management – Advantage of AI in Fintech Companies – AI-Driven Transformations in Insurance – Adopting Digital Based Insurance Model.

UNIT III

Redefining Healthcare and Life Sciences: AI adoption in Healthcare – Real-world Evidence Based Analytics improving Treatment outcomes – Leveraging Patient and Drug similarity Analytics – AI: A Boon to the Life Science Industry – Analytics and Genomics.

UNIT IV

Analytics and AI in Retail: AI-powered shopping experience – Emergence of Smart Consumers – Recommendation Engines for Personalizing Experiences – Evolution of Smart Retailers – Omni channel Experiences – Fluid Supply Chain Transformation.

UNIT V

Exponential Technologies underpinned by Analytics and AI: Beating Cyber-attacks with Analytics – Connected Car Technology reshaping Automotive Industry – IoT Analytics – Crypto currency Analytics – Chatbots – Redefining the Talent Landscape.

Text Book

S.No	Authors	Title	Publishers	Year and Edition
1.	Sameer Dhanrajani	AI and Analytics Acclerating Business Decisions	Wiley Publications	Reprint 2018

Books for Reference

S. No	Authors	Title	Publishers	Year and Edition
1.	Stuart Russel and Peter Norvig	Artificial Intelligence – A Modern Approach	Pearson Education Press	Reprint 2011
2.	Deep Learning Nils J. Nilsson,	Artificial Intelligence: A new Synthesis	Morgan Kaffman,	Reprint 2002

Pedagogy

- Lectures, Case Studies, Group Discussions.

Course Designers

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

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDIT
AI23AC4	Fundamentals of prompt Engineering	Theory	-	-	-	5**

Preamble

- Prompt engineering is the practice of designing clear and effective instructions to guide AI models. This course introduces students to techniques for crafting prompts that improve accuracy, creativity, and problem-solving across different domains.

Prerequisite

- Basic AI awareness
- Logical and structured thinking.

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Gain an understanding of Large Language Models and foundational knowledge of prompts design.	K1
CLO2	Acquire skills to design effective prompts for LLMs	K2
CLO3	Understand advanced prompt engineering techniques	K3
CLO4	Acquire skills to analyse real-world applications of prompt Engineering	K3

Mapping With Programme Learning Outcomes

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

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

FUNDAMENTALS OF PROMPT ENGINEERING (AI23AC4)

UNIT I
Introduction to Large Language Models: LLMs - Nature and Capabilities - Applications - Different LLM Models and their limitations - Real-world applications of LLMs.

UNIT II
Foundations of Prompt Engineering: Prompt engineering - Role in LLM Communication - Basics of prompts - Elements of prompts: Instruction, Context, Input Data, and Output Indicator.

UNIT III
Prompt Design Techniques: Basics of prompt design - examples of prompt design - Text summarization prompt - Information extraction prompt - Question answering prompt - Text classification prompt - Conversation prompts - Code generation prompt - Reasoning prompts.

UNIT IV
Advanced Prompt Engineering Techniques: Prompt designing techniques - Zero shot prompting - Few Shot prompting - Chain of Thoughts prompting – Self consistency prompts - General Knowledge Prompts.

UNIT V
Prompt Engineering in Open AI Playground LLM Settings: Temperature - Max Length - Stop Sequences TopP - Frequency Penalty - Presence Penalty - Best of - Text classification - Code generation – Creativity Information Extraction - Mathematics - Question answering.

Text Book

S. No	Authors	Title	Publishers	Year and Edition
1	John. Ibrahim	Art of asking chatgpt for high-quality answers: A Complete guide to prompt engineering techniques	Nzunda Technologies Limited	2023

Books for References

S. No	Authors	Title	Publishers	Year and Edition
1	John Berryman, Albert Ziegler	Prompt Engineering for LLMs: The Art and Science of Building Large Language Model–Based Applications	Shroff/O'Reilly	2024
2	Ajantha Devi Vairamani, Anand Nayyar	Prompt Engineering: Empowering Communication	CRC Press	2025

Pedagogy
- Lectures, Case Studies, Group Discussions.

COURSE DESIGNERS
1. Dr. S. Meera
2. Dr. A. Sakila