



Semester: VII			
Agentic Artificial Intelligence Category: Professional Core Elective – IV (Group F) (Theory)			
Course Code	:	AI373TA	CIE
Credits: L: T: P	:	3:1:0	SEE
Total Hours	:	42L + 28 T	SEE Duration
Unit-I			08 Hrs
Introduction to Agents Defining the Agents, understanding the Components of an Agent, Examining the rise of the Agent Era, peeling back the AI interface, Navigating the Agent landscape.			
Principles of Agentic System Understanding self-governance, agency, and autonomy: Self-governance, Agency, Autonomy, Example of agency and autonomy in agents. Differences between Traditional ML Vs. Generative AI Vs. Agentic AI.			
Unit – II			08 Hrs
Principles of Agentic System Reviewing intelligent agents and their characteristics, Exploring the architecture of agentic systems: Deliberative architectures, Reactive architectures, Hybrid architectures, Understanding multi-agent systems: Definition and characteristics of MAs, Interaction mechanisms in MAs.			
Enabling Tool Use and Planning in Agents Understanding the concept of tool use in agents: Tool and function calling, Defining tools for agents, Types of tools, The significance of tools in agentic systems, Planning algorithms for agents: Less practical planning algorithms			
Unit – III			08 Hrs
Enabling Tool Use and Planning in Agents Moderately practical planning algorithm – FF, most practical planning algorithms, integrating tool use and planning: Reasoning about tools, Planning for tool use Exploring practical implementations: CrewAI example, AutoGen example, LangGraph example.			
Exploring the Coordinator, Worker, and Delegator Approach Understanding the CWD model: Key principles of the CWD model, The CWD model for the intelligent travel agent, designing agents with role assignments: Roles and responsibilities of each agent, Communication and collaboration between agents: Communication, Coordination mechanism, Negotiation and conflict resolution Knowledge sharing			
Unit – IV			8 Hrs
Exploring the Coordinator, Worker, and Delegator Approach Implementing the CWD approach in generative AI systems: System prompts and agent behavior, Instruction formatting, Interaction patterns			
Effective Agentic System Design Techniques Agent memory architecture and context management, Short-term memory (working memory), Long-term memory (knowledge base), Episodic memory (interaction history), Context management, Integration with decision-making, Sequential and parallel processing in agentic workflows: Sequential processing, Parallel processing, Workflow optimization.			
Unit – V			8 Hrs
Common Use Cases and Applications			



Creative and artistic applications: Evolution of creative and artistic agents, Real-world applications, Natural language processing and conversational agents: Evolution of language agents, Real-world applications, Robotics and autonomous systems: Evolution of robotic agents, Real-world applications, Decision support and optimization: Evolution of decision support agents, Real-world applications

Agentic Frameworks: Model Context Protocol

Introduction, AI Tooling, MCP Architecture: Core Components, Transport Layer and Communication, MCP Server Lifecycle, Current Landscape: Ecosystem Overview, Use Cases.

Course Outcomes

CO1	Demonstrate a comprehensive understanding of agentic systems, including architectures, and essential components (Autonomy, Knowledge representation, and Reasoning)
CO2	Analyze and apply principles of decision-making, planning, reflection, and introspection in intelligent agents, including the use of generative AI for enhanced agent capabilities.
CO3	Implement agentic systems using practical frameworks, planning algorithms, tool integration, and coordination models such as the coordinator-Worker-Delegator (CWD) approach
CO4	Present the use of modern tools in solving day-to-day problems by exhibiting teamwork through oral presentations and reports

Reference Books

1.	AI Agents in Action, Micheal Lanham, Manning Publications Co., ISBN: 9781633436343, 2025.
2.	Building Agentic AI Systems, Anjanava Biswas and Wrick Talukdar, Packt Publishing Ltd., ISBN: 978-1-80323-875-3, 2025.
3.	Xinyi Hou, Yanjie Zhao, Shenao Wang, Haoyu Wang, "Model Context Protocol (MCP): Landscape, Security Threats, and Future Research Directions", DoI: 10.48550/arXiv.2503.23278, 2025.
4.	AI Agents with Python: Build Autonomous Systems That Think, Learn, and Act, Hayden Van Der Post, Reactive Publishing, ISBN-13: 979-831555311, 2025.
5.	A Beginner's Guide to AI Agents: Build Your Own AI Assistant, Elvis Browne, ISBN-13: 979-8314025642, 2025.

RUBRIC FOR THE CONTINUOUS INTERNAL EVALUATION (THEORY)

#	COMPONENTS	MARKS
1.	Quizzes: Quizzes will be conducted in online/offline mode. TWO QUIZZES will be conducted & Each Quiz will be evaluated for 10 Marks. THE SUM OF TWO QUIZZES WILL BE THE FINAL QUIZ MARKS.	20
2.	TESTS: Students will be evaluated in test, descriptive questions with different complexity levels (Revised Bloom's Taxonomy Levels: Remembering, Understanding, Applying, Analyzing, Evaluating, and Creating). THREE tests will be conducted. Each test will be evaluated for 50 Marks, adding up to 150 Marks. FINAL TEST MARKS WILL BE REDUCED TO 40 MARKS.	40
3.	EXPERIENTIAL LEARNING: Students will be evaluated for their creativity and practical implementation of the problem. Case study-based teaching learning (10), Program specific requirements (10), Video based seminar/presentation/demonstration (20) ADDING UPTO 40 MARKS.	40
MAXIMUM MARKS FOR THE CIE (THEORY AND PRACTICE)		100

RUBRIC FOR SEMESTER END EXAMINATION (THEORY)

Q. NO.	CONTENTS	MARKS
	PART A	



1	Objective type questions covering entire syllabus	20
PART B (Maximum of TWO Sub-divisions only)		
2	Unit 1 : (Compulsory)	16
3 & 4	Unit 2 : Question 3 or 4	16
5 & 6	Unit 3 : Question 5 or 6	16
7 & 8	Unit 4 : Question 7 or 8	16
9 & 10	Unit 5: Question 9 or 10	16
TOTAL		100