

25MAMT301	INTRODUCTION TO INTELLIGENT SYSTEMS	Category	L	T	P	R	Credit	Year of Introduction
		VAC	4	0	0	0	4	2025

Preamble: This course introduces the fundamental concepts, models, and techniques used in intelligent systems. It provides a foundation for understanding how machines perceive, reason, learn, and act intelligently. The course bridges classical artificial intelligence with modern intelligent system applications.

Prerequisite: Nil

Course Outcomes: After the completion of the course, the student will be able to:

CO	Course Outcomes	Knowledge Level
CO 1	Explain the fundamentals, characteristics, and components of intelligent systems.	K2 Understand
CO 2	Apply suitable knowledge representation techniques and reasoning methods to solve problems.	K3 Apply
CO 3	Identify different learning paradigms used in intelligent systems.	K2 Understand
CO 4	Develop basic intelligent system architectures for real-world applications.	K3 Apply

Mapping of course outcomes with program outcomes and program specific outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	1	1	2	-	-	-	-	-	-	3	-	-
CO2	3	3	3	2	-	-	-	-	-	-	3	-	-
CO3	3	2	2	2	-	-	-	-	-	-	3	-	-
CO4	3	3	3	2	-	-	-	-	-	-	3	-	-
Avg	3.00	2.25	2.25	2.00	-	-	-	-	-	-	3.00	-	-

Mapping of course outcomes with Knowledge and Attitude Profile (WK)

	WK1	WK2	WK3	WK4	WK5	WK6	WK7	WK8	WK9
CO1	*	*	*	*	*			*	
CO2	*	*	*	*	*			*	
CO3	*	*	*	*	*			*	
CO4	*	*	*	*	*			*	

WKs Mapped with the course

WK1	WK2	WK3	WK4	WK5	WK6	WK7	WK8	WK9
*	*	*	*	*			*	

Mark Distribution:

Total Marks	CIE Marks	ESE Marks	ESE Duration
100	40	60	2.5 hrs

Continuous Internal Evaluation Pattern:

Attendance	: 5 marks
Continuous Assessment Test	: 20 marks
Continuous Assessment Assignment	: 10 marks

SYLLABUS

Module 1 (12 hrs)

Definition and characteristics of intelligent systems, Evolution of intelligent systems, Artificial Intelligence vs Intelligent Systems, Components of an intelligent system, Types of intelligent agents. Applications of intelligent systems in real-world domains.

Module 2 (15 hrs)

Knowledge representation techniques, Logic-based representation, Rule-based systems, Semantic networks, Frames. Reasoning methods: Deductive and inductive reasoning, Forward and backward chaining. Inference mechanisms.

Module 3 (15 hrs)

Concept of learning as knowledge acquisition and performance improvement in intelligent systems. Learning as an optimization and generalization process. Adaptation mechanisms in intelligent agents. Relationship between learning, environment, and agent behavior. Feedback-driven adaptation and system self-improvement.

Module 4 (14 hrs)

Architectural principles of intelligent systems: modularity, autonomy, scalability, and adaptability. Agent-based systems: autonomous agents, perception–action cycle, coordination, cooperation, and negotiation mechanisms. Expert systems: knowledge acquisition, inference engines, explanation facilities, and rule-based decision reasoning. Hybrid intelligent systems: integration of symbolic reasoning with data-driven learning; motivation for hybridization and system-level advantages.

Text Books:

1. Russell, S., & Norvig, P. (2021). *Artificial intelligence: A modern approach* (4th ed.). Pearson.

2. Negnevitsky, M. (2011). *Artificial intelligence: A guide to intelligent systems* (3rd ed.). Pearson Education.
3. Nilsson, N. J. (1998). *Principles of artificial intelligence*. Morgan Kaufmann.

Reference Books:

1. Rich, E., & Knight, K. (2009). *Artificial intelligence* (3rd ed.). Tata McGraw-Hill.
2. Luger, G. F. (2009). *Artificial intelligence: Structures and strategies for complex problem solving* (6th ed.). Pearson Education.
3. Mitchell, T. M. (1997). *Machine learning*. McGraw-Hill.

END SEMESTER EXAMINATION – MODEL QUESTION PAPER

Course Code	25MAMT301
Course Name	INTRODUCTION TO INTELLIGENT SYSTEMS
Max. Marks: 60	Duration: 2.5 Hours

Part A (Answer all questions. Each question carries 3 marks)				
Qn No.	Question	Marks	CO	BL
1.	Define intelligent systems and explain their characteristics.	3	CO1	L2
2.	Differentiate Artificial Intelligence and Intelligent Systems with examples.	3	CO1	L2
3.	Explain logic-based knowledge representation with an example.	3	CO2	L2
4.	Describe forward chaining and backward chaining with an example.	3	CO2	L2
5.	Explain the concept of learning as knowledge acquisition in intelligent systems.	3	CO3	L2
6.	Describe feedback-driven adaptation in intelligent agents with an example.	3	CO3	L2
7.	Explain the architectural principles of intelligent systems.	3	CO4	L2
8.	Describe the components and working of an expert system.	3	CO4	L2

Part B (Answer any one full question from each Module. Each carry 9 marks)				
Qn No.	Question	Marks	CO	BL

Module I				
9.a	Explain the definition, characteristics, and types of intelligent agents in detail.	5	CO1	L2
9.b	Describe the evolution of intelligent systems and their real-world applications.	4	CO1	L2
OR				
10	Compare artificial intelligence and intelligent systems. Explain the components of an intelligent system and types of intelligent agents.	9	CO1	L2
Module II				
11.a	Explain semantic networks and frames as knowledge representation techniques with examples.	5	CO2	L2
11.b	Describe deductive and inductive reasoning and explain inference mechanisms.	4	CO2	L2
OR				
12	Explain rule-based systems and production rules. Apply forward and backward chaining to solve a given problem.	9	CO2	L3
Module III				
13	Explain learning as an optimization and generalization process. Describe adaptation mechanisms in intelligent agents, feedback loops, and self-improving systems.	9	CO3	L3
OR				
14.a	Describe the relationship between learning, environment, and agent behavior with examples.	5	CO3	L3
14.b	Explain knowledge revision and belief updating in intelligent systems.	4	CO3	L2
Module IV				
15.a	Explain agent-based systems: autonomous agents, perception-action cycle, coordination, and cooperation mechanisms.	5	CO4	L2
15.b	Describe hybrid intelligent systems and explain the motivation for integrating symbolic reasoning with data-driven learning.	4	CO4	L2
OR				
16	Explain expert systems: knowledge acquisition, inference engines, explanation facilities, and rule-based decision reasoning. Develop a basic architecture for an intelligent system for a real-world application.	9	CO4	L3

