



SRI VENKATESWARA UNIVERSITY

I Year Syllabus for 4-Year UG Honours in B.Sc. (Artificial Intelligence) as Major in consonance with Curriculum framework w.e.f. AY 2025-26

Year	Semester	Course	Title of the Course	No. of Hrs /Week	No. of Credits
I	I	1	Computer Fundamentals and Office Automation	3	3
			Computer Fundamentals and Office Automation Lab	2	1
		2	Problem Solving Using C	3	3
			Problem Solving Using C Lab	2	1
	II	3	Python Programming and Data Structures	3	3
			Python Programming and Data Structure Lab	2	1
		4	Artificial & Computational Intelligence	3	3
			Artificial & Computational Intelligence Lab	2	1

SEMESTER-II
COURSE 4: ARTIFICIAL & COMPUTATIONAL INTELLIGENCE

Theory

Credits: 3

3 hrs/week

Course Objectives

- Introduce foundational concepts and history of Artificial Intelligence (AI).
- Teach the PEAS framework and agent-based problem solving.
- Develop understanding of uninformed and informed search methods.
- Provide basic knowledge of machine learning concepts and computational intelligence.
- Instill awareness of ethical considerations in AI.
- Introduce logic programming fundamentals using Prolog as a practical tool.

Course Outcomes

Students completing this course will be able to:

- Explain basic AI terminology, agent models, and the PEAS framework.
- Formulate AI problems using search strategies and implement basic algorithms conceptually.
- Understand core machine learning categories and their applications.
- Describe computational intelligence approaches and their role in AI.
- Analyze ethical issues related to AI technologies.
- Write and execute simple Prolog programs demonstrating logic programming fundamentals.

Unit 1: Introduction to Artificial Intelligence and PEAS Framework

Introduction to AI: Definition, history, applications, and scope

The PEAS framework: Performance Measure, Environment, Actuators, Sensors, Examples of PEAS in real-world AI systems

Intelligent agents: Intelligent agents and their environments, **Types of intelligent agents:** Simple reflex, model-based, goal-based, utility-based, Agent architectures and rationality

Unit 2: Expert Systems

Definition and components of Expert Systems (Knowledge Base, Inference Engine, User Interface), Rule-based systems and knowledge representation, Examples of expert systems: medical diagnosis, decision support, Limitations and comparison with AI agents, Role and significance of expert systems in AI evolution.

Unit 3: Search Strategies in AI

Problem-solving as search: problem formulation, states, actions, goal test, Traveller's problem

Uninformed (Blind) Search: Breadth-first search, Depth-first search, Uniform-cost search

Informed (Heuristic) Search: Greedy best-first search, A* algorithm Applications of search in AI problems

Unit 4: Introduction to Machine Learning

What is machine learning, definitions, Types of learning: Supervised, Unsupervised, Reinforcement learning (basic ideas), classification, Regression, clustering and Association, Basic learning algorithms overview and applications

Unit 5: Computational Intelligence and Ethics in AI

Overview of computational intelligence (Basics of fuzzy logic, neural networks), Role of computational intelligence in AI, Ethics and societal challenges in AI, Responsible AI, fairness, transparency, and safety concerns

Unit 1: Introduction to AI, PEAS Framework & Intelligent Agents

Activities:

Interactive lecture with real-world AI examples

Group discussion on PEAS framework for different environments Case study analysis of intelligent agents in everyday AI applications Quiz on AI fundamentals and agent types

Outcomes:

Students will explain AI basics and describe the PEAS components. Students will identify types of intelligent agents and their roles.

Evaluation Method:

Quiz and participation: 10%

Assignment on PEAS and agent modeling: 10%

Unit 2: Expert Systems Activities:

Lecture with multimedia explaining components of expert systems

Hands-on group activity designing rule-based systems for simple decision problems

Case study review of medical diagnosis expert systems Class debate on limitations and advantages of expert systems

Outcomes: Understand expert system architecture and knowledge representation. Develop simple rule-based systems for decision making.

Analyze real-world expert system examples critically.

Evaluation Method:

Group assignment designing rule base: 15% Written test on expert system concepts: 10%

Unit 3: Search Strategies in AI Activities:

Demonstration of uninformed search algorithms Interactive exercises formulating search problems

Simulation of heuristic search and A* algorithm Problem-solving sessions applying search to puzzles

Outcomes: Formulate search problems and apply uninformed and heuristic algorithms conceptually. Explain the working and use cases of different search strategies.

Evaluation Method:

Problem formulation assignment: 10% Class test on search algorithms: 10%

Unit 4: Basics of Machine Learning Activities:

Video lectures on different machine learning paradigms Simple data classification exercises/classification demos Group presentations on various ML types and applications Quiz on ML types and terminology

Outcomes:

Explain supervised, unsupervised, and reinforcement learning basics. Identify sample use cases for machine learning.

Evaluation Method:

Quiz and presentation: 10%

Written assignment on ML overview: 5%

Unit 5: Computational Intelligence & Ethics Activities:

Lecture introducing fuzzy logic, neural networks overview Ethical dilemma discussions and case studies in AI technology Role play on AI responsibility and fairness

Group project: Develop guidelines for responsible AI use

Outcomes:

Understand computational intelligence basics and ethical AI challenges. Propose responsible AI practices for diverse scenarios.

Evaluation Method:

Participation in ethics discussions: 5% Group project report and presentation: 15%

Recommended Textbooks and References

- Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach, 4th Edition
- Elaine Rich, Kevin Knight, Artificial Intelligence, 3rd Edition
- Michael Negnevitsky, Artificial Intelligence: A Guide to Intelligent Systems
- Ivan Bratko, Prolog Programming for Artificial Intelligence, 4th Edition
- Online resources: AI course materials from Coursera, NPTEL, GeeksforGeeks AI tutorials.

SEMESTER-II
COURSE 4: ARTIFICIAL & COMPUTATIONAL INTELLIGENCE

Practical

Credits: 1

2 hrs/week

Note: Experiments have to be conducted using Prolog

1. Introduction to Prolog Environment and Syntax
 - Setting up Prolog, understanding facts, rules, and queries.
2. Defining Simple Facts and Queries
 - Write and test simple facts like family relationships, likes/dislikes.
3. Creating Rules in Prolog
 - Define logical rules with conditions and test queries.
4. List Handling in Prolog
 - Write programs to manipulate lists (head, tail, concatenation).
5. Recursion in Prolog
 - Implement recursive relations such as factorial and Fibonacci.
6. Search and Backtracking
 - Demonstrate Prolog's backtracking with sample queries and control cuts.
7. Family Relationship Programs
 - Model family trees and query relationships like siblings, ancestors.
8. Solve the Eight Queens Problem
 - Classic AI problem solved using backtracking.
9. Implement Simple Arithmetic Operations
 - Addition, subtraction, multiplication using Prolog predicates.
10. Monkey and Banana Problem
 - Logic problem modeling and solution.
11. Basic Expert System Prototype
 - Write rules for a simple medical diagnosis or recommendation system.
12. Implement Search Algorithms (Conceptual)
 - Demonstrate basic search algorithms like best-first search using Prolog rules.

SRI VENKATESWARA UNIVERSITY::TIRUPATI
B.Sc. Artificial Intelligence Honours
I year II Semester
Course 4: ARTIFICIAL & COMPUTATIONAL INTELLIGENCE

MODEL QUESTION PAPER

Time: **3 Hours**

Max. Marks: **75**

PART-A

Answer any **FIVE** of the following. Each Question Carries 3 marks.

(5X3=15)

1. Short answer question from unit-I
2. Short answer question from unit-I
3. Short answer question from unit-II
4. Short answer question from unit-II
5. Short answer question from unit-III
6. Short answer question from unit-III
7. Short answer question from unit-IV
8. Short answer question from unit-IV
9. Short answer question from unit-V
10. Short answer question from unit-V

PART-B

Answer any **FIVE** of the following. Each Question Carries 12 marks.

(5X12=60)

11. a) Essay question from Unit-I
OR
b) Essay question from Unit-I
12. a) Essay question from Unit-II
OR
b) Essay question from Unit-II
13. a) Essay question from Unit-III
OR
b) Essay question from Unit-III
14. a) Essay question from Unit-IV
OR
b) Essay question from Unit-IV
15. a) Essay question from Unit-V
OR
b) Essay question from Unit-V