CSE 502   **Artificial Intelligence**   **2+1**

Objectives:

To introduce students with techniques and capabilities of artificial intelligence (AI) andenable them to do simple exercises.

Unit-I

Definitions of intelligence and artificial intelligence. What is involved in intelligence? Disciplines important to AI. History of development of AI. Different types of AI. Acting humanly, Turing test. AI systems in everyday life. Applications of AI.

Unit-II

Classical AI, concept of expert system, conflict resolution, multiple rules, forward chaining, backward chaining. Advantages and disadvantages of expert system. Fuzzy logic and fuzzy rules. Fuzzy expert systems.

Unit-III

Problem solving using AI, search techniques, breadth first search, depth first search, depth limited search, bidirectional search, heuristic search, problems and examples. Knowledge representation, frames, methods and demons, correlations, decision trees, fuzzy trees.

Unit-IV

Philosophy of AI, Penrose's pitfall, weak AI, strong AI, rational AI, brain prosthesis experiment, the Chinese room problem, emergence of consciousness, technological singularity, Turing test.

Unit-V

Modern AI, biological brain, basic neuron model, perceptrons and learning, self-organizing neural network, N-tuple network, evolutionary computing, genetic algorithms, agent methods, agents for problem solving, software agents, multi agents, hardware agents.

Practical:

Prolog language, syntax and meaning of Prolog programs, Lists, operators, arithmetic. Usingstructures: Example programs, controlling backtracking, input and output. more built-in procedures, programming, style and technique, operations on data structures. Advanced tree representations, basic problem-solving strategies, depth-first search strategy, breadth-first search strategy.

Course Outcome:

Ability to understand and apply principles of AI in solving simple problems to enable them to get insight into working of AI based systems.

Lecture Schedule

S. No.	Topic	No. of Lectures
1.	Definitions of intelligence and artificial intelligence. Disciplines important to AI. History of development of AI.	2
2.	Different types of AI. Acting humanly, Turing test. AI systems in everyday life. Applications of AI.	2
3.	Classical AI, concept of expert system, conflict resolution, multiple rules, forward chaining, backward chaining.	3
4.	Advantages and disadvantages of expert system. Fuzzy logic and	3

	fuzzy rules. Fuzzy expert systems.	
5.	Problem solving using AI, search techniques, breadth first search, depthfirst search	4
6.	Depth limited search, bidirectional search, heuristic search, problems and examples.	4
7.	Knowledge representation, frames, methods and demons, correlations,decision trees, fuzzy trees.	3
8.	Philosophy of AI, Penrose's pitfall, weak AI, strong AI, rational AI, brain prosthesis experiment,	2
9.	Chinese room problem, emergence of consciousness, technological singularity, Turing test.	3
10.	Modern AI, biological brain, basic neuron model, perceptrons and learning, self-organizing neural network,	3
11.	N-tuple network, evolutionary computing, genetic algorithms,	2
12.	Agent methods, agents for problem solving, software agents,	2
13.	Multi agents, hardware agents.	1
	Total	**31**

List of Practicals

S. No.	Topic	No. of Practicals
1	Prolog language, syntax and meaning of Prolog programs, Lists, operators, arithmetic.	4
2	Using structures: Example programs, controlling backtracking, input andoutput. more built-in procedures, programming, style and technique, operations on data structures.	5
3	Advanced tree representations, basic problem-solving strategies, depth-first search strategy, breadth-first search strategy.	5
	Total	**14**

Suggested Reading:

1. Warwick K 2012.*Artificial Intelligence*: The Basics ISBN: 978-0-415-56482-3 (hbk).

2. Ivan Bratko, *Prolog Programming for Artificial Intelligence.*

3. GNU PROLOG A *Native Prolog Compiler with Constraint Solving over Finite Domains* Edition 1.44, for GNU Prolog version 1.4.5 July 14, 2018.