Course Code	**18CIPC502**					
Category	Engineering Science Courses : Professional Core					
Course title	**ARTIFICIAL INTELLIGENCE - THEORY**					
Scheme and Credits	No. of Hours/Week					Semester - V CSE/ISE
	L	T	P	SS	Credits	
	4	0	0	0	4	
CIE Marks: 50	SEE Marks: 50		Total Max. Marks: 100			Duration of SEE: 03 Hours
Prerequisites (if any): NIL						

COURSE OBJECTIVES:

The course will enable students to

1. Learn the concepts of Artificial Intelligence.
2. Understand the methods of solving problems using Artificial Intelligence.
3. Acquire the concepts of knowledge representation.
4. Design knowledge planning concepts.
5. Acquire different AI learning methods.

UNIT I: INTRODUCTION TO AI — 09 Hours

Introduction to AI, Intelligent Agents: Agents and Environment; Rationality; Nature of Environment; Structure of Agents. Problem-Solving: Problem-Solving Agents, Searching Solutions, Search Strategies, Heuristic Functions.

UNIT II: PROBLEM-SOLVING BY SEARCHING — 10 Hours

Classical Search: Local Search Algorithms, Searching Nondeterministic Actions, Partial Observations; AI Search: Games, Optimal Decision in Games, Alpha-Beta Pruning, Real-Time Decisions, Stochastic Games, Other Games; Constraint Satisfaction Problems: Introduction and Inferences, Backtracking and Local Search.

UNIT III: KNOWLEDGE REPRESENTATION — 10 Hours

Logical Agents: Knowledge Based Agents, Logic, Propositional Logic. First-Order Logic: Representation, Syntax and Semantics, Usage, Knowledge Engineering. Inference In First-Order Logic: Inference, Unification, Lifting, Chaining, Resolution.

UNIT IV: KNOWLEDGE PLANNING — 09 Hours

Planning: Classical Planning, Algorithms For Planning State Space Search, Graphs, Planning Approaches and Analysis. Hierarchical Planning, Non-Deterministic Domain, Multi-agent Planning. Knowledge Representation: Ontological Engineering, Categories and Objects, Events, Mental Events and Objects, Reasoning.

UNIT V: LEARNING **10 Hours**

Introduction to Learning, Supervised Learning, Learning Decision Trees, Regression And Classification With Linear Models, Artificial Neural Networks, Nonparametric Models, Support Vector Machines, Ensemble Learning Machine Learning, Explanation-Based Learning, Learning Using Relevance Information; Reinforcement Learning.

TEXT BOOKS:

1. "Artificial Intelligence: A Modern Approach" by Stuart Russell, Peter Norvig, 3rd Edition, Pearson Education, 2010.
2. "Artificial Intelligence" by Elaine Rich, Kevin Knight, Shiva Shankar B Nair: Tata McGraw Hill 3rd edition. 2013.

REFERENCE BOOKS:

1. "Artificial Intelligence", by George F Luger, 5th Edition Pearson Education, 2009.
2. Artificial Intelligence: foundations of computational agents, by David Poole, Alan Mackworth, 2nd Edition, Cambridge University Press, 2017.

e-BOOKS/ONLINE RESOURCES:

1. Artificial Intelligence - MIT: https://courses.csail.mit.edu/6.034f/ai3/rest.pdf.
2. https://epub.uni-regensburg.de/13629/1/ubr06078_ocr.pdf.
3. Lecture Notes in Artificial Intelligence – Springer: https://www.springer.com/series/1244.

MOOCs:

1. Artificial Intelligence -http://www.nptelvideos.in/2012/11/artificial-intelligence.html.
2. https://www.edx.org/course/introduction-to-artificial-intelligence-ai-2.
3. The quest for artificial intelligence-a history of ideas and achievements-Cambridge University Press: http://ai.stanford.edu/~nilsson/QAI/qai.pdf.

COURSE OUTCOMES:

The students at the end of the course, will be able to

CO1: Describe the modern view of AI as the study of agents.

CO2: Apply AI search Models and Generic search strategies for problem solving.

CO3: Write Logic for representing Knowledge and Reasoning of AI systems.

CO4: Design different planning strategies for knowledge presentations.

CO5: Design different learning algorithms for improving the performance of AI systems.

SCHEME OF EXAMINATION:

<table>
<tr><td rowspan="2">CIE – 50 Marks</td><td>Test I (Any Three Units) - 20 Marks</td><td>Quiz I – 5 Marks</td><td>25 Marks</td><td rowspan="2">Total: 50 Marks</td></tr>
<tr><td>Test II (Remaining Two Units) - 20 Marks</td><td>Quiz II – 5 Marks</td><td>25 Marks</td></tr>
<tr><td rowspan="3">SEE – 100 Marks</td><td colspan="2">Q1 (Compulsory): MCQs or Short answer type questions for 15 Marks covering entire syllabus.</td><td>15 Marks</td><td rowspan="3">Total: 100 Marks</td></tr>
<tr><td colspan="2">Q2 & Q3 from Units which have 08 Hours are compulsory.</td><td>17 * 2 = 34 Marks</td></tr>
<tr><td colspan="2">Q4 or Q5, Q6 or Q7 and Q8 or Q9 from Units which have 10 Hours shall have Internal Choice.</td><td>17 * 3 = 51 Marks</td></tr>
</table>

Note: SEE shall be conducted for 100 Marks and the Marks obtained is scaled down to 50 Marks.

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