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| **Subject Code :** | | **Artificial Intelligence for Beginners** | **L, T, P, J, C**  **3 , 0, 0, 0, 3** | | |
| **Preamble** | | |  | | --- | | The course deals with use cases and applications of AI, understand AI concepts and terms like machine learning, deep learning and neural networks. | | | | |
| **Objectives** | | The objective of this course is to   * Familiarize students with Artificial Intelligence principles and techniques * Introduce the facts of computational model and their applications * Explore problem-solving paradigms, search methodologies and learning algorithms | | | |
| **Course Outcome** | | After successfully completing the course the student should be able to   1. Characterize different types of AI environments, transform a given real world problem to state space problem, understand and identify the stages and issues in the development expert system 2. Apply different searching algorithms and heuristic methodologies to reach the goal in state-space problems. 3. Formulate a given real world problem formally using different knowledge representation methods and draw inferences from it. 4. Implement appropriate searching strategies for few real world environments. | | | |
| **Module** | **Topics** | | | **L hours** | **CO** |
| **1** | **Introduction**  Definitions - Importance of AI, Evolution of AI - Applications of AI, Classification of AI systems with respect to environment, Intelligent Agents, Different types of agents. | | | **5** | **1** |
| **2** | **Problem Solving**  Problem solving by Search, Problem space - State space, Blind Search - Types, Performance measurement  Informed search strategies, Heuristic functions, Local search strategies- Hill climbing | | | **7** | **1,2,4** |
| **3** | **Adversarial Search**  Game playing – mini-max algorithm, Alpha-Beta Pruning. | | | **3** | **1,2** |
| **4** | **Constraint satisfaction problems**  Constraint satisfaction problems, Backtracking search for CSP, Local search for CSP | | | **5** | **1, 3** |
| **5** | **Logical systems**  Knowledge Based systems, Propositional Logic, syntax, semantics, inference, propositional theorem proving, Resolution. Horn clauses, Forward chaining and backward chaining | | | **5** | **1,3** |
| **6** | **Fuzzy Logic**  Introduction – Foundation of Fuzzy system- fuzzy relations- Arithmetic operation of fuzzy numbers- Fuzzification and Defuzzification | | | **6** | **1,3** |
| **7** | **Uncertainty and knowledge Reasoning**  Overview – Definition of uncertainty, Bayes Rule – Inference, Belief Network, Utility Based System, Decision Network | | | **5** | **1,3** |
| **8** | **Learning Systems**  Forms of Learning – Types – Supervised, unsupervised, reinforcement learning, Learning Decision Trees | | | **4** | **1,3** |
| **9** | **Planning**  Planning problem, Planning with state-space search, partial order planning, Planning graphs, Planning with propositional logic | | | **4** | **1,3** |
| **10** | **Recent Trends** | | | **1** |  |

**Text Books (overall syllabus covered)**

1. Stuart Russell and Peter Norvig Artificial Intelligence - A Modern Approach, Prentice

Hall, 3rd edition, 2016.

2. D. Poole and A. Mackworth. Artificial Intelligence: Foundations of Computational Agents,

Cambridge University Press, 2010

**Reference**

3. Elaine Ric, Kevin Knight and Shiv Shankar B. Nair, Artificial Intelligence, 3rd edition,

Tata McGraw Hill, 2009.

4. George F. Luger, “Artificial Intelligence-Structures and Strategies for Complex

Problem Solving”, 6th edition, Pearson, 2008.

5. R. Brachman, H. Levesque. Knowledge Representation and Reasoning, Morgan Kaufmann, 2004.

6. E. Alpaydin. Introduction to Machine Learning. MIT Press, 2nd edition, 2010

7. R. S. Sutton and A. G. Barto. Reinforcement Learning: An Introduction. MIT Press, 1998

8. N.P.Padhy: Artificial Intelligence and Intelligent Systems, Oxford University Press, 2009.

**Mode of Evaluation:**

Tests, Assignments,