# CSOE-001: Basics of Artificial Intelligence

**Course Objectives:**

The objectives of this course are to cover:

- Study the concepts of Artificial Intelligence.
- Learn the methods of solving problems using Artificial Intelligence.
- Introduce the concepts of Expert Systems and machine learning.

**Credits: 03** **L-T-P-J: 3-0-0-0**

**Unit-1:** **8 Hours**

**Introduction to Artificial Intelligence:**Introduction to AI-Problem formulation, Problem Definition -Production systems, Control strategies, Search strategies. Problem characteristics, Production system characteristics -Specialized production system- Problem solving methods – Problem graphs, Matching, Indexing and Heuristic functions -Hill Climbing-Depth first and Breath first, Constraints satisfaction – Related algorithms, Measure of performance and analysis of search algorithms.

**Unit-2:** **8 Hours**

**Representation Of Knowledge:**Game playing – Knowledge representation, Knowledge representation using Predicate logic, Introduction to predicate calculus, Resolution, Use of predicate calculus, Knowledge representation using other logic-Structured representation of knowledge.

**Unit-3:** **8 Hours**

**Knowledge Inference:**Knowledge representation -Production based system, Frame based system. Inference – Backward chaining, Forward chaining, Rule value approach, Fuzzy reasoning – Certainty factors, Bayesian Theory-Bayesian Network-Dempster – Shafer theory.

**Unit-4:** **8 Hours**

**Planning And Machine Learning:**Basic plan generation systems – Strips -Advanced plan generation systems – K strips -Strategic explanations -Why, Why not and how explanations, Learning- Machine learning,Adaptive Learning.

**Unit-5:** **8 Hours**

**Expert Systems:**Expert systems – Architecture of expert systems, Roles of expert systems – Knowledge Acquisition – Meta knowledge, Heuristics. Typical expert systems – MYCIN, DART, XOON, Expert systems shells.

**Referential Books:**

- Introduction to Artificial Intelligence – E Charniak and D McDermott, Pearson Education.
- Artificial Intelligence and Expert Systems – Dan W. Patterson, Prentice Hall of India.

**Course Outcome:**

Upon successful completion of, students will be able to:

- Identify problems that are amenable to solution by AI methods.
- Identify appropriate AI methods to solve a given problem.
- Formalize a given problem in the language/framework of different AI methods.
- Implement basic AI algorithms.
- Design and carry out an empirical evaluation of different algorithms on a problemformalization, and state the conclusions that the evaluation supports.