** COURSE OBJECTIVES
- To Study the fundamental concepts of AI agents and environments.
- To Learn the methods of problem solving in AI using various search strategies.
- To Understand the concepts of knowledge representation and inference using logic.
- To Understand the concepts of knowledge representation and inference under uncertainty.
- To Learn the introductory concepts of machine learning in AI.

{{{unit}}}
| UNIT I | FOUNDATIONS | 8 |
Introduction: What is AI; Intelligent Agents: Agents and environments
-- Good behavior -- The nature of environments -- Structure of agents;
Philosophical Foundations: Weak AI -- Strong AI -- Ethics and risks of
developing AI; AI: The Present and Future: Agent components -- Agent
architectures.

{{{unit}}}
| UNIT II | PROBLEM SOLVING & SEARCH TECHNIQUES | 10 |
Solving Problems by Searching: Problem solving agents -- Example
problems -- Searching for solutions -- Uninformed search strategies --
Informed search strategies -- Heuristic functions; Beyond classical
search: Local search algorithms and optimization problems; Adversarial
search: Games -- Optimal decisions in games -- Alpha-beta pruning.

{{{unit}}}
| UNIT III | KNOWLEDGE REPRESENTATION & REASONING | 9 |
Logical Agents: Knowledge-based agents -- Propositional logic --
Propositional theorem proving; First order logic: Syntax and semantics
for first order logic -- Using first order logic; Inference in first
order logic: Propositional versus first order logic -- Unification and
lifting -- Forward chaining -- Backward chaining -- Resolution.

{{{unit}}}
| UNIT IV | UNCERTAIN KNOWLEDGE AND REASONING | 9 |
Quantifying Uncertainty: Acting under uncertainty -- Basic probability
notation -- Inference using full joint distributions -- Bayes' rule &
its use; Probabilistic Reasoning: The semantics of Bayesian networks
-- Exact inference in Bayesian networks -- Other approaches to
uncertain reasoning.

{{{unit}}}
| UNIT V | LEARNING | 9 |
Learning from Examples: Forms of learning -- Supervised learning --
Learning decision trees; Reinforcement learning: Passive reinforcement
learning -- Active reinforcement learning -- Application to robot control.

\hfill *Theory Periods: 45*

** LAB EXERCISES
1. Uninformed Search Techniques
2. Informed Search Techniques
3. Hill Climbing algorithms
4. Adversarial Search techniques
5. Construction of AND-OR graph from knowledge base
6. Inference from knowldge base
7. Inference using full joint probability distribution
8. Inference using Bayesian network
9. Decision tree learning algorithm
10. Passive reinforcement learning algorithm

\hfill *Practical Periods: 30*

\hfill *Total Periods: 75*

** COURSE OUTCOMES
After the completion of this course, students will be able to:
- Identify, formulate, understand and solve AI problems using search
  techniques (K3)
- Elucidate the concept of Knowledge Representation and inference
  using logics (K2)
- Elucidate the concept of Knowledge Representation and inference
  under uncertainty (K2)
- Elucidate the concept of learning in AI applications (K3)
- Implement various search, inference and learning algorithms in AI
  (K4).

** TEXT BOOKS
1. Stuart Russell, Peter Norvig, ``Artificial Intelligence -- A Modern
   Approach'', 3rd Edition, Pearson Education / Prentice Hall of
   India, 2015.
2. Deepak Khemani ``A First Course in Artificial Intelligence'',
   McGraw Hill, 2014.