

Computer Science 4318 – Artificial Intelligence

Student Learning Outcomes

1. Students will demonstrate an understanding of agent-based AI architectures.
2. Students will demonstrate an understanding of various searching algorithms commonly used in artificial intelligence software.
3. Students will demonstrate an understanding of adversarial search and game-playing agents.
4. Students will demonstrate an understanding of logic-based agents.
5. Students will demonstrate an understanding of machine learning.

Course Content

Textbook: Artificial Intelligence: A Modern Approach, by Stuart Russell and Peter Norvig. At least the following chapters are covered (see textbook's Contents), at least in part.

1. **Intelligent Agents.** Agents and environments, rationality.
2. **Solving Problems by Searching.** Uninformed search strategies (depth-first search, breadth-first search, etc.), informed search strategies (greedy best-first search, A*), heuristic functions.
3. **Beyond Classical Search.** Hill-climbing, simulated annealing, local beam search, genetic algorithms, online search agents.
4. **Adversarial search.** Games, minimax search, alpha-beta pruning, imperfect real-time decisions, stochastic games.
5. **Logical Agents.** Knowledge-based agents, propositional logic.
6. **First-Order Logic.**
7. **Quantifying Uncertainty.** Probability, independence, Bayes's rule.
8. **Learning from Examples.** Decision trees, artificial neural networks, support vector machines.