## **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.