

## Computer Science 4318 – Artificial Intelligence Student Learning Outcomes

1. Students will demonstrate an understanding of semantic networks and their uses.
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.
4. Students will demonstrate an understanding of rule-based systems.
5. Students will demonstrate an understanding of neural networks.
6. Students will demonstrate an understanding of proof by resolution.
7. Students will demonstrate an understanding of version space methods.
8. Students will demonstrate an understanding of agent-based AI architectures.
9. Students will demonstrate an understanding of classification trees.

### Course Content

**Textbook:** *Artificial Intelligence*, Third Edition, by Winston. The following chapters are covered (See textbook “Contents”).

1. Semantic Nets and Description Matching. Representations for intelligenced, semantic networks, describe-and-match methods, analogy problems, scoring mechanisms, ambiguity, abstraction units, problem solving.
2. **Nets and Basic Search.** Blind methods, depth-first search, breadth-first search, nondeterministic search, heuristically informed methods, hill-climbing, beam search, best-first search, discovery.
3. **Nets and Optimal Search.** Branch-and-bound search, dynamic programming, optimal paths.
4. **Rules and Rule Chaining.** Rule-based systems, deduction, forward chaining, backward chaining, search and chaining.
5. **Logic and Resolution Proof.** Rules of inference, notation, logic, resolution proofs, refutation, unification, theorem proving.
6. **Learning by Managing Multiple Models.** Version-space methods, characteristics.
7. **Learning by Building Identification Trees.**
8. **Learning by Training Neural Nets.** Components of neural networks, hill climbing and back propagation, threshold functions, training by example.
9. **Learning by Training Perceptrons.**