

## COMP 4190 – Artificial Intelligence

**Calendar Description:** Reasoning with temporal knowledge; causal reasoning; plausible reasoning; nonmonotonic reasoning; abductive reasoning.

**Prerequisite:** [COMP 3190 or COMP 3360] and [one of STAT 1150, STAT 2000 (B), STAT 2001 (B), STAT 2220, or PHYS 2496].

### Outline

- 1) Topics in knowledge representation (2 ½ weeks)  
Taxonomic knowledge, inheritance, temporal knowledge, logics for temporal reasoning, causal knowledge: logical theory of causation, Bayesian networks
- 2) Plausible reasoning (2 weeks)  
Probabilistic reasoning, Dempster-Shafer theory, fuzzy sets and fuzzy logic
- 3) Nonmonotonic reasoning (2 weeks)  
Truth maintenance, default reasoning
- 4) Advanced planning (2 weeks)  
Nonlinear planning, hierarchical planning, truth maintenance/dependency-directed backtracking in planning, complexity in planning
- 5) Abductive reasoning (2 ½ weeks)  
Probabilistic and logic-based models of abduction, applications of abduction in diagnosis, plan recognition, and parsing
- 6) Constraint satisfaction (2 weeks)  
Constraint satisfaction strategies

**Text:** Stuart Russell and Peter Norvig, *Artificial Intelligence - A Modern Approach*, Prentice Hall, 1995 & 2003