Search

- Problem solving by search: formalization
- Uninformed search: Breadth-First, Uniform-Cost, Depth-First, Depth-Limited, and Iterative- Deepening
- Heuristic search: Greedy best-first, A*
- Properties of search: completeness, optimality, time and space complexity
- Path/cycle checking
- Game tree search: MiniMax, alpha-beta pruning
- CSP: Formalization, backtracking, forward checking, and GAC algorithms

Knowledge representation and reasoning

- First-order logic: syntax and semantics
- Soundness and completeness of proof procedures
- Converting first-order formulas into clausal form
- Unification and MGU
- Resolution proof: forward chaining and refutation
- Answer extraction

Planning (not covered this time)

- Closed world assumption
- STRIPS representation of actions
- STRIPS planning
- Relaxed plan heuristics

Reasoning under uncertainty

- Bayesian networks: graphs + tables, inference
- Variable elimination algorithm
- Use D-separation to determine independence

Machine learning

- Decision-tree learning
- Naive Bayes learning
- K-means and EM
- Chain rule for computing partial derivatives
- Linear and logistic regression
- Backpropagation
- Q-learning