1. Introductory lecture(s) (I’m not kidding – this is the one cumulative piece)
   a. Definitions of AI (matrix)
   b. Knowledge representation
2. Planning
   a. Planning as search
   b. Plan operators
   c. State progression and goal regression
   d. Means/End Analysis
3. Uncertainty and probabilistic reasoning
   a. Representing uncertain knowledge with probabilities
   b. Prior probability and conditional probability
   c. Bayes’ Law
   d. Diagnostic versus causal probabilities
   e. Conditional independence and Bayesian networks – combining evidence
4. Making Rational Decisions
   a. Preferences and rationality (constraints and properties)
   b. Utility (and expected utility)
   c. Multiattribute utility and dominance
   d. Value of information
5. Machine Learning
   a. General
     i. Supervised vs unsupervised
     ii. Inductive learning
     iii. Restricted hypothesis space biases
     iv. Preference biases (one function vs another)
     v. Overfitting and noise
     vi. PAC learning
     vii. Training, testing and validation sets
   b. Decision trees
     i. Strengths and weaknesses
     ii. Choosing split attributes (entropy and info gain)
     iii. Algorithm for building trees
     iv. Problems (complications) and ways of handling them
     v. Assessing learning performance
   c. Network learning (neural nets)
     i. General concepts and definitions
     ii. Artificial vs. biological neurons
     iii. activation functions, multilayer networks
     iv. Back propagation, recurrent networks
6. Natural Language Processing
   a. Syntax vs. semantics vs pragmatics
   b. Generation vs understanding, phases of processing
   c. Context free grammars
   d. Challenges – why aren’t we there yet?
7. Robotics
   a. The 3 D’s
   b. Paradigms – Hierarchical vs. Reactive
   c. Biological foundations for the reactive paradigm – behaviors, reflexes, etc.
Types of questions: short answer, definitions, short essay, problem solving (planning, Bayesian networks, decision trees, sample CFGs)