

# Syllabus and Study guide for AI Final exam

## Sources

- Russell & Norvig's textbook (AIMA)
- Slides available in the AIMA book website
- Slides posted via Google classroom

## Study guide

- The exam is **cumulative**, i.e., everything taught in this course will be covered in the final exam. But I have trimmed some topics, as you will see in the table.

## Syllabus

Ch.	Subject	Topics/Skills required
2	Intelligent Agents	<ul style="list-style-type: none"><li>• Understanding PEAS description</li><li>• Understanding the characteristics of environments (static/dynamic, stochastic/deterministic, etc.)</li><li>• Understanding different types of models (model-based, utility based, etc.)</li></ul>
3	Search	<ul style="list-style-type: none"><li>• Understanding all blind and heuristic search techniques (BFS, DFS, Greedy, A* etc.) and ability to solve mathematical problems related to these.</li></ul>
5	Adversarial Search	<ul style="list-style-type: none"><li>• Understand minimax and alpha-beta pruning and ability to solve simple mathematical problems related to these.</li><li>• Understand techniques to make game tree search faster (cut-off search, move ordering, etc.)</li></ul>
7,8	Logic	<ul style="list-style-type: none"><li>• Translating English sentences to and from propositional logic and first order logic</li><li>• Converting sentences to and from CNF and Horn form</li><li>• Applying resolution, forward and backward chaining on propositional logic statements</li></ul>
13	Quantifying Uncertainty	<ul style="list-style-type: none"><li>• Understanding basic notions of probability, conditional probability, independence, full joint distribution, Bayes' rule</li></ul>
14	Probabilistic Reasoning	<ul style="list-style-type: none"><li>• Understanding conditional independence</li><li>• Understanding the basic principle of Bayesian Networks</li><li>• Ability to make inference given the topology and conditional probability tables of a given Bayesian network</li></ul>

15	Temporal Reasoning	<ul style="list-style-type: none"><li>• Understanding the basic principles of a Markov process</li><li>• Ability to perform basic calculations given the transition table of a Markov process</li><li>• Understanding the basic principles of a Hidden Markov Model (HMM)</li><li>• Ability to make inference (filtering) given the transition and emission probabilities of a Hidden Markov Model</li></ul>
18	Basic Machine Learning	<ul style="list-style-type: none"><li>• Knowing the basics of three major types of machine learning (supervised, unsupervised, reinforcement)</li><li>• Knowing the function of basic ML tasks: preprocessing, feature extraction, model construction and model evaluation</li><li>• Knowing concepts related to supervised learning: training, testing, model complexity, overfitting, underfitting</li></ul>