

## 6.034 Notes: Section 1.1

### Slide 1.1.1

This is a brief introduction to the content and organization of 6.034.

### 6.034 Artificial Intelligence

- Topics covered
- Prerequisites
- How the subject works
- Grading
- Collaboration Policy
- Check the course page often.

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### Topics

The course covers three major topics:

- Search
  - Graph search
  - Constraint Satisfaction
  - Games
- Machine Learning
  - Nearest Neighbors
  - Decision Trees
  - Neural Networks
  - SVM
- Knowledge Representation & Inference
  - Propositional & First Order Logic
  - Rule-based systems
  - Natural Language

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### Slide 1.1.2

These are the topics that we will cover during the semester. 6.034 is an introductory subject. Our goal is to give you a solid introduction to three key topics: search, knowledge representation and inference, and machine learning. We will introduce a variety of other different topics in AI, such as planning, robotics and natural language only in passing. Subsequent courses in AI cover those areas in more depth.

### Slide 1.1.3

These are the formal and informal prerequisites for the subject.

6.001 is an essential prerequisite. In particular, we expect you to read and understand substantial Scheme programs and to make small modifications to the code. Remember, this is a subject in computer science. Programming is to CS as calculus is to physics and EE; it is the essential language for making the ideas concrete. Also, practice makes perfect and you should take every opportunity to practice programming. Scheme is the language that we can count on everyone having from 6.001, so we use it heavily. It is also highly suitable for many (though not all) of the topics covered in this subject. If you're going to study computer science, you should take mastering programming languages in stride.

We will assume that you know basic differential calculus of several variables and vector algebra, such as covered in 18.02. You will not be able to understand machine learning without this basic mathematical background.

### Prerequisites

- **6.001**  
We will have regular assignments that expect you to be able to read and write Scheme. This is the only formal pre-requisite.
- **18.02**  
We will assume that you know what the chain rule is and what a dot product is, and a partial derivative, etc. If you have not taken 18.02, you should really wait to take the subject until you have.

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### Course organization

- 2 x 1.5 hr classes (MW11-12:30)
- 1 recitation with TA
- On-line text + exercises
  - Recommended book (available at Quantum & Amazon):  
Russell & Norvig, AI: A Modern Approach 2<sup>nd</sup> edition
    - This book is **only** for supplementary reading; all of the course material is covered in the notes.
- On-line problem set
- 2 Design problems (3-5 page papers)
- 2 In-class quizzes (March 7, April 4)
- Final

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### Slide 1.1.4

The class meets as a whole twice a week for 1 1/2 hours. The lectures will introduce the basic material for the course. These on-line chapters are the textbook for the course; you are responsible for the material in the on-line text. Most weeks there will be a required on-line problem set.

We will schedule meetings with the TAs on Friday in groups of about 20 students. These recitation meetings will go over the on-line problem set problems. The meetings are required unless you've already completed all the on-line problems correctly by Friday.

The recommended book provides a wealth of additional materials and in-depth exploration of the topics we will cover. Although the book is **not** required, you might find it very helpful if you want to dig deeper into the material.

We will have two in-class quizzes (held in-class on the indicated dates) and a final.

### Slide 1.1.5

The grading is broken down as shown here. The only aspect that requires some comment is the treatment of the on-line problems. I feel that you can't really learn the material without doing the problems. You may even be able to do well on the exams but you won't have a full understanding without working the problems. And so, the problems are required.

Since most (though *not all*) of the problems have "Check" buttons, you should be able to get full credit for them. Some of the problems don't have Check buttons and so you won't necessarily get 100% on every problem set. On the other hand, we don't expect you to get a score of 100%; 90% is sufficient for full credit. You won't get a better final grade because you got 100% on the problems. So, don't obsess about losing a point here and there. The objective of the problems and exercises is to help you learn the material and make sure that you understand what we view as key points.

### Grading

- 30% Final
  - 30% Quizzes
  - 25% On-line assignments + Recitation participation
  - 15% Design problems
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- The on-line exercises and problems are an essential component of the subject and are required. A 90% score on any on-line assignment gets full credit. There is no difference between 90% and 100%. An average score below 75% will lead to a grade of Incomplete in the subject.
  - On-line work that is submitted late will receive half credit unless you have a valid reason and make an arrangement with your TA.

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### Collaboration

- **Everything** you do for credit in this subject is supposed to be your own work; this includes on-line work.
- You can talk to other students (and TAs) about approaches to problems, but then you should sit down and do the problem yourself. This is not only the ethical way but also the only effective way of learning the material.

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### Slide 1.1.6

Don't hand in work that you did not do, even to the on-line system. Talking to other people to try to understand the material is fine, in fact, encouraged. Cutting and pasting someone else's answer is NOT fine under any circumstances. Not only is it unethical but you will fail to learn anything in the course.

If you feel so pressured that you are tempted to turn in someone else's work, you are probably trying to do too much. You should probably be taking fewer subjects or cutting back somewhere else. Speak to your advisor or a counseling Dean or come talk to one of us.

