

CMPS 242 Syllabus, Fall '05

The class is moving to a larger room. Starting Monday we will meet in Social Sciences II room 167 (at the same time).

Here is a tentative syllabus for the Machine Learning class. Additional topics may be inserted and/or some topics may be skipped based on the interests of the class. The syllabus is aggressive, and it is unlikely that we will get to everything on this list. The text is *Introduction to Machine Learning* by Alpaydin. You might find an introduction to probability as well as these other books useful:

- *Introduction to Machine Learning* by Alpaydin
- *Neural Networks for Pattern Recognition* by Bishop
- *Pattern Classification* by Duda, Hart and Stork or the earlier *Pattern Classification and Scene Analysis* by Duda and Hart

I am assuming that students have some background in both analysis of algorithms and probability.

Planned Topics:

1. Introduction
2. Linear Discrimination and the Perceptron algorithm
3. Bayesian learning and parameter estimation
4. Batch learning: Decision Trees and Artificial Neural Networks
5. Instance based learning (nearest neighbor)
6. Support vector machines
7. Boosting (AdaBoost)
8. Clustering, EM Algorithm and K-means
9. On-line prediction
10. Concept learning and PAC model and generalization bounds
11. Feature selection
12. Evaluating Hypotheses and model selection

Evaluation in the course will be based on periodic homework assignments (15–25%), an in-class midterm in the seventh or eighth week (30–40%) and a term project (40–50%). Students are encouraged to do the homework and project in groups of 2-3 students.