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:

- *The Elements of Statistical Learning* by Hastie, Tibshirani, Friedman
- *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
- *Machine Learning* by Mitchell
- *Machine Learning, an Algorithmic Perspective* by Marsland.

Students should have some background in both analysis of algorithms (at least the CMPS 101 level) and probability.

**Planned Topics:**

1. Introduction (ch 1 and 2)
2. Bayesian learning and parameter estimation (ch 3, 4, 5)
3. Instance based learning (nearest neighbor) (ch 8)
4. Batch learning: Decision Trees (ch 9) and Artificial Neural Networks (ch 11)
5. Linear Discrimination (ch 10) and the Perceptron algorithm (ch 11)
6. Support vector machines (ch 13)
7. Boosting (AdaBoost) (ch 17)
8. Clustering, EM Algorithm and K-means (ch 7), HMM (ch 13)
9. On-line prediction (Blum survey)
10. Concept learning, PAC model and generalization bounds
11. Graphical Models (ch 16)
12. Feature selection (ch 6) (if time permits)
Evaluation will be based on regular homework assignments an in-class exam in the eighth week and a term project (with different expectations for the graduate students).

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Other Points:

- Written homework assignments will be done in groups of 2 or 3 students and each group should turn in a single set of solutions with all member's names and email accounts. *All* members of the group must attempt each problem and fully understand the group’s solution. It is inappropriate to simply split up the assigned problems among the group members. All help from outside the group (from the web, books other than text, or people other than the TA or instructor) *must* be clearly acknowledged. Presenting others work as your own is dishonest and is called plagiarism.

- Academic Honesty violations, such as submitting the un-attributed work of others, are serious issues and will result in a zero on the assignment, a lowered grade in the course, and a report to the college provost, department, and/or Dean of Graduate Studies. Improperly borrowed work can be as large as an entire solution or as small as a single sentence, figure or idea. See also [http://www.ucsc.edu/academics/academic_integrity/undergraduate_students](http://www.ucsc.edu/academics/academic_integrity/undergraduate_students)

- If you qualify for classroom accommodations because of a disability, please submit your Accommodation Authorization Letter from the Disability Resource Center (DRC) to me during my office hours or by appointment within the first two weeks of the quarter. Contact DRC by phone at 831-459-2089, or by email at drc@ucsc.edu for more information.

- If you need accommodation due to conflicts, family emergencies, illness/injury, or other difficulties, inform the instructor as soon as possible. An “incomplete” can only be given if there is a medical, family, or similar emergency that prevents a student who has been doing clearly passing work fro

- Students are responsible for their own understanding. If something is unclear, ask questions in lecture, sections, office hours, or the forum.

- Students should check the forum regularly (daily or at least every other day) for announcements and clarifications.

- Both lectures and the reading are important. It is important to keep up with the reading, and reading ahead is often helpful. Lectures are mandatory, and students are responsible for the material covered there.

- Due dates are firm, and it is each student’s responsibility to manage their time and complete the assignments on time. Students should read and think about the assignments the day they are assigned so they can ask questions and get the help they need well before the due date.