**CS150 – Topics in Computer Science**  
**Machine Learning**  
**Spring, 2008**

**Introduction**

**OVERVIEW:** How can we build computer systems that, based on experience or data, adapt so as to act in ways that go beyond the actual histories? That is, how can we design systems that *learn*? And for that matter, what does it mean to learn? What are the varieties of learning? How can we learn how to learn?

In this course, we will address these questions and others. Programs that adapt and improve based on their experience are instances of *machine learning* systems. This course introduces students to the variety of methods employed in constructing such systems.

**PREREQUISITES:** CS030 or consent of instructor.

**COURSE OBJECTIVES:** As the primary goal of the course, successful students will learn the core content of machine learning, a sub-discipline of computer science (department outcome C1). As side effects with this, students will see multiple – and very different – approaches to solving a given problem, yielding a flexible and agile way of thinking (departmental outcome C3).

As a seminar course, a secondary goal is to give students practice reading critically, making presentations to their peers, and discussing ideas vigorously. In short, students should become more critical thinkers (campus learning standard) and better communicators (department outcome C2).

Through the several small programming projects, students will hopefully improve their programming skills (department outcome C1). As we acquire some perspective on the potential of machine learning, we will also consider ethical implications of such systems (department outcome C4).

**Administrivia**

**WHEN AND WHERE:** MWF 8:00-9:05am, Bauder Hall 101.


**WEBPAGE:** http://www.westmont.edu/~iba/teaching/CS150ml

**INSTRUCTOR INFORMATION:** Wayne Iba, (iba@westmont.edu), x6799

**Requirements**

**ASSIGNMENTS:** From time to time, students may be required to complete assignments involving short answer responses or problem-solving activities. In addition, students will update their online portfolio (or create one if they do not already have one) with relevant information from the course.

**PROJECTS:** Students will implement several small learning systems. Students gain a deeper understanding of a particular learning method when they have personally implemented it. We will hold code-walks reviewing implemented code and see demonstrations of the code in action. These demonstrations will use real world data sets as the basis of training and testing.

**PRESENTATIONS:** Students will make multiple presentations to the class. These presentations will be evaluated by the instructor and the rest of the class. (The class will also be evaluated on the quality of their evaluations! Interestingly, we will view this evaluation activity as a learning problem and structure the scores accordingly.)

**EXAMS:** There will be one or more exams. Exams will assess student comprehension of the methods in machine learning.

**ATTENDANCE:** Attendance is required. Missing more than the allowed number of classes (6) without approval of the instructor will result in removal from the class with a grade of F.
GRADING: At the beginning of the semester, students will indicate what grade they desire in the course. I will hold consultations with students throughout the semester if the desired grade becomes in jeopardy. During such consultations (should they become necessary), we will discuss remedies to the status of the grade. Overall evaluation will weight preparation and participation most highly, followed by presentations, exams and projects more or less equally, followed by any assignments and the online portfolio. See the first assignment, “selection of grades,” for explication of my expectations for each grade.

ACADEMIC HONESTY: As in every area of life, I presume that you behave honestly within the context of this class. This reflects the respect that I grant each student coming into an academic relationship. If you act dishonestly toward me or your peers, you break that relationship. Do not attempt to receive credit for work that is not your own without properly acknowledging sources via appropriate citations or references. You are encouraged to get help from your peers but make sure you acknowledge such help and that you subsequently understand the help you received. The consequence of violating the trust I implicitly extend to you will typically be an F in the course for reason of academic dishonesty (first incident). But more serious and distressing will be the damage done to our relationship.