

Course Outline
ECE175 – Elements of Machine Intelligence
Department of Electrical and Computer Engineering
University of California, San Diego

Nuno Vasconcelos

Spring 2008

This course provides an undergraduate-level introduction to Statistical Learning. It address problems such as classification and detection, parameter and model estimation, or clustering, which are common in signal processing, communications, image processing, computer vision, artificial intelligence, speech analysis and recognition, data-mining, computational biology, bio-informatics, etc.

Your responsibilities in this class fall into three main categories:

1. Class participation and homework 20%
2. Mid-term 35%
3. Final 45%

Homework: What we will do exactly depends on the availability of grading assistance. More on this later.

Exams:

Mid-term: TBA, in class.

Final: finals week, will test all materials covered.

Instructor: Nuno Vasconcelos, EBU1 5602, 4-5550, e-mail: nuno@ece.ucsd.edu

Teaching Assistant: TBA

Office hours: TA Office hours: TBA

Instructor office hours: Thursday 6:30-7:30PM

Pre-requisites: linear algebra, probability

Text:

- “Introduction to Machine Learning”, Ethem Alpaydin, MIT Press, 2004

Supplementary hand-outs will distributed when appropriate. There are various other books of interest. These are not required but can be used for alternative explanations of the material.

1. Duda, Hart, and Stork, *Pattern Classification*, Wiley, 2001.
2. Hastie, Tibshirani, Fredman, *Elements of Statistical Learning*, 2001
3. Gelman, Rubin, Stern, *Data Analysis*, 2003.

There is a web page for the course, <http://www.svcl.ucsd.edu/~courses/ece175/>

LECTURE SUBJECT	Number of classes
Introduction	1
Linear Algebra review	1
Probability review	1
Metrics, whitening, nearest neighbors	1
Bayes decision rule	2
Dimensionality	1
Principal Component Analysis	1
Linear Discriminant Analysis	1
Maximum likelihood estimation	2
Clustering, k-means	1
Hyperplane classifiers	1
Support Vector Machine	1
Kernels	1
Applications	3