=== CSE 151A: Introduction to Machine Learning ===

I. Course content

This course is a comprehensive introduction to predictive machine learning. Topics covered will include:

(a) Basics

– Types of prediction problems: classification, regression, conditional probability estimation
– Geometry of data spaces and distance functions
– Nearest neighbor methods

(b) Generative modeling

– Generative versus discriminative approaches to classification
– Gaussian generative models

(c) Linear models

– Linear regression
– Logistic regression
– Optimization: gradient descent and its variants, convexity
– The Perceptron and support vector machines

(d) Nonlinear models

– Kernel machines
– Decision trees
– Ensemble methods
– Neural nets

(e) Generalization

(f) Frontier topics (as time permits)

– Semi–supervised and active learning
– Partial supervision

II. Prerequisites

The course requires a background in:

– Linear algebra, at the level of Math 18
– Probability, at the level of CSE 21 / 103
– Programming at the level of CSE 100

In addition, students are expected to be familiar with Python, or to acquire this quickly at the beginning of the course.

III. Assessments and grading

There will be a weekly homework, due Thursday evening. No late homeworks will be accepted under any circumstances; however, the two lowest scores will be dropped.

There will be three quizzes held during discussion section. The lowest quiz score will be dropped.

There will also be a final exam.

The assessments will be weighted as follows:
Homework: 20% total [lowest two dropped]
Quizzes: 40% total [lowest dropped]

Final: 40%

Based on the final scores, grades will be assigned. The cutoffs will be at least as generous as the following:

```
A+ > 99.0
A  > 95.0
A- > 90.0
B+ > 87.0
B  > 83.0
B- > 80.0
C+ > 77.0
C  > 73.0
C- > 70.0
else D/F
```

IV. Exam policy

All tests other than the final will be held in person during discussion section. There is no remote option.

No calculators are allowed during exams. For the quizzes, a single *hand-written* sheet (letter size, double-sided) is allowed. For the final, two sheets are allowed. The exam booklet will contain sufficient space for scratch work.

V. Academic integrity

Students are encouraged to work together on homeworks. However, the final submissions must be written up individually.

VI. Inclusive learning environment

All students are encouraged to participate in class and all questions are welcomed. Students with particular concerns or needs should reach out to the instructor.