

# ECE 532 Homework 1

Due Tuesday January 25th at the beginning of class

1. Come up with your own example of a pattern classification problem (real or imagined). Describe the basic problem (including data acquisition and feature selection and extraction), specify the feature and label spaces, and sketch the class-conditional distributions.
2. Illustrate (sketch) the notions of separable and non-separable features in a 1-d (single feature) binary (two class) problem.
3. Suppose you get a new job in a brewery and your boss wants you to devise an automatic procedure to predict whether or not a batch of beer has “gone bad” (spoiled) by measuring the pH-level of the beer. You are provided with the following examples:

**Good beer pH levels:** 0,2,6,0,1,1,1,4,2,1,0,5,3,7,3,3,6,4,1,5,6,7,4,7,1,7,2,2,7,5,1

**Bad beer pH levels:** 12,2,10,6,11,8,10,7,5,4,4,10,5,8,3,10,6,12,12,9,7,12,11,9,11,9,6,5,6,8,10

Propose a classification rule for this task. Justify your reasons for proposing the rule.

4. Read over background materials on crystallography.