# Pattern Recognition

## ECE 4363 / ECE 5363
## Spring 2019

## Project 2

1.  Use Matlab's quadprog() function to implement the linearly nonseparable (soft margin) SVM in its dual form and test its functionality with the data set generated as shown below. For $C = 0.1$ and $C = 100$, plot the samples, margin hyperplanes, and the decision boundary. Also, on the plot, identify and give the count of the support vectors and the misclassified samples.

2.  Use Matlab's quadprog() function to implement the nonlinearly separable (kernel) SVM and test its functionality with the data set generated as shown below. Use a Gaussian kernel with $\sigma = 1.75$. For $C = 10$ and $C = 100$, plot the samples, margin hyperplanes, and the decision boundary. Also, on the plot, identify and give the count of the support vectors and the misclassified samples.

3.  Compare the computational efficiency of your implementation of kernel SVM with that of Matlab function svmtrain() as the number of training samples grows.

**rng(100);**
**class1=mvnrnd([1 3],[1 0; 0 1],60);**
**class2=mvnrnd([4 1],[2 0; 0 2],40);**

**Archive your m-file and a report containing the generated plots (5 in total) in a zip file named Lastname_Project2.zip and upload it to Blackboard before midnight on 03/22/19.**