ECE 8443 – PATTERN RECOGNITION

COURSE OUTLINE:

I. INTRODUCTION TO PATTERN RECOGNITION

A. Machine Perception
B. Pattern Recognition Systems
C. Design Cycle
D. Learning Models

II. BAYESIAN and MAXIMUM LIKELIHOOD APPROACHES

A. Decision Theory
B. Bayes Classifiers and Discriminant Functions
C. Maximum Likelihood Classifiers
D. Error Rates, Probabilites, and bounds

III. DIMENSIONALITY PROBLEM

A. Problem of Dimensionality
B. PCA and LDA
C. EM (Expectation-Minimization)
D. HHM (Hidden Markov Models)

IV. NONPARAMETRIC METHODS

A. Parzen Window
B. Nearest Mean
C. Nearest Neighbor

V. LINEAR DISCRIMINANT FUNCTIONS

A. Linear and Generalized Linear Discriminant Functions
B. Relaxation Procedures
C. Separable and Nonseparable Cases

VI. MACHINE LEARNING

A. Classifier Superiority
B. Bias and Variance
C. Reasampling
D. Combination and Comparison of Classifiers

VII. UNSUPERVISED CLUSTERING

A. Mixture Densities
B. ML and Bayesian Approaches
C. Clustering
D. Criterion Functions for Clustering
E. Hierarchical Clustering