

ECE 4363: Pattern Recognition

Credit / Contact hours: 3 / 3 per week

Course coordinator: Hamed Sari-Sarraf

Textbook(s) and/or other required material: S. Theodoridis, and K. Koutroumbas, *Pattern Recognition*, 4th Edition, Academic Press, 2009

Catalog description: Foundational topics in pattern recognition, linear discriminant functions, support vector machines, generalized decision functions, Bayes classifier, and various clustering techniques.

Pre-requisite(s): MATH 3342

Co-requisites (if any): None

Designation: Elective

Course learning outcomes: Upon completion of this course, students should be able to

1. Design and Analyze linear and nonlinear classifiers
2. Design and Analyze statistical classifiers
3. Design and Analyze clustering techniques
4. Apply concepts to real-world data using Matlab

ABET student outcomes addressed in course: a, c, e, and k.

Topics covered

Linear Discriminant Functions; Perceptron and its variants – 3 weeks

Optimization-based Classifiers; Multiclass Problem; Classifier Assessment – 2 weeks

Linear and nonlinear Support Vector Machines – 2 weeks

Regression; Bias versus Variance – 1 week

Bayes Decision Theory; Density Estimation Techniques; Naïve Bayes – 2 weeks

Feature Selection; Dimensionality Reduction – 2 weeks

Clustering Methods – 2 weeks