RAI 942 Pattern Recognition (3-0)

Textbook: Pattern Classification by Richard O. Duda, Peter E. Hart and David G. Stork, Second Edition, Wiley, 2001. ISBN-10: 0471056693, ISBN-13: 978-0471056690 **Reference Books / Journals:**

Pattern Recognition and Machine Learning, by Christopher M. Bishop, Springer; 1st ed.

2006, Corr. 2nd printing edition 2007. ISBN-10: 0387310738, ISBN-13: 978-0387310732. Journals:

Pattern Recognition

Pattern Recognition Letters

IEEE Trans. Pattern Analysis & Machine Intelligence (PAMI)

IEEE Trans. Geoscience & Remote Sensing

IEEE Trans. Image Processing

IEEE Trans. Speech and Audio Processing

Objective:

This course will introduce students to the fundamentals of statistical pattern recognition with examples from several application areas. Techniques for analyzing multidimensional data of various types and scales along with algorithms for projection, dimensionality reduction, clustering and classification of data will be explained. The course will present competing approaches to exploratory data analysis and classifier design so that students can make judicious choices when confronted with real pattern recognition problems. Students will implement some of the algorithms using their choice of a programming language.

Pre-Requisite:

EC 803 Computer Vision (or equivalent)

Course Outline:

Topics	Allocated Periods
Introduction to Pattern Recognition Statistical Decision Theory Parameter Estimation Curse of Dimensionality Component analysis and Discriminants Principle Component Analysis (PCA) Nonparametric Techniques Linear Discriminant Functions Decision Trees Neural Networks Error Rate Estimation, Bagging, Boosting Classifier Combination Feature Selection Unsupervised Learning, Clustering, and Multidimensional Scaling Semi-supervised Learning	45