EC E 532, Theory and Applications of Pattern Recognition

1. Credits: 3  Contact Hours: 2.5
2. Textbook and Materials:
   Pattern Classification, R. Duda, P. Hart and D. Stork, 2000
   a. Other Supplemental Materials: None

   Specific Course Information:

   a. Brief description of the content of the course (Course Catalog Description):
      Pattern recognition systems and components; decision theories and classification; discriminant
      functions; supervised and unsupervised training; clustering; feature extraction and
      dimensional reduction; sequential and hierarchical classification; applications of training,
      feature extraction, and decision rules to engineering problems.
   b. Pre-requisites or Co-requisites: ECE 331 or Math 431 or cons inst
   c. This is a Selected Elective course.

   Specific Goals for the Course:

   a. Course Outcomes:

      1. Students will be able to derive features from a data set using either intuition or standard
         feature sets.
      2. They will then be able to take a new sample and to classify the sample into one of a
         number of possible classes.
      3. Students will appreciate the difference between supervised and unsupervised learning.
      4. Students will be able to implement such classification systems in software and to assess
the efficacy of their implementations.

- **ABET Student Learning Outcomes**:
  
  (a) Ability to apply mathematics, science and engineering principles.
  (b) Ability to design and conduct experiments, analyze and interpret data.
  (c) Ability to design a system, component, or process to meet desired needs.
  (e) Ability to identify, formulate and solve engineering problems.
  (g) Ability to communicate effectively.
  (j) Knowledge of contemporary issues.
  (k) Ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

- **Brief List of Topics to be Covered**:

  1. Bayesian decision theory
  2. Nonparametric methods
  3. Linear discriminant functions
  4. Learning theory
  5. Basic Machine Learning