**Elective-III: Pattern Recognition**

**Unit I:** Introduction: Pattern Recognition Systems, Design Cycle, Applications of pattern recognition, Learning and Adaption-Supervised, Unsupervised and Reinforcement Learning.

**Unit II:** Probability: Introduction to Probability, Probability of events, Random variables, Probability Distributions, Joint Distribution and Densities, Moments of Random Variables, Estimation of Parameters from samples, Minimum Risk Estimators.

**Unit III:** Statistical Decision Making: Bayes’ Decision Theory, Multiple Features, Conditionally Independent Features, Decision Boundaries, Unequal costs of Error, Estimation of Error Rates, Leaving-one-out Technique, Confusion Matrix, Characteristic Curves.

**Unit IV:** Classifiers: Hidden Markov Model, Support Vector Machine, Artificial Neural network-back Propagation Algorithm and Fuzzy based classifiers.

**Unit V:** Non Parametric Decision Making: Introduction, Histograms, Kernel and window Estimators, Nearest Neighbor classification Technique, Adaptive Decision Boundaries, Adaptive Discriminate Functions, Minimum Squared Error Discriminate Functions.

**Unit VI:** Clustering: Introduction, Hierarchical clustering, Partitional Clustering.

**Text Book:** 1. Pattern Recognition and Image Analysis, Earl Gose, Richard Johnsonbaugh and Steve Jost, PHI, 1996.

**Reference Book:** 1. Pattern Classification, Richard O Duda, Peter E. Hart and David G. Stork, John Wiley, 2000