



PATTERN RECOGNITION AND APPLICATION

PROF. PRABIR KUMAR BISWAS

Department of Electrical Engineering
IIT Kharagpur

TYPE OF COURSE : Rerun | Elective | UG | PG

COURSE DURATION : 12 weeks (26 Jul'21 -15 Oct'21)

EXAM DATE : 23 Oct 2021

INTENDED AUDIENCE : Any Interested Learner

COURSE OUTLINE :

The course has been designed to be offered as an elective to final year under graduate students mainly from Electrical Sciences background. The course syllabus assumes basic knowledge of Signal Processing, Probability Theory and Graph Theory. The course will also be of interest to researchers working in the areas of Machine Vision, Speech Recognition, Speaker Identification, Process Identification etc. The course covers feature extraction techniques and representation of patterns in feature space. Measure of similarity between two patterns. Statistical, nonparametric and neural network techniques for pattern recognition have been discussed in this course. Techniques for recognition of time varying patterns have also been covered. Numerous examples from machine vision, speech recognition and movement recognition have been discussed as applications. Unsupervised classification or clustering techniques have also been addressed in this course. Analytical aspects have been adequately stressed so that on completion of the course the students can apply the concepts learnt in real life problems.

ABOUT INSTRUCTOR :

Prof. Prabir Kumar Biswas is professor and head of the department of Electronics & Electrical Communication Engineering IIT Kharagpur. His research areas are Image Processing, Computer Vision, Automated Visual Inspection, Multimedia Network, Pattern Recognition and Sensor Network. He had received Humboldt Fellow award in 2002. He is a senior member Institute of Electrical and Electronics Engineers, USA.

COURSE PLAN :

Week 1 : Introduction; Feature Extraction - I & II

Week 2 : Bayes Decision Theory - I & II

Week 3 : Normal Density and Discriminant Function - I & II, Bayes Decision Theory - Binary Features

Week 4 : Maximum Likelihood Estimation, Probability Density Estimation - I

Week 5 : Probability Density Estimation - II, III & IV

Week 6 : Dimensionality Problem, Multiple Discriminant Analysis

Week 7 : Principal Component Analysis - Tutorial, Multiple Discriminant Analysis - Tutorial, Perceptron Criteria - I

Week 8 : Perceptron Criteria - II, MSE Criteria

Week 9 : Linear Discriminator Tutorial, Neural Network - I & II

Week 10 : Neural Network - III/ Hopfield Network, RBF Neural Network - I

Week 11 : RBF Neural Network - II, Support Vector Machine, Clustering - I

Week 12 : Clustering - II & III