CENTRAL UNIVERSITY OF KERALA
DEPARTMENT OF COMPUTER SCIENCE
M.Sc. COMPUTER SCIENCE

CORE COURSE					
COURSE CODE	COURSE TITLE	CONTACT HRS/WEEK			CREDITS
		LEC	LAB	TUT	
CSC5202	Pattern Recognition	2	2	1	4

Lec = Lecture, Tut = Tutorial, Lab = Practical

This is a participatory and problem solving **skill development course**.

Course Objective

The objective of the course is to provide theoretical and practical aspects of pattern recognition.

By completing this course, students will obtain the following course/learning outcomes:

1. Knowledge to be gained:
   (i) Knowledge in mathematical and statistical techniques used in pattern recognition
2. Skill to be gained:
   (ii) Develop methods and algorithms for pattern recognition applications
3. Competency to be gained:
   (iii) Model real world pattern recognition problems.

Prerequisites: Basic knowledge in mathematics and statistics.

Grading:

Lab experiments and implementation	– 15%
Class Test	- 10%
Assignment/Quiz/presentation	– 5%
Lab Test	- 10%
Final Exam	– 60%

CSC5202 – Pattern Recognition

Module 1

Pattern Recognition Systems – Definitions, data representation, representations of patterns and classes. Types of pattern recognition systems. Applications of pattern recognition systems. Bayesian decision making and Bayes Classifier for continuous and discrete features.

Module 2

Min-max and Neymann-Pearson classifiers, Discriminant functions, decision surfaces. Maximum likelihood estimation and Bayesian parameter estimation. Overview of Nonparametric density estimation – Histogram based approach, classification using Parzen window.

Module 3

K-nearest neighbour estimation and classification. Classification of clustering algorithms – hierarchical clustering – agglomerative clustering. Partitional clustering – Forgy's algorithm. K-means clustering.

Module 4

Introduction to feature selection – filter method – sequential forward and backward selection algorithms. Wrappers method and embedded methods. Feature extraction methods – principal component analysis, fisher linear discriminant analysis, ICA.

References:

1. Duda R.O., Hart P.E., Stork D.G., *Pattern Classification*, John Wiley and Sons, 2nd Edition, 2001
2. Bishop C.M., *Pattern Recognition and Machine Learning,* Springer, 2nd Edition, 2006
3. Theodoridis S., Pikrakis A., Koutroumbas K., Cavouras D., *Introduction to Pattern Recognition: A Matlab approach*, Academic Press, 2010