PATTERN RECOGNITION

Course Code	20EC6601A	**Year**	III	**Semester**	II
Course Category	HONORS 3	**Branch**	ECE	**Course Type**	THEORY
Credits	4	**L-T-P**	3-1-0	**Prerequisites**	--
Continuous Internal Evaluation	30	**Semester End Evaluation**	70	**Total Marks:**	100

Course Outcomes	
Upon successful completion of the course, the student will be able to	
CO1	Outline basic concepts of pattern recognition.(L2)
CO2	Classify decision-making algorithms in pattern recognition. (L4)
CO3	Apply Hierarchical and Partition clustering techniques in pattern recognition applications.(L3)
CO4	Analyze feature selection algorithms in pattern recognition.(L4)

Mapping of course outcomes with Program outcomes (CO/ PO/PSO Matrix)

Note: 1- Weak correlation 2-Medium correlation 3-Strong correlation

* - Average value indicates course correlation strength with mapped PO

COs	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2									1			1	1
CO2		3								2			2	2
CO3	3									2			2	2
CO4		2								2			2	2
Average * (Rounded to nearest integer)	**2**	**2**								**2**			**2**	**2**

Syllabus		
Unit No.	**Contents**	**Mapped CO**
I	**Introduction**: Basic concepts, Applications, Fundamental problems in pattern Recognition system design, Design concepts and methodologies, Simple pattern recognition model.	CO1
II	**Statistical Decision Making**: Introduction, Baye's theorem, Multiple features, Conditionally independent features, Decision boundaries, Unequal cost of error, estimation of error rates, the leaving-one-out-techniques, characteristic curves, estimating the composition of populations.	CO1,CO2
III	**Non Parametric Decision Making:** Histogram, kernel and	CO1,CO2

	window estimation, nearest neighbour classification techniques. Adaptive decision boundaries, adaptive discriminant functions, Minimum squared error discriminant functions, choosing a decision making techniques	
IV	**Clustering and Partitioning:** Hierarchical Clustering: Introduction, agglomerative clustering algorithm, the single-linkage, complete-linkage and average-linkage algorithm. Ward's method Partition clustering - Forg's algorithm, K-means's algorithm, Isodata algorithm.	CO1,CO3
V	**Pattern Pre-Processing and Feature Selection:** Introduction, distance measures, clustering transformation and feature ordering, clustering in feature selection through entropy minimization, features selection through orthogonal expansion, binary feature selection, Applications of Pattern Recognition in bio-metric, facial recognition, Finger prints, etc	CO1,CO4

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Learning Resources
Text Books
1. Gose. Johnsonbaugh, Jost. Pattern recognition and Image Analysis, PHI. 1996 2. Tou. Rafael. Gonzalez. Pattern Recognition Principle, Pearson Education. 1975
Reference Books
1. Richard duda, Hart., David Strok, Pattern Classification, John Wiley ,2nd Edition 2000. 2. Theodoridis, S. and K. Koutroumbas, Pattern recognition, 4th Ed. 2009, San Diego, CA: Academic Press.
