



National Institute of Technology Meghalaya
An Institute of National Importance

CURRICULUM

Programme	Bachelor of Technology in Electronics and Communication Engineering	Year of Regulation	2018-19
Department	Electronics and Communication Engineering	Semester	VIII
Course Code	Course Name	Credit Structure	Marks Distribution
		L T P C	INT MID END Total
EC 418	Pattern Recognition and Applications	3 0 0 3	50 50 100 200
Course Objectives	To study the fundamentals of pattern recognition.	Course Outcomes	CO1 Ability to understand the fundamentals of pattern recognition.
	To study the various parameter based estimation methods.		CO2 Ability to analyse the various parameter based estimation methods.
	To study some dimensionality reduction methods.		CO3 Ability to analyse some dimensionality reduction methods.
	To study the fundamentals of artificial neural networks.		CO4 Ability to understand the fundamentals of artificial neural networks.

No.	COs	Mapping with Program Outcomes (POs)												Mapping with PSOs			
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
1	CO1	3	1	1	-	1	-	-	-	-	-	-	-	3	1	1	-
2	CO2	3	3	3	2	3	-	-	-	-	-	-	-	3	2	-	-
3	CO3	3	2	2	-	2	-	-	-	-	-	-	-	3	2	-	-
4	CO4	3	3	3	2	3	-	-	-	-	-	-	-	3	1	1	-

SYLLABUS

No.	Content	Hours	COs
I	Introduction: Introduction to statistical pattern recognition, Bayes Decision Theory: Minimum-error-rate classification. Classifiers, Discriminant functions, Decision surfaces. Discrete features.	10	CO1
II	Parameter Estimation Methods: Maximum-Likelihood estimation, Bayesian estimation, Unsupervised learning and clustering - Criterion functions for clustering. Algorithms for clustering: K-Means, Hierarchical and other methods. Cluster validation. Gaussian mixture models, Expectation-Maximization method for parameter estimation. Hidden Markov Models (HMMs). Discrete HMMs. Continuous HMMs.	9	CO2
III	Dimensionality reduction: Principal component analysis - it relationship to eigen analysis. Fisher discriminant analysis - Generalised eigen analysis.	8	CO3
IV	Artificial neural networks: Multilayer perceptron - feedforward neural network. A brief introduction to deep neural networks, convolutional neural networks, recurrent neural networks.	8	CO4
Total Hours		35	

Essential Readings

- R. O. Duda, P. E. Hart and D. G. Stork, "Pattern classification", John Wiley & Sons, 2nd edition, 2002.
- C. M. Bishop, Neural Networks for Pattern Recognition, Oxford University Press, 1st edition, 1995.

Supplementary Readings

- C.M.Bishop, Pattern Recognition and Machine Learning, Springer, 1st edition, 2006.