



Department of Computer Science & Engineering

National Institute of Technology, Jamshedpur

(An Institution of national importance under MHRD, Govt. of India)

SPRING SEMESTER (B.Tech8ndSem.) 2019 - 2020

Course Handout

Course No. : CS803
Course Title :Pattern Recognition (4-1-1)
Instructor-In-Charge :Dr. Koushlendra Kumar Singh

COURSE OBJECTIVE:

To expose students to advance techniques of pattern classification methodology with image processing, signal processing applications etc. Pattern recognition techniques are used to design automated systems that improve their own performance through experience. This course covers the methodologies, technologies, and algorithms of statistical pattern recognition from a variety of perspectives.

PREREQUISITES:

Students taking this course should be familiar with linear algebra, probability, random process, and statistics. In addition, programming experience (MATLAB/C/C++) will be helpful.

REFERENCES:

- Primary reference: Christopher M. Bishop, Pattern Recognition and Machine Learning (PRML). Springer, 2006.
- Secondary reference: David J. C. MacKay, *Information Theory, Inference, and Learning Algorithms*. Cambridge University Press, 2003. [Free online, and apparently better than Harry Potter, unless one speaks Welsh or Latin.

TEXT BOOKS:

Pattern classification, Richard O. Duda, Peter E. Hart, David G. Stork

COURSE PLAN:

Serial No.	Topics	No. of Lectures	PRML Chapters
1.	Introduction, Revision of Probability Theory and Distributions	1-8	1, 2
2.	Supervised Learning: Linear Regression Models	9-10	3
3.	Supervised Learning: Classification, Linear Discriminant Analysis	11-12	4
4.	Supervised Learning: Kernels, Support Vector Machines	13-16	6,7

Serial No.	Topics	No. of Lectures	PRML Chapters
5.	Supervised Learning: Neural Networks, Deep Learning	17-21	5
6.	Feature Selection	22	
7.	Naïve Bayes, Probabilistic Graphical Models	23-26	8
8.	Unsupervised Learning: Clustering, Mixture Models, Expectation-Maximisation	27-29	9
9.	Unsupervised Learning: Latent Variables, Component Analysis	30-34	12
10.	Hidden Markov Models	35-38	13
11.	Semi-Supervised Learning	39-41	

EVALUATION SCHEME:

EC No.	Evaluation Component	Duration	Weightage	Nature of Component
1.	Mid Sem	2 Hrs	30%	Closed Book
2.	End Sem Exam	3 Hrs	50%	Closed Book
3.	Surprise Quizzes/ Project/ Teacher assessment		20%	Presentation/ Take home

Notices: All notices regarding the course will be mailed to the students.

Instructor In-Charge