

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPT./CENTRE: **Computer Science and Engineering**

1. Subject Code: **CSN - 382** Course Title: **Machine Learning**

2. Contact Hours: **L: 3 T: 1 P: 0**

3. Examination Duration (Hrs.): **Theory**

0	3
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Practical

0	0
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4. Relative Weightage: **CWS**

15

PRS

15

MTE

30

ETE

40

PRE

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5. Credits:

0	4
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 6. Semester

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Autumn **Spring** **Both**

7. Pre-requisite: **CS - 103, CS-371**

8. Subject Area: **DEC**

9. Objective: To provide an understanding of the research advances and different techniques of pattern recognition and machine learning.

10. Details of the Course:

Sl. No.	Contents	Contact Hours
1.	Introduction: Overview of learning, Supervised vs Unsupervised learning, Patterns and Features, Pattern Recognition approach and its applications.	06
2.	Classification Techniques: Nearest Neighbors, Decision Trees, Perceptrons, Neural Network, Support Vector Machine.	08
4.	Unsupervised Methods: Curse of Dimensionality, Principal Component Analysis, Linear Discriminant Analysis, K-Means, Expectation Maximization, Vector Quantization, SOM.	08
5.	Bayesian Network Fundamentals: Probability basics, Inference and Learning in Bayesian Networks, Belief Propagation, Graphical Models, Hidden Markov Models.	08
6.	Classifier Ensembles: Bagging, Boosting, AdaBoost, Random Forests.	06
7.	Evolutionary Algorithms: Genetic Programming, Evolutionary strategies, Particle swarm optimization, Ant Colony Optimization.	06
	Total	42

11. Suggested Books:

Sl. No.	Name of Books / Authors	Year of Publication
1.	C.M. Bishop. "Pattern Recognition and Machine Learning", Springer.	2006
2.	R. Duda, P. Hart and D. Stork. "Pattern Classification", Wiley	2001
3.	A. E. Eiben, J. E. Smith, "Introduction to Evolutionary Computing". Springer.	2008
4.	T. Mitchell. "Machine Learning", McGraw Hill	1997