Machine Learning	**3**	**0**	**2**	and Stochastic Processes, Linear Algebra

Course Objective: 1. To understand various key paradigms for machine learning approaches.
2.To familiarize with the mathematical and statistical techniques used in machine learning.
3. To understand and differentiate among various machine learning techniques.

S. NO.	Course Outcomes (CO)
CO1	Understand the fundamental concepts and algorithms of machine learning
CO2	Develop a comprehensive understanding of fundamental machine learning concepts, algorithms, and techniques, including supervised and unsupervised learning, classification, regression, clustering, and dimensionality reduction.
CO3	Apply principles and algorithms to evaluate models generated from data
CO4	Learn to critically evaluate the performance of machine learning models using appropriate metrics
CO5	Develop the ability to identify and formulate problems suitable for machine learning solutions, design appropriate models, and interpret results in practical applications.

S. NO.	Contents	Contact Hours
UNIT 1	Introduction to Machine Learning: Overview of different tasks: classification, regression, clustering, Concept of learning, Types of the Machine Learning, Data Table, Information System, Data Representation, diversity of data, Basic Linear Algebra and Probaboliy Theory, Optimization: Maximum likelihood, Expectation maximization, Gradient descent, Bias-Variance Tradeoff, Metrics to Evaluate Classification and Regression models	**14**
UNIT 2	Supervised Learning: Linear Regression, Logistic Regression, Baysian Decision Theory, Naïve Bayes, K-Nearest Neighbour, Support Vector Machine, Decision trees, Ensemble Classifier, Random Forest, Linear Classifiers and Kernels, Neural Networks, Deep Neural Network, Fundametals of Deep Learning: DNN, CNN.	**14**
UNIT 3	Unsupervised Learning: Clustering, Expectation Maximization, K-Mean Clustering, Hierarchical vs Partitional Clustering, Gaussian Mixture Model, Dimensionality Reduction, Feature Selection, PCA, factor analysis, manifold learning.	**14**
	TOTAL	**42**

REFERENCES

S.No.	Name of Books/Authors/Publishers	Year of Publication / Reprint
1	Introduction to Machine Learning, Alpaydin, E.,PHI Learning Pvt. Ltd.	2015
2	Machine Learning, Tom Mitchell, McGraw Hill	2017
3	Applied Machine Learning by M.Gopal|, McGraw Hill, ISBN: 978-9354601590	2021

4	Understanding Machine Learning: From Theory to Algorithms, 1st Edition,by Shai Shalev-Shwartz, Cambridge University Press	2015
5	Pattern Recognition and Machine Learning by Christopher Bishop, Springer Verlag	2006
6	Pattern Classification by Richard Duda, Wiley Publisher	2007

FIFTH SEMESTER

B.Tech. Information Technology				
Course code: Course Title	**Course Structure**			**Pre-Requisite**
Compiler Design	**L**	**T**	**P**	Principles of computing
	3	**0**	**2**	