

**Course code: CS-631 T****Course Title: A1. Machine Learning**

Total Credit: 2

Marks: 50 (UA: 40 + IA: 10)

Periods: 3 per week (50 Minutes each)

**Prerequisites :-** Programming and Data Structure, Algorithms and Statistics**Learning Objectives**

- To introduce the students with concepts of machine learning,
- machine learning algorithms and building the applications using machine learning for various domains.

**Learning Outcomes**

On completion of the course, the students will be able to:

- Explore the fundamental issues and challenges in Machine Learning including data and model selection and complexity.
- Appreciate the underlying mathematical relationships within and across Machine Learning algorithms
- Evaluate the various Supervised Learning algorithms using appropriate Dataset.
- Evaluate the various unsupervised Learning algorithms using appropriate Dataset.
- Design and implement various machine learning algorithms in a range of real-world applications.

**Course Outline**

**Unit – 1: Introduction to Machine Learning:** Overview of Human Learning and Machine Learning, Types of Machine Learning, Applications of Machine Learning , Tools and Technology for Machine Learning. **Preparing to Model:** Machine Learning activities, Types of data in Machine Learning, Structures of data, Data quality and remediation, Data Pre-Processing: Dimensionality reduction, Feature subset selection.

**Unit – 2 :** Modelling and Evaluation: Selecting a Model: Predictive/Descriptive, Training a Model for supervised learning, model representation and interpretability, Evaluating performance of a model, Improving performance of a model. **Basics of Feature Engineering:** Feature and Feature Engineering, Feature transformation: Construction and extraction, Feature subset selection : Issues in high-dimensional data, key drivers, measure and overall process.

**Unit – 3:** Bayesian Concept Learning: Impotence of Bayesian methods, Bayesian theorem, Bayes' theorem and concept learning, Bayesian Belief Network.

**Unit – 4 : Supervised Learning: Classification and Regression:** Supervised Learning, Classification Model, Learning steps, Classification algorithms, Regression, Regression algorithms,

**Unit– 5: Test and Tutorial****Reference Books :**

1. Machine Learning, Saikat Dull, S. Chjandramouli, Das, Pearson
2. Machine Learning with Python for Everyone, Mark Fenner, Pearson
3. Machine Learning, Anuradha Srinivasaraghavan, Vincy Joseph, Wiley
4. Machine Learning with Python, U Dinesh Kumar Manaranjan Pradhan, Wiley
5. Python Machine Learning, Sebastian Raschka, Vahid Mirjalili, Packt Publishing